INTERNATIONAL CIVIL AVIATION ORGANIZATION

REPORT OF THE FIFTH MEETING OF THE RUNWAY AND GROUND SAFETY WORKING GROUP

(RGS WG/5)

(Cairo, Egypt, 25 – 27 November 2018)

The views expressed in this Report should be taken as those of the MID Region Runway and Ground Safety Working Group (RGS WG) and not of the Organization. This Report will, however, be submitted to the RASG-MID and any formal action taken will be published in due course as a Supplement to the Report.

Approved by the Meeting
and published by authority of the Secretary General

TABLE OF CONTENTS

Page

PART I – HISTORY OF THE MEETING

1. PLACE AND DURATION

1.1 The Fifth meeting of the Runway and Ground Safety Working Group (RGS WG/5) was held at the ICAO Middle East Regional Office in Cairo, Egypt, from 25 to 27 November 2018.

2. OPENING

2.1 The meeting was opened by Mr. Mohamed Smaoui, Deputy Regional Director, ICAO Middle East (MID) Office. Mr. Smaoui welcomed all the participants to Cairo. He recalled that the RGS WG is established to promote the runway and ground safety in the MID Region in line with the MID Aviation Safety Strategy. The RGS WG is supportting the RASG-MID Steering Committee (RSC) and Regional Aviation Safety Team (MID-RAST) in the development, implementation and monitoring of Safety Enhancement Initiatives (SEIs) related to the RS Focus Area (FA).

2.2 Mr. Smaoui commended the achievement made by the RGS WG over the past years and highlighted that, in accordance with the RGS WG Terms of Reference, the meeting will address mainly the following subjects:

- implementation of Aerodrome Safety priorities and objectives in the MID Region;
- coordination between RASG-MID and MIDANPIRG in the area of Aerodromes; and
- review and update the list of air navigation deficiencies in the AOP field.

2.3 In closing, Mr. Smaoui thanked the participants for their attendance and wished the meeting every success in its deliberations.

3. ATTENDANCE

3.1 The meeting was attended by a total of twenty-six (26) participants from seven (7) States (Egypt, Iran, Libya, Qatar, Sudan, UAE and USA) and one (1) International Organization (IATA). The list of participants is at **Attachment A**.

4. OFFICERS AND SECRETARIAT

4.1 The meeting was chaired by Mr. Mohammad Faisal Al Dossari, Director Air Navigation & Aerodromes Department, General Civil Aviation Authority, UAE.

4.2 Mr. Mohamed Iheb Hamdi, Regional Officer, Aerodromes and Ground Aids (RO/AGA) was the Secretary of the meeting.

4.3 Mr. Yong Wang, Chief, Airport Operations and Infrastructure Section, ANB from ICAO Headquarters in Montreal supported the meeting.

5. LANGUAGE

5.1 Discussions were conducted in English and documentation was issued in English.

6. AGENDA

6.1 The following Agenda was adopted:

Agenda Item 1: Adoption of the Provisional Agenda

Agenda Item 2: Global and Regional Development related to RGS

Agenda Item 3: Implementation of Aerodrome Safety priorities and objectives in the MID Region (Aerodrome Certification, Runway Safety, Aerodrome Safeguarding, Wildlife Management, Aerodrome Emergency Planning, etc…)

Agenda Item 4: Coordination between RASG-MID and MIDANPIRG in the area of Aerodromes

Agenda Item 5: AOP Air Navigation Deficiencies

Agenda Item 6: Future Work Programme

Agenda Item 7: Any other business

7. CONCLUSIONS AND DECISIONS – DEFINITION

7.1 All RASG-MID Sub-Groups and Task Forces record their actions in the form of Conclusions and Decisions with the following significance:

a) **Conclusions** deal with matters that, according to the Group's terms of reference, merit directly the attention of States and its stakeholders/partners, or on which further action will be initiated by the Secretary in accordance with established procedures; and

b) **Decisions** relate solely to matters dealing with the internal working arrangements of the Group and its subsidiary bodies.

8. LIST OF DRAFT CONCLUSIONS AND DRAFT DECISIONS

DRAFT CONCLUSION 5/1: *MID REGIONAL WORKSHOP ON GRF*

DRAFT CONCLUSION 5/2: *PLAN ON AERODROMES CERTIFICATION*

DRAFT CONCLUSION 5/3: *AIRPORT AND PUBLIC HEALTH EMERGENCY PLANNING*

DRAFT CONCLUSION 5/4: *AIRPORT MASTER PLAN*

PART II: REPORT ON AGENDA ITEMS

REPORT ON AGENDA ITEM 1: ADOPTION OF THE PROVISIONAL AGENDA AND ELECTION OF CHAIRPERSON

1.1 The meeting reviewed and adopted the Agenda as at paragraph 6.1 of the History of the Meeting.

REPORT ON AGENDA ITEM 2: GLOBAL AND REGIONAL DEVELOPMENT RELATED TO RGS

Outcome of Thirteenth Air Navigation Conference (AN-Conf/13)

2.1 The subject was addressed in WP/2, presented by the Secretariat. The meeting noted the outcome of Thirteenth Air Navigation Conference (AN-Conf/13) (Montréal, Canada, 9-19 October 2018) and recalled that AN-Conf/13 developed number of Recommendations related to RGS as outlined in **Appendix 2A.** The meeting supported the recommendations and agreed to include them in the work programme of the Group in order to agree on further follow up actions as deemed necessary.

Global Reporting Format (GRF)

2.2 The subject was addressed in WP/3, presented by the Secretariat. The meeting recalled that the Amendment 1 to the PANS Aerodromes (applicability date 5 November 2020) introduced the Global Reporting Format (GRF) for assessing and reporting runway surface conditions, as **at Appendix 2B.**

2.3 The meeting noted that a Global ICAO/ACI Symposium on Implementation of the New Global Reporting Format for Runway Surface Condition (GRF2019) will be held in Montréal, Canada from 26 to 28 March 2019. The objective of the Symposium is to support the deployment of the GRF, taking into account the relevant ICAO supporting guidance materials. Invitation Letter and the initial Agenda of the Symposium is at **Appendix 2C**. The meeting encouraged States to actively participate in the Symposium.

2.4 In line with the above, the meeting highlighted the need to organize a MID Regional Workshop on GRF to support the GRF Implementation at the Regional level. Accordingly, the meeting agreed to the following Draft Conclusion:

DRAFT CONCLUSION 5/1: MID REGIONAL WORKSHOP ON GRF

That, the ICAO MID Office organize a Regional Workshop on GRF in 2020.

2.5 The meeting recalled that the RGS WG/4 meeting (Cairo, Egypt, 5-7 November 2017), through Draft Conclusion 4/5, agreed that an Advisory Circular on Monitoring and Reporting of Runway Surface Condition should be developed in the MID Region. Considering the developments of the GRF and its relevant Guidance Materials at the global level, the meeting agreed to postpone the development of any Regional Guidance Material and/or documents to be in line with the outcome of the above-mentioned Global GRF Symposium.

Outcome of RASG-MID/6 and RSC/6

2.6 The subject was addressed in WP/4, presented by the Secretariat. The meeting reviewed the progress made for the implementation of the RASG-MID/6 and RSC/6 Conclusions and Decisions as at **Appendices 2D** and **2E**, respectively.

REPORT ON AGENDA ITEM 3: IMPLEMENTATION OF AERODROME SAFETY PRIORITIES AND OBJECTIVES IN THE MID REGION

Review and Update of the MID Region Safety Strategy Targets related to RGS

3.1 The subject was addressed in WP/5 and WP/6 presented by the Secretariat. The meeting reviewed the MID Region Safety Indicators status and Safety Targets related to RGS as detailed in **Appendix 3A**.

3.2 The meeting noted that the MID Region Safety Strategy was revisited during the Fourth MID Region Safety Summit (Riyadh, 2-3 October 2018). The list of Safety Indicators and Targets, as reviewed and amended by the Summit as at **Appendix 3B** will be presented to the RASG-MID/7 meeting for endorsement.

Aerodrome Certification

3.3 The subject was addressed in WP/5 presented by the Secretariat. The meeting reviewed the updated status of Aerodrome Certification in the MID Region as at **Appendix 3C**. It was highlighted that 34 out of 58 International Aerodromes (representing 59%) had been certified in the MID Region.

3.4 The meeting noted that the ICAO MID Regional Office received request from Jordan to delete AMMAN/Marka Airport (OJAM) from the list of International Aerodromes. Accordingly, the Table AOP I-1has been updated and approved by the President of the Council on 21 February 2018.

3.5 Egypt highlighted that Luxor International Airport (HELX) has been already certified and the International Airport of Borj El Arab is going to be certified by the end of 2018.

3.6 Sudan highlighted that Nayala International Airport is going to be certified by December 2018.

3.7 The meeting noted with concern that there is variation in the level of Aerodrome Certification implementation in the MID Region. The meeting agreed that ICAO MID Office will issue a State Letter to request States to provide an updated status of Certified International Aerodromes.

3.8 The meeting recalled that the AN-Conf/13 recommended that States should establish a plan for the Certification of Aerodromes under their jurisdictions. Accordingly, the meeting agreed to the following Draft Conclusion:

DRAFT CONCLUSION 5/2: PLAN ON AERODROMES CERTIFICATION

That, States, that have not yet completed the certification of all their international aerodromes, be urged to provide the ICAO MID Office, before 15 February 2019 with their plan for the Certification of the remaining Aerodromes.

Runway Safety Teams and RS Go-Teams

3.9 The subject was addressed in WP/5 presented by the Secretariat. The meeting was apprised of the status of implementation related to the establishment of Runway Safety Teams at International Aerodromes as at **Appendix 3D**. The Safety Target related to the establishment of RSTs is 50% by 2020, which is achieved, since the current status is 57 %.

3.10 The meeting noted that the RS Go-Team visit to Muscat was successfully conducted (29 October - 1 November 2018). The main objective of the RS Go-Team visit was to provide necessary assistance to Oman Public Authority of Civil Aviation (PACA) and the Aerodrome Operator (Oman Airports) to foster the activities of the Runway Safety Team (RST) at Muscat International Airport, through the conduct of a peer-review; as well as to provide support to the State in improving runway safety and the implementation of Aerodrome Certification.

3.11 The meeting reiterated that States should take necessary actions to ensure establishment of RST at international aerodromes and request RS Go-Team visits, as required.

MID Annual Safety Report (ASR) and Runway Safety Priorities and Analysis in the MID Region

3.12 The subject was addressed in WP/7, PPT/1 and PPT/2 presented by the Secretariat. Based on the outcome of the MID-ASRT/3 meeting (Cairo, Egypt, 202-22 November 2018) and the 7th Edition of the MID-ASR covering the period 2013-2017, it was highlighted that:

- The MID Region had an accident rate of **1.45** accidents per million departures in 2017, which is below the global rate **(2.4)**.

- The 5-year average accident rate (2013-2017) is **2.67**, which is equal to the global average rate for the same period.

- The MID Region had no fatal accidents in 2013 and 2017. However, three fatal accidents occurred in 2014, 2015 and 2016. The 2014 accident caused 38 fatalities, 224 fatalities were registered in 2015 and 1 fatality in 2016.

- No Controlled Flight Into Terrain (CFIT) related accident occurred in the MID Region for the period 2013-2017.

3.13 The Focus Areas identified as follows:

1. Runway Safety (RS)- (mainly RE and ARC during landing);
2. Loss of Control Inflight - (LOC-I);
3. Controlled Flight Into Terrain- (CFIT); and
4. Mid Air Collision- (MAC).

3.14 The emerging risks identified based on the analysis of the data available, are:

1. Fire/Smoke (non-impact) – (F-NI);
2. Wake turbulence;
3. Runway Incursion-(RI);
4. Bird Strike- (BIRD); and
5. Security- (SEC)

3.15 With respect to the proactive safety information, the meeting noted that the regional average overall Effective Implementation (EI) in the MID Region is 73.24 %, which is above the world average 66.27% (as of 10 October 2018). Three (3) States are currently below EI 60%.

3.16 The meeting recognized that the top contributory factors for Runway Excursion and Runway Incursion include:

- *for Runway Excursion*: Regulatory Oversight, Safety management, Training; Manual handling/flight controls, SOP adherence, Failure to GAO around after un-stabilized approach; Meteorology, Airport facilities, Poor/faint marking/signs or runway/taxiway, Contaminated runway-Poor braking action; Long/floated/bounced/firm/off-center and Vertical/Lateral/speed deviation; and

- *for Runway Incursion*: Regulatory Oversight, Safety management, Training; Pilots factors, Airside vehicle drivers factors, Air Traffic controllers factors, Communication error, Meteorology and Airport facilities.

3.17 The meeting reviewed the recommended actions related to the Runway Excursion and the Runway Incursion contained in the Global Runway Safety Action Plan at **Appendix 3E**; and urged States to take necessary measures to implement these recommended actions, where appropriate.

Follow up on the SEIs related to RGS

3.18 The meeting reviewed the progress achieved in the implementation of the SEIs related to RGS as reflected in the following table:

SEIs / Description	Deliverables	Status	Follow up Actions
MID-RAST/RGS/1 Un-stabilized Approach		***Transferred to RAST (CFIT)***	To be deleted from the RGS list of SEIs
MID-RAST/RGS/2 Development of guidance material and training programmes to support the creation of action Plans by the Runway Safety Team (RST)	*Develop and issue Stop Bar guidance documentation for consideration of LRSTs*	***Completed***	**Champion**: UAE
	Organize a Workshop for Regional RST Go-Teams		
	Develop and issue regulatory framework supporting establishment of LRSTs		
	Develop and issue a model checklist for LRSTs		
MID-RAST/RGS/3 Development of guidance material and training programmes to support Aerodrome Infrastructure and Maintenance Management	*Conduct a MID-Regional Runway Safety Seminar*	***In Progress (first Draft to be distributed by June 2019)***	4 out of 5 actions of the SEIs actions have been completed and the remain deliverable will be concluded by 2018. **Champion**: UAE
	Organize a Regional Aerodrome Certification Workshop		
	Develop a MID-Region Aerodrome Certification toolkit for States.		
	Develop and issue guidance material on periodic surveillance audits of Aerodrome Infrastructure and Maintenance		
	Develop and issue guidance material as RSA on proactive oversight of Aerodrome Infrastructure Development		
MID-RAST/RGS/4 Aerodrome Safeguarding	*Safeguarding Guidance Toolkit (RSA 11)*	***Completed***	**Champion**: EGYPT
	Regional Safeguarding Workshop		
MID-RAST/RGS/5 Wildlife Hazard Management and Controls	*RSA for Regulatory Framework & Guidance Materials*	***In Progress***	2 out of 3 actions have been completed. Sudan will host a Workshop on Wildlife Management Control in Khartoum from 10-12 December 2018. **Champion**: SUDAN
	Wildlife Hazard Management Plan Template		
	Wildlife Management Control Workshop		

MID-RAST/RGS/6 Laser Attacks	*RSA for Guidance Material* *Amended RSA-12* *ICAO to issue State Letter to promulgate regulations on Laser Attacks* *RSA with Case Studies*	***Completed***	**Champion**: EGYPT
MID-RAST/RGS/7 Ground Handing Operations and Safety	*RSA for Aerodrome Apron Management* *Seminar on Ground Handling (Safety)*	***In Progress***	Development of an Advisory Circular on Apron Management Safety. **Champion**: UAE Ground Handling Seminar will be held back to back with the RGS WG/6.
MID-RAST/RGS/8 ARFF and Emergency Planning	*Develop a survey on ARFF/AEP level of implementation* *Present Survey Results to RGS WG for consideration of other required actions*	***In Progress***	Survey on ARFF/AEP Level of Implementation. **Champion**: EGYPT
MID-RAST/RGS/9 Safety Management	*Organize SMS Training/Workshop* *Develop Aerodrome SMS Compliance and Effectiveness Toolkit* *Present Toolkit at the Aerodrome SMS Workshop*	***In Progress***	Toolkit has been developed **(Champion**: UAE)
MID-RAST/RGS/10 Runway Excursions	*RSA for Monitoring and Reporting Runway Surface Conditions* *State Letter urging States to report the incidents on Annual Basis to the ICAO MID Office in conjunction with MID-ASRT.*	***In Progress***	RSA for Monitoring and Reporting Runway Surface Conditions **Champion**: FAA

Aerodromes Safeguarding

3.19 The subject was addressed in WP/9 presented by Egypt. The meeting agreed that Egypt present a WP on the subject to the next RGS WG/6 meeting to share their experience and propose the way forward.

Conducting of Full-scale Exercise to Respond to a Public Health Event (PHEIC)

3.20 The subject was addressed in WP/10 presented by Egypt. The meeting recalled that CAPSCA/7 meeting highlighted that Egypt was commended for the conduct of a full-scale simulation exercise to respond to a public health event at Borg El Arab International Airport; and for sharing this experience with the meeting. The importance of performing exercises to validate emergency plans, by all stakeholders, identify gaps and make recommendations for further improvement was highlighted, and States were encouraged to conduct similar exercises, on regular basis. Accordingly, the meeting agreed to the following Draft Conclusion:

DRAFT CONCLUSION 5/3: AIRPORT AND PUBLIC HEALTH EMERGENCY PLANNING

That, ICAO consider the review of Doc 9137-Airport Services Manual, Part 7 – Airport Emergency Planning, to include, inter-alia, provisions related to Public Health Emergency Planning in support of Annex 14 Vol 1, para. 9.1.2 & 9.1.3.

Aerodrome Emergency Plan and RFF Implementation

3.21 The subject was addressed in WP/11 presented by Egypt. The meeting recalled that the RSC/6 meeting, through RSC Conclusion 6/4, agreed that a survey on ARFF/AEP level of implementation be carried-out and the results be presented to the RGS WG/6 meeting for further course of actions.

Apron Management

3.22 The subject was addressed in WP/12 presented by UAE. The meeting recalled that the RSC/6 meeting, through RSC Conclusion 6/5, agreed that an Advisory Circular be developed on Aerodrome Apron Management.

3.23 In this regard, the meeting noted with appreciation that a Draft RSA was developed by UAE covering the Apron Management as at **Appendix 3F**. The meeting reviewed the Draft RSA and agreed that it should be finalized by UAE (Champion), Egypt and Sudan in order to be presented to the RASG-MID/7 meeting for final endorsement.

REPORT ON AGENDA ITEM 4: COORDINATION BETWEEN RASG-MID AND MIDANPIRG IN THE AREA OF AERODROME SAFETY

ASBU Implementation

4.1 The subject was addressed in WP/3 and WP/14 presented by the Secretariat. The meeting recalled that ASBU Modules B0-SURF and B0-ACDM, which have been identified by the MID Region Air Navigation Strategy as priority one, are directly related to aerodrome operations and need to be coordinated and reviewed by the RGS WG.

4.2 The meeting noted the information related to sub-elements of both B0-A-CDM and B0-SURF and was of the view to consider the main elements contained in the current MID eANP Volume III, until further discussion by ANSIG.

B0-ACDM

4.3 The subject was addressed in WP/13 presented by the secretariat. The meeting recalled that the ANSIG/3 meeting agreed through Draft Conclusion 3/3: and Draft Conclusion 3/4 on the need for designation of ACDM Focal Points for each State/International Airport for which ACDM implementation is required, Survey on ACDM implementation be presented to MSG carried out for the monitoring of ACDM implementation by the concerned international aerodromes and ACDM Workshop be organized by the ICAO MID Office in 2019.

4.4 The meeting reviewed the status of implementation of B0-ACDM, B0-ACDM Table included in the MID eANP Vol III and the Questionnaire on ACDM Implementation at **Appendices 4A, 4B and 4C**, respectively.

4.5 The meeting was apprised of the slow progress of implementation of the B0-ACDM.and encouraged States/Aerodromes required to implement ACDM to follow the recommended steps detailed in **Appendix 4D.**

B0-SURF

4.6 The subject was addressed in WP/14 presented by the secretariat. The meeting recalled that B0-SURF aims at enhancing safety and efficiency of surface operations through implementation of Advanced Surface Movement Guidance and Control System (A-SMGCS). A-SMGCS provides surveillance and alerting of movements of both aircraft and vehicles on the aerodrome thus improving runway/aerodrome safety and capacity.

4.7 A-SMGCS Levels 1-2 related to B0-SURF are to be implemented by a number of agreed international airports as included in the MID Region Air Navigation Strategy. The meeting reviewed the Performance Indicators/Supporting Metrics, Targets and status of the implementation of B0-SURF are detailed in **Appendices 4E** and **4F** respectively.

4.8 The meeting agreed that ICAO MID Office will circulate a State Letter to get the current update of the status of B0-SURF elements implementation.

Aerodrome Master Planning

4.9 The subject was addressed in WP/15 presented by the secretariat. The meeting noted the latest developments regarding airport master planning and the outcomes of ADOP/3 meetings.

4.10 Considering that the work related to the development of SARPs and Guidance material pertaining to airport master planning, has been already initiated in ICAO Headquarters, the meeting reviewed and amended the RGS/4 Draft Conclusion 4/6 for presentation to the MSG/6 meeting for endorsement, on behalf of MIDANPIRG.

4.11 Accordingly, the meeting invited States to share with the RGS WG/6 meeting their experience with regard to the implementation of airport master planning and agreed on the following Draft Conclusion:

DRAFT CONCLUSION 5/4: AIRPORT MASTER PLAN

That, States, to encourage Airport Operators to develop a Master Plan for their International Airports.

REPORT ON AGENDA ITEM 5: AOP AIR NAVIGATION DEFICIENCIES

Review of the AOP Air Navigation Deficiencies

5.1 The subject was addressed in WP/16, presented by the Secretariat. The meeting recalled that the MIDANPIRG/15 meeting, through Conclusion 15/35, urged States to use the MID Air Navigation Deficiency Database (MANDD) for the submission of requests for addition, update, and elimination of Air Navigation Deficiencies, including the submission of a specific Corrective Action Plan (CAP) for each deficiency; and agreed that a deficiency would be eliminated only when a State submit a formal Letter to the ICAO MID Office containing the evidence(s) that mitigation measures have been implemented for the elimination of this deficiency.

5.2 The meeting reviewed List of Deficiencies in the AOP field at **Appendix 5A** and noted that the lack of implementation of Aerodrome Certification represents the majority of the AOP deficiencies in the MID Region. The meeting noted with concern that the majority of deficiencies in the AOP field have no specific Corrective Action Plan (CAP). Accordingly, the meeting urged States to implement the provisions of MIDANPIRG Conclusion 15/35 related to elimination of Air Navigation Deficiencies, in particular, the submission of a specific Corrective Action Plan (CAP) for each deficiency.

REPORT ON AGENDA ITEM 6: FUTURE WORK PROGRAMME

6.1 The subject was addressed in WP/17, presented by the Secretariat. The meeting noted that the RASG-MID/7 meeting is planned to be held 15-18 April 2019, concurrently with MIDANPIRG/17.

6.2 Accordingly, the meeting agreed that the RGS WG/6 meeting be held back-to-back with the Ground Handling Workshop in November 2019. The venue will be Cairo, unless a State is willing to host the meeting.

REPORT ON AGENDA ITEM 7: ANY OTHER BUSINESS

7.1 Nothing has been discussed under this agenda item.

APPENDICES

APPENDIX 2A

Recommendations	Task Description	Follow-up Actions
Recommendation 2.1/1 – Aerodrome capacity and efficiency enhancement	That States: a) review, as needed, all options to increase aerodrome capacity, including increasing the efficiency of existing aerodrome infrastructure, reviewing the need for investment in new infrastructure and mitigating restrictions in surrounding airspace; b) establish a plan for the certification of aerodromes under their jurisdiction, in accordance with their national regulations, incorporating the identification of gaps and implementation of solutions to overcome those gaps, including the assessment and development of mitigation measures in areas of non-compliance; That ICAO: c) progress the work on the development of provisions related to aerodrome design and operations in support of aerodrome capacity and efficiency enhancement; d) explore new areas for enhancing aerodrome capacity and efficiency, including total airport management (TAM), reduced separation standards, joint civil-military aerodromes and other new initiatives and technologies such as folding wing tip (FWT); e) continue to provide assistance to States in the area of aerodrome certification; and f) monitor developments such as New Experience Travel Technologies (NEXTT) and consider the formulation of provisions, where necessary, to support its implementation.	
Recommendation 2.1/2 – Total airport management (TAM) and airport throughput	That States: a) implement airport collaborative decision-making (A-CDM) and, when appropriate, extend A-CDM to incorporate total airport management (TAM); That ICAO: b) update provisions and guidance on A-CDM by extending it to TAM with greater integration with air traffic flow management (ATFM); c) update provisions on wake turbulence and time-based separation; and d) update provisions on reduced runway separation minima.	

Recommendations	Task Description	Follow-up Actions
Recommendation 4.3/1 – Improving the performance of the air navigation system	That States: a) adopt and adapt as needed, the six-step performance management process for the planning and implementation of air navigation improvements and reflect this process in their national air navigation plans; b) align their national air navigation plans with regional plans to attain a globally harmonized performance management process and support the achievement of global performance objectives; c) support ICAO in promoting the No Country Left Behind (NCLB) initiative and reaffirm their commitment to the development of timely and accurate national air navigation plans aligned with regional and global plans; That ICAO: d) encourage the planning and implementation regional groups (PIRGs) to embrace a performance-based approach for implementation and adopt the six-step performance management process, as described in the *Manual on Global Performance of the Air Navigation System* (Doc 9883), by reflecting the process in Volume III of all regional air navigation plans; e) continue to expedite the work on performance indicators related to the *Global Air Navigation Plan* (Doc 9750, GANP), including review of the work by an appropriate group of performance experts and consider establishing such an expert group under the Global Air Navigation Plan (GANP) Study Group; and f) examine possible operational incentives in the development of new air traffic management (ATM) concepts.	
Recommendation 4.3/2 – Regional and national collaboration and implementation initiatives	That States: a) adhere to the implementation commitments agreed at the regional level, and reflected in the regional air navigation plans, in order to effectively deploy regional initiatives; b) cooperate among themselves and with the industry to strengthen State implementation provisions within the framework of the No Country Left Behind (NCLB) initiative; c) plan the modernization of their air navigation system together with all stakeholders, based on local needs and available resources, taking into account regional and global commitments;	

Recommendations	Task Description	Follow-up Actions
	d) recognize the important contribution being provided by the Africa-Indian Ocean (AFI) Plan towards the implementation of an effective regional framework for the African Air Navigation Services Provider (ANSP) Peer Review Programme to enhance the safety and efficiency of air transport operations in Africa; e) support the implementation of ICAO initiatives to improve the efficiency and effectiveness of regional processes; f) encourage the participation of high level authorities in the decision-making process for planning and implementation; That ICAO: g) encourage States, regions and international organizations to support cross-border, interregional and intra-regional collaborative planning, activities and projects, supporting effective, efficient and expeditious harmonization; h) continue to provide support to the African air navigation services provider (ANSP) Peer Review Programme; i) urge States, in coordination with the industry, to support the implementation of regional priorities; j) support the implementation of an action plan for the development of aviation infrastructure in Africa under the Comprehensive Regional Implementation for Aviation Safety in Africa (AFI Plan); k) encourage States and organizations to continue sharing surveillance data to improve safety and efficiency in air traffic management; l) encourage regional collaboration and coordination as well as the use of incentives when planning the implementation of operational improvements to enable all stakeholders to achieve the benefits expected from the implementation; and m) encourage African States and industry to continue to work together within the African Flight Procedure Programme (AFPP).	

Recommendations	Task Description	Follow-up Actions
Recommendation 6.1/1 — Draft 2020-2022 Edition of the Global Aviation Safety Plan (Doc 10004, GASP)	That States: a) agree in principle with the draft 2020-2022 edition of the *Global Aviation Safety Plan* (GASP, Doc 10004), with the inclusion of GASP goals and targets; and That ICAO: b) take into consideration input from the Conference, the questionnaire and the future work of the GASP Study Group for subsequent endorsement of the 2020-2022 edition of the GASP at the 40th Session of the ICAO Assembly.	
Recommendation 6.2/1 — Supporting Effective Safety Management Implementation	That States and international organizations: a) identify focal points for the submission of practical examples and tools to be reviewed, validated and posted on the ICAO safety management implementation (SMI) website as a means of sharing successful experiences with the aviation community; b) support the ICAO SMI website by providing practical examples of their respective safety management practices, methodologies and tools for the purpose of sharing with other Member States; That ICAO: c) commit to the ongoing development, promotion and maintenance of the safety management implementation (SMI) website in order to ensure active use of the tool and relevance of content to the aviation community; d) devise strategies to support the submission and validation of practical examples for the SMI website in the six ICAO working languages (English, Arabic, Chinese, French, Spanish, and Russian) and ensure the translation of the content posted on the website into the six ICAO working languages; e) develop initiatives tailored to each region with inputs from the regional aviation safety groups (RASGs) in support of the goals and targets of the Global Aviation Safety Plan (GASP) and Global Air Navigation Plan (GANP) with a focus on the effective implementation of State safety programmes (SSPs) and safety management systems (SMSs) at the State and service provider levels, respectively, including the development of the required safety management competencies and/or the delegation to States,	

Recommendations	Task Description	Follow-up Actions
	regional safety oversight organizations (RSOOs) and regional accident and incident investigation organizations (RAIOs); f) further support the development of appropriate harmonized safety performance indicators (SPIs) at the regional, State and service provider levels and explore the development of means to monitor the effectiveness of SSP and SMS on a more real-time basis; g) in collaboration with States, RSOOs and industry explore more powerful methods of identifying hazards and managing risk, suitable for complex socio-technical systems such as aviation and adaptable, regardless of the type of risk; h) in collaboration with States, RSOOs and industry explore the benefits of a unified framework for integrated risk management (safety, security, environment, etc…) taking into account the evolution of ISO management standards; and i) update, for adoption by the 40th Session of the ICAO Assembly, Assembly Resolutions related to safety management to reflect Amendment 1 to Annex 19 — *Safety Management*, as well as Amendment 15 to Annex 13 — *Aircraft Accident and Incident Investigation*, with consideration given to an overarching safety management Assembly Resolution to complement Assembly Resolution A39-12, Appendices A and B, related to the Global Aviation Safety Plan (GASP) and Global Air Navigation Plan (GANP) in order to focus the attention of States on key aspects of achieving effective SSP implementation.	
Recommendation 6.2.3/1 — Developing safety intelligence	That States and international organizations: a) collaborate for the development of trust sharing networks and adhere to the protective provisions as provided in Amendment 1 to Annex 19 — Safety Management; and That ICAO: b) support States with right-to-know laws in addressing the provisions for the protection of safety data, safety information and related sources in Amendment 1 to Annex 19.	

Recommendations	Task Description	Follow-up Actions
Recommendation 7.1/1 — Data-driven decision-making	That States: a) implement data-driven decision-making processes, taking into account the ICAO safety and air navigation indicators, within their safety and air navigation activities and to build data analysis capacity; b) consider using ICAO's air navigation analysis solutions, especially during the initial development of their State safety programmes (SSPs), and joining the ICAO Safety Information Monitoring System (SIMS) project to better utilize their stored data; c) exchange safety and air navigation information with other Member States through data analysis tools such as SIMS in support of safety risk management; d) continue joint development of safety risk assessment models that support and enable baseline risk quantification, safety risk assessment and forecasting to support risk-based decision making, accident and incident modeling, barrier analysis, sensitivity, and "what if?" analyses to ensure that primary safety considerations are addressed within the integrated safety risk assessment models; e) together with industry stakeholders, support regional mechanisms and platforms for greater data sharing and alignment of safety priorities; That ICAO: f) further develop and promote iSTARS and SIMS and other analysis solutions, and conduct regular iSTARS User Group Meetings so as to continually adapt to the changing safety environment; g) encourage activities that facilitate global reporting of safety events and vulnerabilities to assure that the necessary safety data is available; h) review and develop guidance to further facilitate the sharing of safety data between operators and those responsible for the type design and manufacture of aircraft; i) raise awareness in States on the importance of initiating SSP and SMS implementation with simple processes that optimize resources to demonstrate benefits and develop momentum required to achieve the needed change in the organizational culture;	

Recommendations	Task Description	Follow-up Actions
	j) take action to foster the creation of uniform processes in States that promote the sharing of safety data; k) encourage States to use the ICAO Safety Management Implementation website as an information sharing platform to facilitate the exchange of experience in regional data sharing among regional groups; and l) support regional mechanisms and platforms that enable States and industry stakeholders to share and align safety priorities in support of the RASGs.	
Recommendation 7.2/2 — ICAO Runway Safety Programme — Global Runway Safety Action Plan	That States: a) recognise that runway safety-related accident categories, particularly runway excursions and incursions, continue to be a global safety priority for aviation stakeholders as determined by a risk-based analysis; b) urge runway safety stakeholders, including aircraft operators, air navigation service providers, aerodrome operators, aerospace industry, and regional aviation safety groups, to implement the actions in the GRSAP to reduce the global rate of runway excursions and runway incursions; c) continue to establish requirements and activities aimed at improving runway safety through State runway safety programmes; d) encourage aerodrome operators to establish effective runway safety teams and encourage all runway safety stakeholders to actively participate in established runway safety teams; and That ICAO: e) continue to lead and coordinate the runway safety programme with its partner organizations to work together to mitigate runway safety-related risks.	

Recommendations	Task Description	Follow-up Actions
Recommendation 7.3/1 – ICAO implementation strategies	That ICAO: a) strengthen the linkage between the Global Air Navigation Plan (GANP), the Global Aviation Safety Plan (GASP) and the Global Aviation Security Plan (GASeP) to achieve an integrated implementation approach; b) take into account implementation support needs when developing provisions; c) further improve the planning and implementation regional group (PIRG) and regional aviation safety group (RASG) mechanisms to enhance the coordination and alignment of implementation between regions; d) consider the development of a global collaboration mechanism to facilitate interregional alignment, harmonization, and sharing of best practices and lessons learned; e) support the development of a flexible, progressive and risk-based strategy to improve global implementation of Standards and Recommended Practices (SARPs); f) request an appropriate group of experts to further review and explore a process that would facilitate short-term (successive) aircraft interchange operations; and g) further develop risk management capabilities and facilitate implementation of multilateral arrangements for the sharing of risk information and (regional) contingency planning related with civil aircraft operations over or near conflict zones.	

Recommendations	Task Description	Follow-up Actions
Recommendation 7.3/3 — State national planning framework	That States: a) reaffirm support for the fundamental roles and responsibilities of Contracting States, Council and the Air Navigation Commission, as provided in the *Convention on International Civil Aviation* (Doc 7300), for the development of quality and timely Standards and Recommended Practices (SARPs); b) enhance their involvement in all stages of the provision development process and encourage RSOOs and other aviation stakeholders to do the same; c) support the ICAO Next Generation of Aviation Professionals (NGAP) Programme in light of the international need to address the existing aviation personnel shortages and to ensure a competent workforce capable of meeting the needs and challenges of the global aviation community into the future; and d) share best practices on applied strategies to promote more productive recruitment, training and education, development and retention programmes.	
Recommendation 8.1/1: Measures to proactively address emerging issues	That ICAO: a) raise awareness and inform States of existing guidance on identifying and addressing emerging safety issues, including mitigation actions and balancing the integrated management of distinct risks (existing/emerging); b) urge the regional aviation safety groups (RASGs) or other regional organizations, including regional safety oversight organizations (RSOOs), to institute a process for addressing emerging safety issues based on a data-driven analysis; c) urge States, regional entities and industry to participate actively in regional and sub-regional studies on emerging safety issues conducted by the RASGs; d) urge States, regional entities and industry to share information on emerging safety issues with other States and ICAO through the dedicated website; e) systematically collect information from States and regional organizations, for the purpose of assessing and monitoring their global safety impact, on the following: new concepts of operations and new technologies; new risk management concepts and	

Recommendations	Task Description	Follow-up Actions
	methods coping with the dynamics and complexity of the aviation system; as well as the initial implementation of such new concepts, methods and technologies; f) establish a holistic, performance-based process for the development of ICAO provisions in response to these emerging issues and risks to assess if the established provisions achieve the objectives for which they were designed; g) provide guidance for the implementation of risk and performance-based assessment and oversight at both State and regional levels; h) provide a global, inclusive civil-military cooperation mechanism to move from a reactive situation to a proactive one by applying predictive, holistic risk management to emerging issues; and i) based on data from regional aviation safety groups, develop a study on the subject of objects falling from aeroplanes and guidance material on preventive measures.	

International Civil Aviation Organization | Organisation de l'aviation civile internationale | Organización de Aviación Civil Internacional | Международная организация гражданской авиации | منظمة الطيران المدني الدولي | 国际民用航空组织

Tel.: +1 514-954-8219 ext. 6717

Ref.: AN 4/27-16/28 5 May 2016

Subject: Approval of Amendment 1 to the PANS-Aerodromes

Action Required: a) Implementation of Amendment 1 to the PANS-Aerodromes on 5 November 2020; b) Publication of any differences as of 5 November 2020

Sir/Madam,

1. I have the honour to inform you that the Air Navigation Commission, acting under delegated authority, on 18 February 2016, approved Amendment 1 to the first edition of the *Procedures for Air Navigation Services — Aerodromes* (PANS-Aerodromes, Doc 9981) for applicability on 5 November 2020. The amendment was approved on 20 April 2016 by the President of the Council on behalf of the Council in accordance with established procedure. A copy of the amendment is available as attachments to the electronic version of this State letter on the ICAO-NET (http://portal.icao.int) where you can access all other relevant documentation.

2. Amendment 1 stems from proposals developed by the Secretariat as a result of the work of the Friction Task Force (FTF) of the Aerodrome Design and Operations Panel (ADOP) (formerly the Aerodromes Panel (AP)) to introduce provisions regarding the use of a global reporting format for assessing and reporting runway surface conditions. The amendment also introduces the division of the PANS-Aerodromes into two parts for better readability: Part I contains high-level matters, including aerodrome certification, and Part II contains day-to-day operational matters such as foreign object debris (FOD), wildlife hazards and inspection of the movement area.

3. An implementation task list, including an outline of guidance material, and an impact assessment for the proposed amendment are presented in Attachments B and C, respectively.

4. Your Government is invited by the Council to implement the provisions of the PANS-Aerodromes. In this connection, I draw your attention to the decision taken by the Council, on 1 October 1973, to discontinue the publication of differences in Supplements to PANS documents and, instead, to request States to publish up-to-date lists of significant differences from PANS documents in their Aeronautical Information Publications (AIPs).

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5. Please note that the time between the approved date and the applicability date of 5 November 2020 for Amendment 1 to the PANS-Aerodromes is longer than usual due to the nature and complexity of the proposals.

6. May I, therefore, invite your Government to publish in your AIP a list of any significant differences which will exist on 5 November 2020 between the provisions of the PANS-Aerodromes and your national regulations and practices.

Accept, Sir/Madam, the assurances of my highest consideration.

Fang Liu
Secretary General

Enclosures:

A — Amendment to the Foreword of the PANS-Aerodromes
B — Implementation task list and outline of guidance material in relation to Amendment 1 to the PANS-Aerodromes
C — Impact assessment in relation to Amendment 1 to the PANS-Aerodromes

ATTACHMENT A to State letter AN 4/27-16/28

AMENDMENT TO THE FOREWORD OF THE PANS-AERODROMES, FIRST EDITION

Add the following at the end of Table A:

Amendment	***Source(s)***	***Subject***	***Approved Applicable***
1	Friction Task Force (FTF) of the Aerodrome Design and Operations Panel (ADOP) (formerly the Aerodromes Panel (AP))	Amendment concerning the use of an enhanced global reporting format for assessing and reporting runway surface condition.	20 April 2016 5 November 2020

— — — — — — — —

ATTACHMENT B to State letter AN 4/27-16/28

IMPLEMENTATION TASK LIST AND OUTLINE OF GUIDANCE MATERIAL IN RELATION TO AMENDMENT 1 TO THE PANS-AERODROMES, DOC 9981

1. IMPLEMENTATION TASK LIST

1.1 Essential steps to be followed by a State in order to implement the proposed amendment to the PANS-Aerodromes, Doc 9981:

a) conduct a gap analysis between the new ICAO provisions and national regulatory framework;

b) identification of the rule-making process necessary to transpose the new ICAO provisions into national regulations, where necessary;

c) drafting the necessary modifications to the national regulations;

d) official adoption of the national regulations and means of compliance;

e) establishment of a national implementation plan that takes into account the new ICAO provisions;

f) training of relevant aerodrome personnel prior to implementation of the new provisions;

g) implementation of the new national regulations by aerodrome operators;

h) modification of oversight framework according to the new national regulations;

i) oversight by the State of the implementation of the regulations; and

j) publication of significant differences, if any, in the State's AIP.

2. STANDARDIZATION PROCESS

2.1 Approval date: 20 April 2016

2.2 Applicability date: 5 November 2020

2.3 Embedded applicability date(s): N/A

3. SUPPORTING DOCUMENTATION

3.1 ICAO documentation

Title	Type (PANS/TI/Manual/Circ)	Planned publication date
Airport Services Manual, Part 2 — *Pavement Surface Conditions* (Doc 9137)	Updated guidance	November 2016
Airport Services Manual, Part 8 — *Airport Operational Service* (Doc 9137)	Updated guidance	November 2016
Airport Services Manual, Part 9 — *Airport Maintenance Practices* (Doc 9137)	Updated guidance	November 2016
Circ 329, *Assessment, Measurement and Reporting of Runway Surface Conditions*	Updated guidance	November 2016

3.2 External documentation

Title	External Organization	Publication date
None		

4. IMPLEMENTATION ASSISTANCE TASKS

Type	Global	Regional
Symposium on Runway Surface Condition Assessment and Reporting		Europe (Paris, March/April 2016)
Regional workshop on implementation of global reporting format		ICAO Regional Offices

5. UNIVERSAL SAFETY OVERSIGHT AUDIT PROGRAMME (USOAP)

5.1 No new protocol questions (PQs) are required. However, a number of related PQs will need revision of ICAO references for review of evidence.

— — — — — — — —

IMPACT ASSESSMENT IN RELATION TO AMENDMENT 1 TO THE PANS-AERODROMES, DOC 9981

1. INTRODUCTION

1.1 Amendment 1 to the PANS-Aerodromes, Doc 9981, contains provisions related to the implementation of the enhanced global reporting format for assessing and reporting runway surface conditions, and is intended to improve safety and efficiency performance at aerodromes.

2. IMPACT ASSESSMENT

2.1 *Safety impact*: Runway surface conditions have contributed to many safety events, and investigations have revealed shortfalls in the accuracy and timeliness of assessment and reporting methods. The proposed global reporting format is designed to report runway surface conditions in a standardized manner such that flight crew are able to accurately determine aeroplane take-off and landing performance, resulting in a global reduction in runway excursion incidents/accidents.

2.2 *Financial impact*: For States, the financial cost will be limited to generating a series of regulatory amendments, training of CAA inspectors and implementing a robust oversight process. For industry, specifically the aerodrome operators, the financial cost will mainly be in the areas of training of staff (runway assessors) exposed to the change.

2.3 *Security impact*: Nil.

2.4 *Environmental impact*: Positive impact due to lesser occurrences of runway excursion incidents/accidents.

2.5 *Efficiency impact*: Accurate and timely runway State information provided by aerodromes and adjusted to the operational need (i.e. aeroplane performance as provided by aeroplane manufacturers) and promulgated/disseminated according to defined terminology and procedures will have a positive impact on the efficiency of the air transportation system. Occurrences of excursions, disruptions to aerodrome and air traffic operations such as, but not limited to, the removal of aircraft disabled at an aerodrome, in particular on a runway, are expected to be reduced.

2.6 *Expected implementation time*: Between two to five years.

— END —

AMENDMENT No. 1

TO THE

PROCEDURES
FOR
AIR NAVIGATION SERVICES

AERODROMES

(Doc 9981)

INTERIM EDITION

The text of Amendment No. 1 to the PANS-Aerodromes (Doc 9981) was approved by the President of the Council on behalf of the Council on **20 April 2016** for applicability on **5 November 2020**. This interim edition is distributed to facilitate implementation of the amendment by States. Replacement pages incorporating Amendment No. 1 are expected to be distributed in October 2020. (State letter AN 4/27-16/28 refers.)

APRIL 2016

INTERNATIONAL CIVIL AVIATION ORGANIZATION

NOTES ON THE PRESENTATION OF THE AMENDMENT TO THE PANS-AERODROMES

The text of the amendment is arranged to show deleted text with a line through it and new text highlighted with grey shading, as shown below:

1. ~~Text to be deleted is shown with a line through it.~~	text to be deleted
2. New text to be inserted is highlighted with grey shading.	new text to be inserted
3. ~~Text to be deleted is shown with a line through it~~ followed by the replacement text which is highlighted with grey shading.	new text to replace existing text

TEXT OF AMENDMENT 1 TO THE

PROCEDURES FOR AIR NAVIGATON SERVICES

AERODROMES
(PANS-AERODROMES, DOC 9981)

. . .

FOREWORD

. . .

6. CONTENTS OF THE DOCUMENT

Editorial note.— Insert new paragraphs 6.1 to 6.4 as follows and *renumber* subsequent paragraphs accordingly:

6.1 The PANS-Aerodromes consists of two parts as follows:

Part I — *Aerodrome certification, safety assessments and aerodrome compatibility*
Part II — *Aerodrome operational management*

6.2 **Part I — *Aerodrome certification, safety assessments and aerodrome compatibility*** describes procedures for the certification of an aerodrome, how to conduct a safety assessment and methods required to assess the compatibility of an aerodrome to accept a proposed change in operation. Part I provides the basic guidelines to States, and those operators and organizations certificating and managing aerodromes.

6.3 **Part II — *Aerodrome operations management*** provides operational procedures for the operation and management of aerodromes and related aerodrome activities. The requirements contained in this part may be applicable to the aerodrome operator and/or other relevant entities operating on the aerodrome. The procedures described in this part provide an overall framework to allow for a standardized approach to aerodrome operations.

6.4 Both parts present coverage of operational practices that are beyond the scope of Standards and Recommended Practices (SARPs) but with respect to which a measure of international uniformity is desirable.

PART I — AERODROME CERTIFICATION,
SAFETY ASSESSMENTS AND AERODROME COMPATIBILITY

End of new text.

~~6.1~~ 6.5 Chapter 1 — Definitions

Chapter 1 contains a list of terms and their technical meanings as used in this document.

~~6.2~~ 6.6 Chapter 2 — Certification of aerodromes

6.~~2~~6.1 Chapter 2 outlines the general principles and procedures to be followed through all of the suggested stages of certifying an aerodrome operator: the initial meeting between the State and the aerodrome operator, technical inspections of the aerodrome, approval/acceptance of all or relevant portions of the aerodrome manual, on-site verification of aerodrome operational aspects including the safety management system (SMS) of the operator, analysis of the deviations from regulatory requirements and issuance of the verification report, assessment of the corrective action plan, issuance of the certificate and continued safety oversight.

6.~~2~~6.2 Appendix 1 to Chapter 2 contains a list of the main items to be inspected and/or audited in each of the technical and operational areas including the SMS of the operator. Appendix 2 concerns critical data related to safety occurrences. The attachments to Chapter 2 contain a list of possible subjects for an aerodrome manual, guidance on initial certification process and a checklist that can be used by the State to assess the acceptance of an aerodrome manual and initial certification of an aerodrome. It is appreciated that these will differ according to the legal basis of the State, but some States might find these helpful.

6.~~3~~7 Chapter 3 — Safety assessments for aerodromes

Chapter 3 outlines the methodologies and procedures to be followed when undertaking a safety assessment. It includes a brief description of how a safety assessment fulfils an element of the overall aerodrome operator's SMS. An aerodrome operator's SMS should enable the aerodrome operator to manage the safety risks it is exposed to as a consequence of the hazards it must face during the operations of the aerodrome.

6.~~4~~8 Chapter 4 — Aerodrome compatibility

6.~~4~~8.1 Chapter 4 outlines a methodology and procedure to assess the compatibility between aeroplane operations and aerodrome infrastructure and operations when an aerodrome accommodates an aeroplane that exceeds the certificated characteristics of the aerodrome.

6.~~4~~8.2 This chapter addresses situations where compliance with the design provisions stipulated in Annex 14, Volume I, is either impractical or physically impossible. Where alternative measures, operational procedures and operating restrictions have been developed, these should be reviewed periodically to assess their continued validity.

6.~~4~~8.3 The attachments to Chapter 4 contain selected aeroplane characteristics data. They are provided for convenience to allow the aerodrome operator to easily compare the characteristics of various commonly operated aeroplanes. However, the data will be subject to change, and accurate data should always be obtained from the aircraft manufacturers' documentation prior to any official assessment of compatibility.

~~6.5 Chapter 5 Aerodrome operational management *(to be developed)*~~

~~Chapter 5 will outline the general principles and procedures to be followed in providing uniform and harmonized aerodrome operations.~~

PART II — AERODROME OPERATIONAL MANAGEMENT

6.9 The structure of each chapter within Part II is set up with three specific sections including a general part, the objectives to be achieved, and the operating practices related to these objectives.

6.9.1 The "general" section of the chapter includes an introduction to each of the topics covered in the subsequent chapter. It also provides an overview of the general principles in order to understand the procedures that follow.

6.9.2 The "objectives" section contains the basic principles that have been defined for the topic. These basic principles have been formulated as required for global uniform application. The "Objectives" cover the whole subject matter and are not broken down into the individual subsections.

6.9.3 The "operational practices" section covers the specific operational practices and the ways in which they are applied in order to achieve the basic principles defined in "objectives".

6.9.4 Chapter 1 contains provisions and procedures applicable for assessing and reporting the condition of a runway.

6.9.5 Chapter 2 (*Airside inspections: to be developed*)

6.9.6 Chapter 3 (*Work in progress: to be developed*)

6.9.7 Chapter 4 (*Foreign object debris (FOD): to be developed*)

6.9.8 Chapter 5 (*Wildlife hazard management: to be developed*)

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Editorial Note.— Part II is all new text.

PART II – AERODROME OPERATIONAL MANAGEMENT

Chapter 1
REPORTING FORMAT USING STANDARD RUNWAY CONDITION REPORT

1.1 RUNWAY SURFACE CONDITION ASSESSMENT AND REPORTING

1.1.1 General

Note.— This section includes an introduction to each of the topics covered in subsequent sections. It also provides an overview of the general principles in order to understand the procedures that follow.

1.1.1.1 Assessing and reporting the condition of the movement area and related facilities is necessary in order to provide the flight crew with the information needed for safe operation of the aeroplane. The runway condition report (RCR) is used for reporting assessed information.

1.1.1.2 On a global level, movement areas are exposed to a multitude of climatic conditions and consequently a significant difference in the condition to be reported. The RCR describes a basic structure applicable for all these climatic variations. Assessing runway surface conditions rely on a great variety of techniques and no single solution can apply to every situation.

Note.— Guidance on methods of assessing runway surface condition is given in Attachment A – Assessment Methods.

1.1.1.3 The philosophy of the RCR is that the aerodrome operator assesses the runway surface conditions whenever water, snow, slush, ice or frost are present on an operational runway. From this assessment, a runway condition code (RWYCC) and a description of the runway surface are reported which can be used by the flight crew for aeroplane performance calculations. This format, based on the type, depth and coverage of contaminants, is the best assessment of the runway surface condition by the aerodrome operator; however, all other pertinent information will be taken into consideration and be kept up to date and changes in conditions reported without delay.

1.1.1.4 The RWYCC reflects the runway braking capability as a function of the surface conditions. With this information, the flight crew can derive, from the performance information provided by the aeroplane manufacturer, the necessary stopping distance of an aircraft on the approach under the prevailing conditions.

1.1.1.5 The operational requirements in 1.1.1.3 stems from Annex 6 — *Operation of Aircraft*, Part I — *International Commercial Air Transport — Aeroplanes* and Annex 8 — *Airworthiness of Aircraft* with the objective to achieve the desired level of safety for the aeroplane operations.

1.1.1.6 Annex 14, Volume I contains high-level SARPs related to the assessment and reporting of runway surface condition. Associated objectives and operational practices are described in 1.1.2 and 1.1.3 below.

1.1.1.7 The operational practices are intended to provide the information needed to fulfil the syntax requirements for dissemination and promulgation specified in Annex 15 — *Aeronautical Information Services* and the *Procedures for Air Navigation Services — Air Traffic Management* (PANS-ATM, Doc 4444).

Note.— For practical reasons, the RCR information string has been provisionally incorporated in Annex 15 as a revision of the SNOWTAM format.

1.1.1.8 When the runway is wholly or partly contaminated by standing water, snow, slush, ice or frost, or is wet associated with the clearing or treatment of snow, slush, ice or frost, the runway condition report should be disseminated through the AIS and ATS services. When the runway is wet, not associated with the presence of standing water, snow, slush, ice or frost, the assessed information should be disseminated using the runway condition report through the ATS only.

Note.— Operationally relevant information concerning taxiways and aprons are covered in the situational awareness section of the RCR.

1.1.1.9 The operational practices describe procedures to meet the operationally needed information for the flight crew and dispatchers for the following sections:

a) aeroplane take-off and landing performance calculations:

i) dispatch – pre-planning before commencement of flight:

– take off from a runway; and
– landing on a destination aerodrome or an alternate aerodrome

ii) in flight – when assessing the continuation of flight; and
– before landing on a runway;

b) situational awareness of the surface conditions on the taxiways and aprons.

1.1.2 Objectives

Note.— This section contains the basic principles that have been defined for the topic and have been formulated as required for global uniform application. They cover the whole subject matter and are broken down into the individual subsections.

1.1.2.1 The RWYCC shall be reported for each third of the runway assessed.

1.1.2.2 The assessment process shall include:

a) assessing and reporting the condition of the movement area;

b) providing the assessed information in the correct format; and

c) reporting significant changes without delay.

1.1.2.3 The information to be reported shall be compliant with the RCR which consists of:

a) aeroplane performance calculation section; and

b) situational awareness section.

1.1.2.4 The information shall be included in an information string in the following order using only AIS compatible characters.

a) aeroplane performance calculation section:

i) aerodrome location indicator;

ii) date and time of assessment;

iii) lower runway designation number;

iv) RWYCC for each runway third;

v) per cent coverage contaminant for each runway third;

vi) depth of loose contaminant for each runway third;

vii) condition description for each runway third; and

viii) width of runway to which the RWYCCs apply if less than published width.

b) situational awareness section:

i) reduced runway length;

ii) drifting snow on the runway;

iii) loose sand on the runway;

iv) chemical treatment on the runway;

v) snowbanks on the runway;

vi) snowbanks on taxiway;

vii) snowbanks adjacent to the runway;

viii) taxiway conditions;

ix) apron conditions;

x) State approved and published use of measured friction coefficient; and

xi) plain language remarks.

1.1.2.5 The syntax for dissemination as described in the RCR template in Annex 15, Appendix 2, is determined by the operational need of the flight crew and the capability of trained personnel to provide the information arising from an assessment.

Note.— For practical reasons, the RCR information string has been provisionally incorporated in Annex 15 — Aeronautical Information Services *as a revision of the SNOWTAM format.*

1.1.2.6 The syntax requirement in 1.1.2.5 shall be strictly adhered to when providing the assessed information through the RCR.

1.1.3 Operational practices

Note.— This section covers the specific operational practices and the ways in which they are applied in order to achieve the basic principles defined in 1.1.2 – Objectives.

1.1.3.1 Reporting, in compliance with the runway condition report, shall commence when a significant change in runway surface condition occurs due to water, snow, slush, ice or frost.

1.1.3.2 Reporting of the runway surface condition should continue to reflect significant changes until the runway is no longer contaminated. When this situation occurs, the aerodrome will issue a runway condition report that states the runway is wet or dry as appropriate.

1.1.3.3 A change in the runway surface condition used in the runway condition report is considered significant whenever there is:

a) any change in the RWYCC;

b) any change in contaminant type;

c) any change in reportable contaminant coverage according to Table 1;

d) any change in contaminant depth according to Table 2; and

e) any other information, for example a pilot report of runway braking action, which according to assessment techniques used, are known to be significant.

Runway Condition Report – Aeroplane performance calculation section

1.1.3.4 The aeroplane performance calculation section is a string of grouped information separated by a space " " and ends with a return and two line feed "≪≡". This is to distinguish the aeroplane performance calculation section from the following situational awareness section or the following aeroplane performance calculation section of another runway.

The information to be included in this section consists of the following.

a) **Aerodrome location indicator**: a four-letter ICAO location indicator in accordance with Doc 7910, *Location Indicators*.

This information is mandatory.

Format: nnnn
Example: ENZH

b) **Date and time of assessment**: date and time (UTC) when the assessment was performed by the trained personnel.

This information is mandatory.

Format: MMDDhhmm
Example: 09111357

c) **Lower runway designation number**: a two or three character identifying the runway for which the assessment is carried out and reported.

This information is mandatory.

Format: nn[L] or nn[C] or nn[R]
Example: 09L

d) **Runway condition code for each runway third**: a one digit number identifying the RWYCC assessed for each runway third. The codes are reported in a three character group separated by a "/" for each third. The direction for listing the runway thirds shall be in the direction as seen from the lower designation number.

This information is mandatory.

When transmitting information on runway surface condition by ATS to flight crew, the sections are, however, referred to as the first, second or third part of the runway. The first part always means the first third of the runway as seen in the direction of landing or take-off as illustrated in Figures 1 and 2 and detailed in PANS-ATM (Doc 4444).

Format: n/n/n
Example: 5/5/2

Note 1.— A change in RWYCC from, say, 5/5/2 to 5/5/3 is considered significant. (See further examples below).

Note 2.— A change in RWYCC requires a complete assessment taken into account all information available.

Note 3.— Procedures for assigning a RWYCC are available in 1.1.3.12 to 1.1.3.16.

e) **Per cent coverage contaminant for each runway third**: a number identifying the percentage coverage. The percentages are to be reported in an up to nine character group separated by a "/" for each runway third. The assessment is based upon an even distribution within the runway thirds using the guidance in Table 1.

This information is conditional. It is not reported for one runway third if it is dry or covered with less than 10 per cent.

Format: [n]nn/[n]nn/[n]nn
Example: 25/50/100

NR/50/100	if contaminant coverage is less than 10% in the first third
25/NR/100	if contaminant coverage is less than 10% in the middle third
25/50/NR	if contaminant coverage is less than 10% in the last third

With uneven distribution of the contaminants additional information is to be given in the plain language remark part of the Situational awareness section of the runway condition report. Where possible a standardized text should be used.

Note.— When no information is to be reported, insert "NR" at their relevant position in the message to indicate to the user that no information exists (/NR/).

f) **Depth of loose contaminant; dry snow, wet snow, slush or standing water for each runway third**: a two or three digit number representing the assessed depth (mm) of the contaminant for each runway third. The depth is reported in a six to nine character group separated by a "/" for each runway third as defined in Table 2. The assessment is based upon an even distribution within the runway thirds as assessed by a trained person. If measurements are included as part of the assessment process, the reported values are still reported as assessed depths as the trained person has placed his judgment upon the measured depths to be representative for the runway third.

Format: [n]nn/[n]nn/[n]nn
Examples: 04/06/12 *[STANDING WATER]*
02/04/09 *[SLUSH]*
02/05/10 *[WET SNOW or WET SNOW ON TOP OF ...]*
02/20/100 *[DRY SNOW or DRY SNOW ON TOP OF]*
NR/NR/100 *[DRY SNOW in the last third only]*

This information is conditional. It is reported only for DRY SNOW, WET SNOW, SLUSH and STANDING WATER.

Example of reporting depth of contaminant whenever there is a significant change

1) After the first assessment of runway condition, a **first runway condition report** is generated. The initial report is:

   5/5/5 100/100/100 02/02/02 SLUSH/SLUSH/SLUSH

   Note.— The full information string is not used in this example.

2) With continuing precipitation, a new runway condition report is required to be generated as subsequent assessment reveals a change in the runway condition code. A **second runway condition report** is therefore created as:

   2/2/2 100/100/100 03/03/03 SLUSH/SLUSH/SLUSH

3) With even more precipitation, further assessment reveals the depth of precipitation has increased from 3 mm to 5 mm along the entire length of the runway. However, a new runway condition report **is not** required because the runway condition code has not change (change in depth is less than the significant change threshold of 3 mm).

4) A final assessment of the precipitation reveals that the depth has increased to 7 mm. A new runway condition code is required because the change in depth from the last runway condition report (**second runway condition code**) i.e. from 3 mm to 7 mm is greater than the significant change threshold of 3 mm. A **third runway condition report** is thus created as below:

   2/2/2 100/100/100 07/07/07 SLUSH/SLUSH/SLUSH

   For contaminants other than STANDING WATER, SLUSH, WET SNOW or DRY SNOW, the depth is not reported. The position of this type of information in the information string is then identified by /NR/.
   Example: /NR/

When the depth of the contaminants varies significantly within a runway third, additional information is to be given in the plain language remark part of the *Situational awareness section* of the runway condition report.

Note.— Significantly in this context is a variation in depth in the lateral direction more than twice the depth indicated in column 3 of Table 2. Further information is available in Circular 329.

g) **Condition description for each runway third**: to be reported in capital letters using terms specified in paragraph 2.9.5 in Annex 14, Volume I. These terms have been harmonized with the terms used in the Standards and Recommended Practices in Annexes 6, 8, 11 and 15. The condition type is reported by any of the following condition type description for each runway third and separated by an oblique stroke "/".

This information is mandatory.

COMPACTED SNOW
DRY
DRY SNOW
DRY SNOW ON TOP OF COMPACTED SNOW
DRY SNOW ON TOP OF ICE
FROST
ICE
SLUSH
STANDING WATER
WATER ON TOP OF COMPACTED SNOW
WET
WET ICE
WET SNOW
WET SNOW ON TOP OF COMPACTED SNOW
WET SNOW ON TOP OF ICE

Format: nnnn/nnnn/nnnn
Example: DRY SNOW ON TOP OF COMPACTED SNOW/WET SNOW ON TOP OF COMPACTED SNOW/WATER ON TOP OF COMPACTED SNOW

h) **Width of runway to which the RWYCCs apply if less than published width** is the two digit number representing the width of cleared runway in metres if less than published width.

This information is optional.

Format: nn
Example: 30

If the cleared runway width is not symmetrical along the centre line, additional information is to be given in the plain language remark part of the situational awareness section of the runway condition report.

Runway condition report – Situational awareness section:

1.1.3.5 All individual messages in the situational awareness section end with a full stop sign. This is to distinguish the message from subsequent message(s).

The information to be included in this section consists of the following:

a) **Reduced runway length**

This information is conditional when a NOTAM has been published with a new set of declared distances affecting the LDA.

Format: Standardized fixed text
RWY nn [L] or nn [C] or nn [R] LDA REDUCED TO [n]nnn
Example: RWY 22L LDA REDUCED TO 1450.

b) **Drifting snow on the runway**

This information is optional.

Format: Standardized fixed text
Example: DRIFTING SNOW.

c) **Loose sand on the runway**

This information is optional.

Format: RWY nn[L] or nn[C] or nn[R] LOOSE SAND
Example: RWY 02R LOOSE SAND.

d) **Chemical treatment on the runway**

This information is mandatory.

Format: RWY nn[L] *or* nn[C] *or* nn[R] CHEMICALLY TREATED.
Example: RWY 06 CHEMICALLY TREATED.

e) **Snowbanks on the runway**

This information is optional.
Left or Right distance in metres from centerline.

Format: RWY nn[L] *or* nn[C] *or* nn[R] SNOWBANK Lnn *or* Rnn *or* LRnn FM CL
Example: RWY 06L SNOWBANK LR19 FM CL.

f) **Snowbanks on taxiway**

This information is optional.
Left or Right distance in metres from centerline.

Format: TWY [nn]n SNOWBANK Lnn *or* Rnn *or* LRnn FM CL
Example: TWY A SNOWBANK LR20 FM CL.

g) **Snowbanks adjacent to the runway penetrating level/profile set in the aerodrome snow plan.**

This information is optional.

Format: RWY nn[L] *or* nn[C] *or* nn[R] ADJACENT SNOWBANKS.
Example: RWY 06R ADJACENT SNOWBANKS.

h) **Taxiway conditions**

This information is optional.

Format: TWY [nn]n POOR.
Example: TWY B POOR.

i) **Apron conditions**

This information is optional.

Format: APRON [nnnn] POOR.
Example: APRON NORTH POOR.

j) **State approved and published use of measured friction coefficient**

This information is optional.

Format: *[State set format and associated procedures]*
Example: *[Function of State set format and associated procedures]*

k) **Plain language remarks using only allowable characters in capital letters.**
Where possible, standardized text should be developed.

This information is optional.

Format: Combination of allowable characters where use of full stop « . » marks the end of message.

Allowable characters:
A B C D E F G H I J K LM N O P Q R S T U V W X Y Z
0 1 2 3 4 5 6 7 8 9
/ [oblique stroke] "." [period]" " [space]

Complete information string

1.1.3.6 An example of a complete information string prepared for dissemination is as follows:

[COM header and Abbreviated header] (Completed by AIS)
GG EADBZQZX EADNZQZX EADSZQZX
070645 EADDYNYX
SWEA0151 EADD 02170055
SNOWTAM 0151

[Aeroplane performance calculation section]
EADD 02170055 09L 5/5/5 100/100/100 NR/NR/NR WET/WET/WET
EADD 02170135 09R 5/4/3 100/50/75 NR/06/06 WET/SLUSH/SLUSH
EADD 02170225 09C 3/2/1 75/100/100 06/12/12 SLUSH/WET SNOW/WET SNOW

[Situational awareness section]
RWY 09L SNOWBANK R20 FM CL. RWY 09R ADJ SNOWBANKS. TWY B POOR. APRON NORTH POOR.

Assessing a runway and assigning a runway condition code

1.1.3.7 The assessed RWYCC to be reported for each third of the runway is determined by following the procedure described in paragraph 1.1.3.12 to paragraph 1.1.3.16.

Note.— Guidance on methods of assessing runway surface condition, including the determination of a slippery wet runway, is given in Attachment A.

1.1.3.8 If 25 per cent or less area of a runway third is wet or covered by contaminant, a RWYCC 6 shall be reported.

1.1.3.9 If the distribution of the contaminant is not uniform, the location of the area that is wet or covered by the contaminant is described in the plain language remark part of the Situational awareness section of the runway condition report.

1.1.3.10 A description of the runway surface condition is provided using the contamination terms described in capital letters in Table 3 Assigning a runway condition code.

1.1.3.11 If multiple contaminants are present where the total coverage is more than 25 per cent but no single contaminant covers more than 25 per cent of any runway third, the RWYCC is based upon the judgment by a trained person, considering what contaminant will most likely be encountered by the aeroplane and its likely effect on the aeroplane's performance.

1.1.3.12 The RWYCC is determined using Table 3.

1.1.3.13 The variables, in Table 3, that may affect the runway condition code are:

a) type of contaminant;

b) depth of contaminant; and

c) outside air temperature. Where available the runway surface temperature should preferably be used.

Note.— At air temperatures of +3°degrees Celsius and below, with a dew point spread of 3ºdegrees Celsius or less, the runway surface condition may be more slippery than indicated by the runway condition code assigned by Table 3. The narrow dew point spread indicates that the air mass is relatively close to saturation which is often associated with actual precipitation, intermittent precipitation, nearby precipitation or fog.

This may depend on its correlation with precipitation but it may also, at least in part, depend on the exchange of water at the air-ice interface. Due to the other variables involved such as surface temperature, solar heating and ground cooling or heating, a small temperature spread does not always mean that the braking action will be more slippery. The observation should be used by aerodrome operators as an indicator of slippery conditions but not as an absolute.

1.1.3.14 An assigned RWYCC 5, 4, 3 or 2 shall not be upgraded.

1.1.3.15 An assigned RWYCC 1 or 0 can be upgraded using the following procedures (but see 1.1.3.16 below):

a) if a properly operated and calibrated State-approved measuring device and all other observations supports a higher RWYCC as judged by a trained person;

b) the decision to upgrade RWYCC 1 or 0 cannot be based upon one assessment method alone. All available means of assessing runway slipperiness are to be used to support the decision;

c) when RWYCC 1 or 0 is upgraded, the runway surface is assessed frequently during the period the higher RWYCC is in effect to ensure that the runway surface condition does not deteriorate below the assigned code; and

d) variables that may be considered in the assessment that may affect the runway surface condition, include but are not limited to:

i) any precipitation conditions;

ii) changing temperatures;

iii) effects of wind;

iv) frequency of runway in use; and

v) type of aeroplane using the runway.

1.1.3.16 Upgrading of RWYCC 1 or 0 using the procedures in 1.1.3.15 shall not be permitted to go beyond a RWYCC 3.

1.1.3.17 If sand or other runway treatments are used to support upgrading, the runway surface is assessed frequently to ensure the continued effectiveness of the treatment.

1.1.3.18 The RWYCC determined from Table 3 should be appropriately downgraded considering all available means of assessing runway slipperiness, including the criteria given in Table 4.

1.1.3.19 Where available, the pilot reports of runway braking action should be taken into consideration as part of the ongoing monitoring process, using the following principle:

a) a pilot report of runway braking action is taken into consideration for downgrading purposes; and

b) a pilot report of runway braking action can be used for upgrading purposes only if it is used in combination with other information qualifying for upgrading.

Note 1.— The procedures for making special air-reports regarding runway braking action are contained in the Procedures for Air Navigation Services — Air Traffic Management *(PANS-ATM, Doc 4444), Chapter 4, and Appendix 1, Instructions for air-reporting by voice communication.*

Note 2.— Procedures for downgrading reported RWYCC can be found in 1.1.3.23 including the use of Table 5 runway condition assessment matrix (RCAM).

1.1.3.20 Two consecutive pilot reports of runway braking action of POOR shall trigger an assessment if RWYCC of 2 or better has been reported.

1.1.3.21 When one pilot has reported a runway braking action of LESS THAN POOR, the information shall be disseminated, a new assessment shall be made and the suspension of operations on that runway shall be considered.

Note 1.— If considered appropriate, maintenance activities may be performed simultaneously or before a new assessment is made.

Note 2.— Procedures for the provision of information to arriving aircraft are contained in Procedures for Air Navigation Services — Air Traffic Management (PANS-ATM, Doc 4444), Section 6.6.

1.1.3.22 Table 4 shows the correlation of pilot reports of runway braking action with RWYCCs.

1.1.3.23 The combined Table 3 and Table 4 form the runway condition assessment matrix (RCAM) in Table 5. The RCAM is a tool to be used when assessing runway surface conditions. It is not a standalone document and shall be used in compliance with the associated procedures of which there are two main parts:

a) assessment criteria; and

b) downgrade assessment criteria.

1.2 AERODROME MOVEMENT AREA MAINTENANCE

(Guidance on surface friction characteristics and State's responsibility including examples of States' good practices are currently being developed.)

LIST OF TABLES AND FIGURES

Table 1 – Percentage of coverage for contaminants

Assessed per cent	Reported per cent
10 – 25	25
26 – 50	50
51 – 75	75
76 – 100	100

Table 2 – Depth assessment for contaminants

Contaminant	Valid values to be reported	Significant change
STANDING WATER	04, then assessed value	3 mm up to and including 15 mm
SLUSH	03, then assessed value	3 mm up to and including 15 mm
WET SNOW	03, then assessed value	5 mm
DRY SNOW	03, then assessed value	20 mm

Note 1.— For STANDING WATER, 04 (4 mm) is the minimum depth value at and above which the depth is reported. (From 3 mm and below, the runway third is considered WET).

Note 2.— For SLUSH, WET SNOW and DRY SNOW, 03 (3 mm) is the minimum depth value at and above which the depth is reported.

Note 3.— Above 4 mm for STANDING WATER and 3 mm for SLUSH, WET SNOW and DRY SNOW an assessed value is reported and a significant change relates to observed change from this assessed value.

Table 3 – Assigning a runway condition code (RWYCC)

Runway condition description	Runway condition code (RWYCC)
DRY	**6**
FROST **WET** (The runway surface is covered by any visible dampness or water up to and including 3 mm deep. **SLUSH** (up to and including 3 mm depth) **DRY SNOW** (up to and including 3 mm depth) **WET SNOW** (up to and including 3 mm depth)	**5**
COMPACTED SNOW (Outside air temperature minus 15 degrees Celsius and below)	**4**
WET ("Slippery wet" runway) **DRY SNOW** (more than 3 mm depth) **WET SNOW** (more than 3 mm depth) **DRY SNOW ON TOP OF COMPACTED SNOW** (Any depth) **WET SNOW ON TOP OF COMPACTED SNOW** (Any depth) **COMPACTED SNOW** (Outside air temperature above minus 15 degrees Celsius)	**3**
STANDING WATER (more than 3 mm depth) **SLUSH** (more than 3 mm depth)	**2**
ICE	**1**
WET ICE **WATER ON TOP OF COMPACTED SNOW** **DRY SNOW OR WET SNOW ON TOP OF ICE**	**0**

Table 4 – Correlation of runway condition code and pilot reports of runway braking action

Pilot report of runway braking action	Description	Runway condition code (RWYCC)
N/A		6
GOOD	Braking deceleration is normal for the wheel braking effort applied AND directional control is normal	5
GOOD TO MEDIUM	Braking deceleration OR directional control is between good and medium	4
MEDIUM	Braking deceleration is noticeably reduced for the wheel braking effort applied OR directional control is noticeably reduced	3
MEDIUM TO POOR	Braking deceleration OR directional control is between medium and poor	2
POOR	Braking deceleration is significantly reduced for the wheel braking effort applied OR directional control is significantly reduced	1
LESS THAN POOR	Braking deceleration is minimal to non-existent for the wheel braking effort applied OR directional control is uncertain	0

Table 5 – Runway condition assessment matrix (RCAM)

Runway condition assessment matrix (RCAM)			
Assessment criteria		Downgrade assessment criteria	
Runway condition code	Runway surface description	Aeroplane deceleration or directional control observation	Pilot report of runway braking action
6	• DRY	---	---
5	• FROST • WET (The runway surface is covered by any visible dampness or water up to and including 3 mm depth) ***Up to and including 3 mm depth:*** • SLUSH • DRY SNOW • WET SNOW	Braking deceleration is normal for the wheel braking effort applied AND directional control is normal.	GOOD
4	***-15ºC and Lower outside air temperature***: • COMPACTED SNOW	Braking deceleration OR directional control is between Good and Medium.	GOOD TO MEDIUM
3	• WET ("Slippery wet" runway) • DRY SNOW or WET SNOW (Any depth) ON TOP OF COMPACTED SNOW ***More than 3 mm depth:*** • DRY SNOW • WET SNOW ***Higher than -15ºC outside air temperature***[1]: • COMPACTED SNOW	Braking deceleration is noticeably reduced for the wheel braking effort applied OR directional control is noticeably reduced.	MEDIUM
2	***More than 3 mm depth of water or slush:*** • STANDING WATER • SLUSH	Braking deceleration OR directional control is between Medium and Poor.	MEDIUM TO POOR
1	• ICE [2]	Braking deceleration is significantly reduced for the wheel braking effort applied OR directional control is significantly reduced.	POOR
0	• WET ICE [2] • WATER ON TOP OF COMPACTED SNOW [2] • DRY SNOW or WET SNOW ON TOP OF ICE [2]	Braking deceleration is minimal to non-existent for the wheel braking effort applied OR directional control is uncertain.	LESS THAN POOR

[1] Runway surface temperature should preferably be used where available.
[2] The aerodrome operator may assign a higher runway condition code (but no higher than code 3) for each third of the runway, provided the procedure in paragraph 1.1.3.15 is followed.

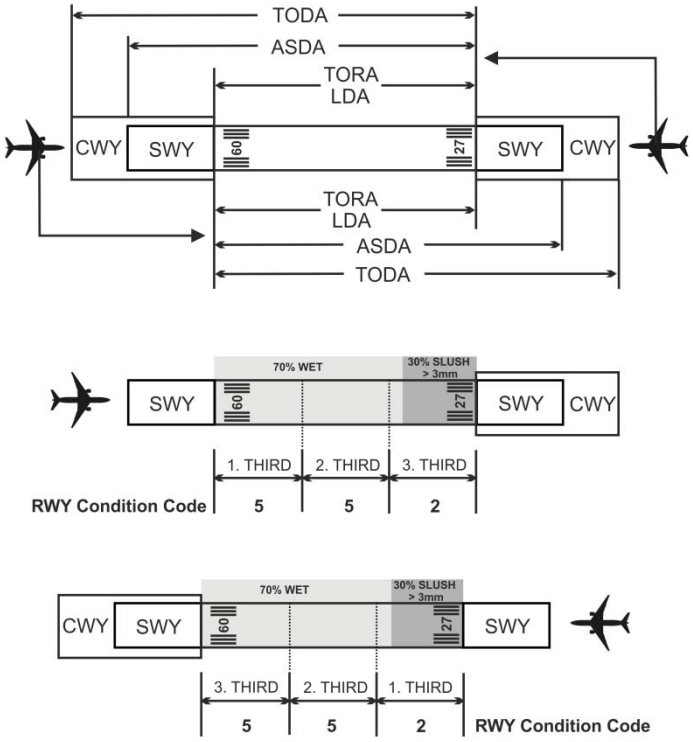

Figure 1. Reporting of runway condition code from ATS to flight crew for runway thirds

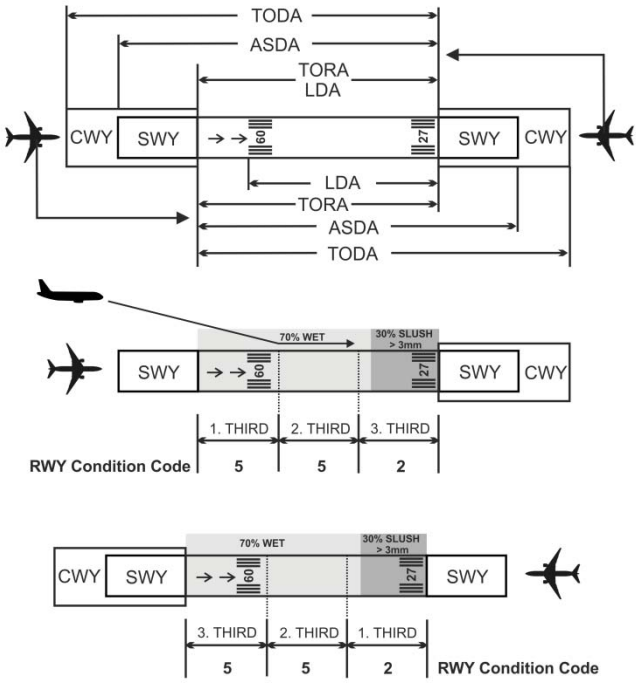

Figure 2. Reporting of runway condition code
for runway thirds from ATS to flight crew on a runway with displaced threshold

— — — — — — — —

Attachment A to Chapter 1, Section 1.1
METHODS OF ASSESSING RUNWAY SURFACE CONDITION

		ANNEX 14, Volume I, 6th Edition, July 2013	REMARK
DESIGN AND CONSTRUCTION	slope	3.1.13 Longitudinal slopes 3.1.19 Transverse slopes	
	Texture	3.1.26 **Recommendation.—**The average surface texture depth of a new surface should be not less than 1.0 mm.	
	Minimum friction level set by the State	3.1.23 A paved runway shall be so constructed as to provide surface friction characteristics at or above the minimum friction level set by the State.	The State set criteria for surface friction characteristics and output from State set or agreed assessment methods form the reference from which trend monitoring are performed and evaluated.
	Polishing	3.1.23 A paved runway shall be so constructed as to provide surface friction characteristics at or above the minimum friction level set by the State.	Polished Stone Value. (PSV-value) is a measure of skidding resistance on a small sample of stone surface, having being subjected to a standard period of polishing.

			Rubber build-up	Geometry change	Polishing
ASSESSMENT METHODS FOR MONITIORING TREND OF CHANGE TO SURFACE FRICTION CHARACTERISTICS	Visual - macrotexture	Visual assessment will only give a very crude assessment of the macrotexture. Extensive rubber build-up can be identified.	X		
	Visual - microtexture	Visual assessment will give a very crude assessment of the microtexture and to what degree the microtexture has been filled and covered by rubber.	X		
	Visual – runway geometry (ponding)	Visual assessment during a rain storm and subsequent drying process of the runway will reveal how the runway drains and if there has been any changes to runway geometry causing ponding. Depth of any pond can be measured by a ruler or any other appropriate depth measurement method/tool.		X	
	By touch - macrotexture	Assessment by touch can differentiate between degree of loss of texture but not quantifying it.	X		
	By touch - microtexture	Assessment by touch can identify if microtexture has been filled in/covered by rubber-build-up.	X		
	Grease smear method (MTD)	Measure a volume – Mean Texture Depth (MTD) primarily by using the grease smear method, is the measurement method used for research purposes related to aeroplane performance.	X		
	Sand (glass) patch method (MTD)	Measure a volume – Mean Texture Depth. The sand (glass) patch method are not identical to the grease smear method. There is at present no internationally accepted relationship between the two methods.	X		
	Laser – stationary (MPD) Laser – moving (MPD)	Measure a profile – Mean Profile Depth (MPD). There is no established relationship between MTD and MPD. The relationship must be established for the laser devices used and the preferred volumetric measurement method used.	X		

	Friction measurement – controlled applied water depth	A friction measurement is a system output which includes all the surface friction characteristics and characteristics of the measuring device itself. All other variables than those related to the surface friction characteristics must be controlled in order to relate the measured values to the surface friction characteristics. The system output is a dimensionless number which is related to the surface friction characteristics and as such is also a measure of macrotexture. (The system generated number needs to be paired with other information (assessment methods) to identify which surface friction characteristics that significantly influence the system output.) It is recognised that there is currently no consensus within the aviation industry how to control the uncertainty related to repeatability, reproducibility and time stability. It is paramount to keep this uncertainty as low as possibly, consequently ICAO has tightened the standards associated with use of friction measurement devices, including training of personnel who operates the friction measuring devices.	X		X
	Friction measurement – Natural wet conditions	Friction measurements performed under natural wet conditions during a rain storm might reveal if portions of a runway are susceptible to ponding and/or to fall below State set criteria.	X	X	X
	Modelling of water flow and prediction of water depth	Emerging technologies based on the use of a model of the runway surface describing its geometrical surface (mapped) and paired with sensor information of water depth allow real-time information and thus a complete runway surface monitoring, and anticipation of water depths.		X	

End of new text

— END —

International Civil Aviation Organization | Organisation de l'aviation civile internationale | Organización de Aviación Civil Internacional | Международная организация гражданской авиации | منظمة الطيران المدني الدولي | 国际民用航空组织

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Ref.: AN 4/28 – 18/86

14 August 2018

Subject: ICAO/ACI Symposium on Implementation of the New Global Reporting Format for Runway Surface Condition (GRF2019)
(Montréal, Canada, 26 to 28 March 2019)

Action required: Disseminate information as appropriate and register online by **1 March 2019**

Sir/Madam,

1. I have the honour to invite you to the joint International Civil Aviation Organization (ICAO)/Airports Council International (ACI) Symposium on Implementation of the New Global Reporting Format for Runway Surface Condition (GRF2019), which will be held at ICAO Headquarters in Montréal, Canada from 26 to 28 March 2019.

2. This symposium aims at increasing international awareness in advance of the November 2020 applicability date of the new ICAO methodology for assessing and reporting runway surface conditions. This new methodology, commonly known as the Global Reporting Format (GRF), ensures a harmonized assessment and reporting of runway surface conditions and a correspondingly improved flight crew assessment of take-off and landing performance. The preliminary list of objectives and topics for the programme of the symposium is attached.

3. The symposium will be followed by a half-day workshop on 28 March 2019, dedicated to training requirements and resources associated with the new methodology.

4. You are kindly requested to disseminate this invitation letter to all appropriate entities of your State, including, but not limited to, civil aviation authorities, aerodrome operators, aircraft operators, air navigation service providers, aeronautical information service providers and aerospace industry. Additional information regarding the meeting venue, hotel accommodations, visa requirements, and online registration will be available on the event website at http://www.icao.int/Meetings/GRF2019. Any queries regarding the symposium may be forwarded to GRF2019@icao.int. Participants should register no later than **1 March 2019**. The symposium will be held in English only.

Accept, Sir/Madam, the assurances of my highest consideration.

Fang Liu
Secretary General

Enclosure:
List of preliminary programme objectives

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ATTACHMENT to State letter AN 4/28 – 18/86

ICAO / ACI SYMPOSIUM ON IMPLEMENTATION OF THE NEW GLOBAL REPORTING FORMAT FOR RUNWAY SURFACE CONDITION (GRF2019)

(Montréal, Canada, 26 to 28 March 2019)

PRELIMINARY PROGRAMME OBJECTIVES

a) Increase global awareness and knowledge of the new methodology for assessing and reporting runway surface condition;

b) develop an awareness of implementation challenges and opportunities;

c) facilitate an exchange of best practices;

d) ensure an understanding of associated ICAO Standards and Recommended Practices (SARPs), Procedures for Air Navigation Services (PANS) requirements and guidance material;

e) establish the role for ICAO, international organizations and industry in global implementation;

f) develop an understanding of training and awareness needs; and

g) explore relevant new technology and future developments.

APPENDIX 2D

FOLLOW-UP ON RASG-MID/6 CONCLUSIONS AND DECISIONS RELATED TO RGS

CONCLUSIONS AND DECISIONS	CONCERNS/ CHALLENGES (RATIONALE)	DELIVERABLE/ TO BE INITIATED BY		TARGET DATE	STATUS/REMARKS
CONCLUSION 6/2: SAFETY MANAGEMENT IMPLEMENTATION That *States, regional and international organizations are invited to share tools and examples, which support effective safety management implementation, to be considered for posting on the ICAO safety management implementation website.*	Sharing of best practices	State Letter	ICAO	Jan. 2018	**Actioned** SL ME4-18/027 dated 25 January 2018
CONCLUSION 6/4: SHARING OF SAFETY RECOMMENDATIONS *That,* *a) States be urged to share their Safety Recommendations after investigation of accidents and incidents; and* *b) MID-SST to coordinate with MID-ASRT, ICAO and stakeholders the development of a RASG-MID Safety Advisory to consolidate a set of safety recommendations addressing the Focus Areas and Emerging Risks in the MID Region.*	Sharing of safety recommendations in order to agree on mitigation measures at regional level (Best practices)	State Letter RSA	ICAO MID-SST MID-ASRT ICAO Stakeholders	Jan. 2018 TBD	**Ongoing** SL ME4-18/028 dated 25 January 2018

CONCLUSIONS AND DECISIONS	CONCERNS/ CHALLENGES (RATIONALE)	DELIVERABLE/ TO BE INITIATED BY		TARGET DATE	STATUS/REMARKS
CONCLUSION 6/5: ADOPTION OF ISAGO AND IGOM FOR GROUND HANDLING OPERATIONS					**Actioned**
That, States be invited to:		State Letter	ICAO	Jan. 2018	SL ME4-18/028 dated 25 January 2018
a) encourage airlines and aerodrome operators to implement the procedures contained in the IATA Ground Operations Manual (IGOM) for harmonization purpose and to improve safety of Ground Handling Operations; and	Use of IATA Guidance material contained in the IGOM.				
b) use the IATA Safety Audit for Ground Operations (ISAGO) as a source of safety data which provide complementary information for the safety oversight activities of ground handling operations services.	Use of ISAGO as a source of complementary safety data for safety oversight activities				
CONCLUSION 6/6: DEVELOPMENT OF ADDITIONAL GROUND HANDLING OPERATIONS PROVISIONS					**Ongoing**
That, ICAO be invited to consider the development of additional Ground Handling Operations provisions.	Need for additional provisions/guidance on Ground Handling Operations	Additional Ground Handling Operations provisions	ICAO	TBD	

CONCLUSIONS AND DECISIONS	CONCERNS/ CHALLENGES (RATIONALE)	DELIVERABLE/ TO BE INITIATED BY		TARGET DATE	STATUS/REMARKS
CONCLUSION 6/7: EXPANSION OF THE RSP SCOPE *That, ICAO be invited to consider the expansion of the ICAO Runway Safety Programme (RSP) scope to include the movement area (including aprons).*	Inclusion of the movement area in RSP scope	Expansion of the ICAO RSP scope	ICAO	TBD	**Ongoing**
DECISION 6/12: RASG-MID SAFETY ADVISORY - WILDLIFE MANAGEMENT AND CONTROL *That, the RASG-MID Safety Advisory (RSA/13) on Wildlife Management and Control at **Appendix 3I** is endorsed and be published by the ICAO MID Office.*	Guidance material to the Wildlife Management and Control	RSA	RASG-MID	Sept. 2017	**Completed** SL ME 4–17/292 dated 23 October 2017 - RASG-MID Safety Advisory-13 (RSA-13) has been posted on the ICAO MID website.
DECISION 6/13: AMENDED RASG-MID SAFETY ADVISORY/12 – LASER ATTACK SAFETY GUIDELINES *That, the revised version of the RASG-MID Safety Advisory (RSA/12) on Laser Attacks at **Appendix 3J** is endorsed and be published by the ICAO MID Office.*	Updated guidance related to the Laser Attack Safety	RSA-Rev. 1	RASG-MID	Sept. 2017	**Completed** SL ME 4–17/291 dated 23 October 2017 RASG-MID Safety Advisory-12 (RSA-12) is available on the ICAO MID website.
CONCLUSION 6/14: REVISED MID REGION SAFETY STRATEGY *That, the revised version of the MID Region Safety Strategy at **Appendix 3N** is endorsed.*	Need to keep pace with developments, including the GASP 2017-2019	MID Region Safety Strategy (Edition 5)	RASG-MID	Sept. 2017	**Completed**

APPENDIX 2E

FOLLOW-UP ON RSC/6 CONCLUSIONS AND DECISIONS

CONCLUSIONS AND DECISIONS	CONCERNS/ CHALLENGES (RATIONALE)	DELIVERABLE/ TO BE INITIATED BY		TARGET DATE	STATUS/REMARKS
RSC CONCLUSION 6/3: REVISED RASG-MID SAFETY ADVISORY (RSA-11) SAFEGUARDING OF AERODROMES .					**Completed**
That, the revised RASG-MID Safety Advisory on Aerodrome Safeguarding (RSA-11) at **Appendix 3N**, which includes Aerodrome Safeguarding Toolkit is endorsed	Obstacles control on the aerodrome and in its vicinity	RSA on Aerodrome safeguarding	Egypt	June 2018	Posted on the ICAO MID website in June 2018.
RSC CONCLUSION 6/4: SURVEY ON AEP/ARFF LEVEL OF IMPLEMENTATION					**Ongoing**
That, *a) a survey on ARFF/AEP level of implementation be carried out; and* *b) the results of the survey be presented to the RGS WG/5 meeting for further course of actions*	- Effectiveness of Aerodrome Emergency Planning and the operability of the ARFF services at International Aerodromes	Questionnaire on AEP/ARFF Level of Implementation	Egypt supported by Saudi Arabia and UAE	Dec. 2017	

CONCLUSIONS AND DECISIONS	CONCERNS/ CHALLENGES (RATIONALE)	DELIVERABLE/ TO BE INITIATED BY		TARGET DATE	STATUS/REMARKS
RSC CONCLUSION 6/5 : AERODROME APRON MANAGEMENT AND GROUND HANDLING SERVICES *That,* *a) an Advisory Circular be developed on Aerodrome Apron Management; and* *b) a Seminar on Ground Handling be organized and hosted by UAE and supported by ICAO, IATA and Ground Handlers in 2019.*	- Ground Handling operations are a source of significant personnel safety and aircraft/equipment damage concerns	Advisory Circular on Aerodrome Apron Management Safety	UAE supported by Egypt and Saudi Arabia	June 2018	**Ongoing**

CONCLUSIONS AND DECISIONS	CONCERNS/ CHALLENGES (RATIONALE)	DELIVERABLE/ TO BE INITIATED BY		TARGET DATE	STATUS/REMARKS
RSC CONCLUSION 6/6: AERODROME SMS COMPLIANCE AND EFFECTIVENESS TOOLKIT AND AERODROME SMS WORKSHOP					**Ongoing**
That, *a) an aerodrome SMS Workshop be organized by ICAO back-to-back with the RGS WG/5 meeting with the technical support of Egypt and UAE; and* *b) sample Aerodrome SMS Compliance and Effectiveness Tool-Kit be developed and presented at the Aerodrome SMS Workshop.*	- Effectiveness of the Aerodrome SMS implemented at International Aerodromes Request to develop an	SMS compliance and effectiveness Tool Kit Regional Aerodrome SMS Workshop Draft SMS compliance & effectiveness Tool Kit	UAE Supported by Egypt and Saudi Arabia ICAO	Sept. 2018	Compliance and effectiveness Tool Kit developed The Workshop will be held back-to-back with the RGS WG/5

CONCLUSIONS AND DECISIONS	CONCERNS/ CHALLENGES (RATIONALE)	DELIVERABLE/ TO BE INITIATED BY		TARGET DATE	STATUS/REMARKS
RSC CONCLUSION 6/7: ***FURTHER SAFETY ENHANCEMENTS RELATED TO RUNWAY EXCURSIONS***					**Ongoing**
That, *a) a RASG-MID Safety Advisory on Monitoring and Reporting of Runway Surface Condition, be developed; and* *b) States be urged to report the Runway-Excursion-related occurrences on Annual basis to the ICAO MID Office.*	- Consistency of the runway surface condition reporting system, in terms of quality with aircraft operational performance	Draft Advisory Circular on Monitoring and Reporting of Runway Surface Condition	FAA supported by Egypt and UAE	May 2018	
RSC CONCLUSION 6/8: ***REVISED RASG-MID SAFETY ADVISORY ON WILDLIFE HAZARDS MANAGEMENT AND CONTROL (RSA-13)***					**Completed**
That, the revised RASG-MID Safety Advisory on WHMC (RSA-13) at ***Appendix 3Q,*** *which includes the WHMC Plan Template is endorsed.*	Effectiveness of Wildlife Hazards Management and Control	RSA on Wildlife Hazards Management and Control	Sudan supported by UAE and Egypt	Sep 2017	Posted on the ICAO MID website in June 2018.

APPENDIX 3A

STATUS OF THE MID REGION SAFETY INDICATORS TARGETS
(SAFETY INDICATORS TARGETS RELATED TO RGS ARE SHADED IN GREEN)

MID Region Safety Performance - Safety Indicators-Reactive

		Average 2013-2017		2017	
Safety Indicator	**Safety Target**	**MID**	**Global**	**MID**	**Global**
Number of accidents per million departures	Reduce/Maintain the regional average rate of accidents to be in line with the global average rate by **2016**	2.49	2.6	1.45	2.42
Number of fatal accidents per million departures	Reduce/Maintain the regional average rate of fatal accidents to be in line with the global average rate by **2016**	0.64	0.44	0	1.32
Number of Runway Safety related accidents per million departures	Reduce/Maintain the regional average rate of Runway Safety related accidents to be below the global average rate by **2016**	1.18	1.22	0	1.12
	Reduce/Maintain the Runway Safety related accidents to be less than 1 accident per million departures by **2016**	1.54			
Number of LOC-I related accidents per million departures	Reduce/Maintain the regional average rate of LOC-I related accidents to be below the global rate by **2016**.	0	0.08	0	0.05
Number of CFIT related accidents per million departures	Reduce/Maintain the regional average rate of CFIT related accidents to be below the global rate by **2016**.	0	0.02	0	0.02

Region Safety Performance - Safety Indicators-Proactive

Safety Indicator	Safety Target	MID	Remark
Regional average EI	Increase the regional average EI to be above 70% by **2020**	70.47	Target Achieved
Number of MID States with an overall EI over 60%.	11 MID States to have at least 60% EI by **2020**	10 States	
Number of MID States with an EI score less than 60% for more than 2 areas (LEG, ORG, PEL, OPS, AIR, AIG, ANS and AGA).	Max 3 MID States with an EI score less than 60% for more than 2 areas by 2017	7 States	
Number of Significant Safety Concerns	MID States resolve identified Significant Safety Concerns as a matter of urgency and in any case within 12 months from their identification. No significant Safety Concern by **2016**.	None	Target Achieved
Use of the IATA Operational Safety Audit (IOSA), to complement safety oversight activities.	a. Maintain at least 60% of eligible MID airlines to be certified IATA-IOSA at all times. b. All MID States with an EI of at least 60% use the IATA Operational Safety Audit (IOSA) to complement their safety oversight activities, by 2018.	57% (As of Sep 2017) 4 out of 10 States (40%)	
Number of certified international aerodrome as a percentage of all international aerodromes in the MID Region.	a. 50% of the international aerodromes certified by 2015. b. 75% of the international aerodromes certified by 2017.	58%	
Number of established Runway Safety Team (RST) at MID International Aerodromes.	50% of the International Aerodromes by 2020.	56%	

Region Safety Performance - Safety Indicators-Predictive

Safety Indicator	Safety Target	MID
Number of MID States, having completed the SSP gap analysis on iSTARS.	10 MID States by 2015	10 States
Number of MID States that have developed an SSP implementation plan.	10 MID States by 2015	8 States
Number of MID States with EI>60%, having completed implementation of SSP Phase 1.	All MID States with EI>60% to complete phase 1 by **2016**.	3 States (4 States-partially)
Number of MID States with EI>60%, having completed implementation of SSP Phase 2.	All MID States with EI>60% to complete phase 2 by the end of **2017**.	1 State (6 States-partially)
Number of MID States with EI>60%, having completed implementation of SSP Phase 3.	All MID States with **EI>60%** to complete phase 3 by the end of **2018**.	(7 States-partially)
Number of MID States with EI>60%, having completed implementation of SSP.	All MID States with EI>60% to complete SSP implementation by **2020**	None
Number of MID States with EI>60% that have established a process for acceptance of individual service providers' SMS.	a. 30% of MID States with EI>60% by 2015. b. 70% of MID States with EI>60% by 2016. c. 100% of MID States with EI>60% by 2017.	75%

APPENDIX 3B

Fourth MID Region Safety Summit
(Riyadh, Saudi Arabia, 2-3 Oct 2018)

Revised MID Region Safety Targets

STATUS OF THE MID REGION SAFETY INDICATORS TARGETS
(SAFETY INDICATORS TARGETS RELATED TO RGS ARE SHADED IN ORANGE)

Aspirational Goal: Zero fatality by 2030

Goal 1: Achieve a continuous reduction of operational safety risks

Safety Indicator	Safety Target	Timeline	Status
Number of accidents per million departures	~~Reduce/Maintain the~~ Regional average rate of accidents to be in line with the global average rate ~~by 2016 and beyond~~.	2016	
Number of fatal accidents per million departures	~~Reduce/Maintain the~~ Regional average rate of fatal accidents to be in line with the global average rate ~~by 2016~~	2016	
Number of fatalities per million departures	Number of fatalities per billion passengers carried (fatality rate) to be in line with the global average rate	2018	
Number of Runway ~~Safety~~ Excursion accidents per million departures	~~Reduce/Maintain the~~ Regional average rate of Runway ~~Safety~~ Excursion accidents to be below the global average rate ~~by 2016~~	2016	
Number of Runway ~~Safety~~ Incursion accidents per million departures	~~Reduce/Maintain the Runway Safety related accidents to be less than 1 accident per million departures by 2016~~ Regional average rate of Runway ~~Safety~~ Incursion accidents to be below the global average rate	2018	
Number of LOC-I related accidents per million departures	~~Reduce/Maintain the~~ Regional average rate of LOC-I related accidents to be below the global rate ~~by 2016~~	2016	
Number of CFIT related accidents per million departures	~~Reduce/Maintain the~~ Regional average rate of CFIT related accidents to be below the global rate ~~by 2016~~	2016	
Number of Mid Air Collision (accidents)	Zero Mid Air Collision accident	2018	

Safety Indicator	Safety Target	Timeline	Status
Number of Near Mid Air Collision (serious incidents)	Regional average rate of Near Mid Air Collision (serious incidents per million departures) to be less than **0.1** All States to reduce the rate of Near Mid Air Collision (AIRPROX) within their airspace by 2020	2020	

Goal 2: Strengthen States' safety oversight capabilities/Progressively increase the USOAP-CMA EI scores/results:

Safety Indicator	Safety Target	Timeline	Status
USOAP-CMA Effective Implementation (EI) results: a. Regional average EI b. Number of States with an overall EI over 60% c. Regional average EI by area d. Regional average EI by CE ~~Number of MIDStates with an EI score less than 60% for more than 2 areas (LEG, ORG, PEL, OPS, AIR, AIG, ANS and AGA).~~	~~Progressively increase the USOAP-CMA EI scores/results:~~ a. ~~Increase the r~~Regional average EI to be above 70% ~~by 2020~~ b. 11 MID States to have at least 60% EI ~~by 2020~~ c. Regional average EI for each area to be above 70% ~~by 2020~~ d. Regional average EI for each CE to be above 70% ~~by 2020~~ ~~Max 3 MIDStates with an EI score less than 60% for more than 2 areas by 2017.~~	a. 2020 b. 2020 c. 2020 d. 2020	
Number of Significant Safety Concerns (SSC)	a. No Significant Safety Concern (SSC) ~~by 2016~~. ~~States resolve identified Significant Safety Concerns~~ SSC, if identified, to be resolved as a matter of urgency, and in any case within 12 months from ~~their~~ its identification	2016	

Goal 3: Improve aerodrome safety:

Safety Indicator	Safety Target	Timeline	Status
Number of certified International Aerodrome as a percentage of all International Aerodromes in the MID Region	a. 50% of the International Aerodromes certified ~~by 2015~~ b. 75% of the International Aerodromes certified ~~by 2017~~	a. 2015 b. 2017	
Number of established Runway Safety Team (RST) at MID International Aerodromes.	50% of the International Aerodromes having established a RST ~~by 2020~~.	2020	

Goal 4: Expand the use of Industry Programmes:

Safety Indicator	Safety Target	Timeline	Status
Use of the IATA Operational Safety Audit (IOSA), to complement safety oversight activities.	a. Maintain at least 60% of eligible MID airlines to be certified IATA-IOSA at all times. b. All MID States with an EI of at least 60% use the IATA Operational Safety Audit (IOSA) to complement their safety oversight activities~~, by 2018~~.	a. N/A b. 2018	
Use of the IATA Safety Audit for Ground Operations (ISAGO) certification, as a percentage of all Ground Handling service providers	The IATA Ground Handling Manual (IGOM) endorsed as a reference for ground handling safety standards by all MID States. Pursue at least 50% increase in ISAGO registration (baseline 2017)	2020	
Use of the ACI Airport Excellence (APEX) in Safety programme	At least 1 ACI APEX in Safety conducted in 1 Airport of the Region per year	N/A	

Goal 5: Implementation of effective SSPs and SMSs:

Safety Indicator	Safety Target	Timeline	Status
Percentage of MID States that use ECCAIRS for the reporting of accidents and serious incidents.	a. ~~60%~~ 9 States ~~by 20198~~ b. ~~80%~~ 12 States ~~by 2020~~	a. 2019 b. 2020	
Number of States that have completed the SSP Gap Analysis on iSTARS	13 States ~~by 2020~~	2020	
Number of States that have developed an SSP implementation plan	13 States ~~by 2020~~	2020	
Regional Average SSP Foundation (in %)	70% ~~by 2022~~	2022	
Number of States that have fully implemented the SSP Foundation	10 States ~~by 2022~~	2022	
Number of States that have established an ALoSP	10 States ~~by 20~~25	2025	
Number of States that have implemented an effective SSP	~~10~~ 7 States ~~by 2025~~	2025	
~~Percentage~~ Number of States that have established a process for acceptance of individual service providers' SMS	~~80%~~ 12 States ~~by 2020~~	2020	
Number of States providing information on safety risks, including SSP SPIs, to the RASG-MID	7 States ~~by 2022~~	2020	
Establishment of a Regional mechanism for regional data collection, sharing and analysis	Regional Mechanism established ~~by 2018~~	2018	
~~Number of MID States with EI>60%, having completed implementation of SSP Phase 1.~~	~~All MID States with EI>60% to complete phase 1 by 2016.~~		

Safety Indicator	Safety Target	Timeline	Status
~~Number of MID States with EI>60%, having completed implementation of SSP Phase 2.~~	~~All MID States with EI>60% to complete phase 2 by 2017.~~		
~~Number of MID States with EI>60%, having completed implementation of SSP Phase 3.~~	~~All MID States with EI>60% to complete phase 3 by 2018.~~		
~~Number of MID States with EI>60%, having completed implementation of SSP.~~	~~All MID States with EI>60% to complete SSP implementation by 2020.~~		

Goal 6: Increase Collaboration at the Regional Level to enhance safety:

Safety Indicator	Safety Target	Timeline	Status
Number of States attending the RASG-MID meetings	At least 12 States from the MID Region	2019	
Number of States providing required data related to accidents, serious incidents and incidents to the MID-ASRT	All States from the MID Region	2020	
Number of States requiring and actively seeking assistance/support Number of States that received assistance/support through the RASG-MID, MENA RSOO and/or other NCLB mechanisms	All States having an EI below 60% to be member of the MENA RSOO All States having an EI below 60% to have an approved NCLB Plan of Actions for safety (agreed upon with the ICAO MID Office) SEI or Technical Assistance Mission/Project implemented for each assistance need identified by the RASG-MID	2019 2019	

Safety Indicator	Safety Target	Timeline	Status
Number of States, having an EI below 60% in some areas, delegating certain safety oversight functions to the MENA RSOO or other State(s)	Percentage of States, having an EI below 60% in some areas, delegating certain safety oversight functions to the MENA RSOO or other State(s), to be at least **50%**	2022	
Number of States that contribute to the implementation of SEIs and Technical Assistance Missions/Projects	7 States	2020	
Percentage of SEIs implemented in accordance with the agreed timeframe	80% of the SEIs	N/A	

Goal 7: Ensure the appropriate infrastructure is available to support safe operations:

Safety Indicator	Safety Target	Timeline	Status
Number of Air Navigation Deficiency Priority "U" identified by MIDANPIRG	No Air Navigation Deficiency Priority "U"	2022	

Goal 8: Monitor the fleet age:

Safety Indicator	Safety Target
*Average Fleet Age.	States are required to monitor their fleet age. No regional Safety Targets are defined.
*Percentage of fleet above 20 years of age.	

APPENDIX 3C

STATUS OF AERODROME CERTIFICATION IMPLEMENTATION IN MID REGION

	State	Number of Intl Aerodromes (AOP Table 1-1 -MID ANP)	Number of Certified Intl Aerodromes	Percentage Certified	List of Certified Intl Aerodromes	Remarks
1	Bahrain	1	1	100%	BAHRAIN/Bahrain Intl (OBBI)	
2	Egypt	7	5	71%	- CAIRO/Cairo Intl (HECA) - SHARM EL-SHEIKH/Sharm El Sheikh Intl (HESH) - HURGADA/Hurghada Intl (HEGN) - MARSA ALAM /Marsa Alam Intl (HEMA) - ASWAN/Aswan Intl (HESN)	Certification Status for LUXER/Luxor Intl Airport (HELX) is to be verified
3	Iran	9	4	44%	- TEHRAN/Mehrabad Intl (OIII) - ZAHEDAN/Zahedan Intl (OIZH) - YAZD /Yazd Intl (OIYY) - ISFAHAN/Isfahan Int'l (OIFM)	Certification Status for: TEHRAN/IKIA Intl (OIIE) and BANDAR Abbas /Bandar Abbas Intl (OIKB) are to be verified
4	Iraq	6	2	33%	- BAGHDAD/Baghdad Intl (ORBI) - ERBIL/Erbil Intl (ORER)	Information to be verified
5	Jordan	2	2	100%	- AMMAN/Queen Alia Intl (OJAI) - AQABA/ King Hussein Intl (OJAQ)	
6	Kuwait	1	1	100%	KUWAIT/Kuwait Intl (OKBK)	
7	Lebanon	1	0	0%		
8	Libya	3	0	0%		
9	Oman	2	2	100%	- MUSCAT/Muscat Intl (OOMS) - SALALAH/Salalah (OOSA)	

	State	Number of Intl Aerodromes (AOP Table 1-1 -MID ANP)	Number of Certified Intl Aerodromes	Percentage Certified	List of Certified Intl Aerodromes	Remarks
10	Qatar	2	2	100%	- DOHA/Doha Intl (OTBD) - DOHA/Hamad Intl (OTHH)	
11	Saudi Arabia	4	4	100%	- DAMMAM/Kind Fahid Intl (OEDF) - JEDDAH/King Abdulaziz Intl (OEJN) - MADINAH/Prince Mohammad Bin Abdulaziz Intl (OEMA) - RIYADH/King Khalid Intl (OERK)	
12	Sudan	4	3	75%	-KHARTOUM/Khartoum (HSSS) - EL OBEID/El Obeid (HSOB) - PORT SUDAN/Port Sudan (HSPN)	Certification Status for: NYALA/Nyala (HSNN) to be verified
13	Syria	3	0	0%		
14	UAE	8	8	100%	- ABU DHABI/Abu -Dhabi Intl (OMAA) - ABU DHABI/Al Bateen Intl (OMAD) - DUBAI/Dubai Intl (OMDB) - DUBAi/Al Maktoum Intl (OMDW) - AL AIN/Al Ain Intl (OMAL) - FUJAIRAH/Fujairah Intl (OMFJ) - RAS AL KHAIMAH/Ras Al Khaimah Intl (OMRK) - SHARJAH/Sharjah Intl (OMSJ	
15	Yemen	5	0	0%		
	Total Certified	**58**	**34**	**59%**		**MID Region Safety Target 75% by end of 2017**

APPENDIX 3D

Establishment of Runway Safety Teams (RSTs)

at International Aerodromes in the MID Region

(Updated September 2017)

	State	Number of Int'l Aerodromes	Number of established Runway Safety Teams	List of Aerodromes having established Runway Safety Team
1	**BAHRAIN**	1	1	Bahrain/Bahrain Intl (OBBI)
2	**EGYPT**	7	4	- Cairo/Cairo Intl (HECA) - Sharm El Sheikh Intl (HESH) - Hurghada Int'l (HEGN) - Marsa Alam Intl (HEMA)
3	**IRAN**	9	6	- Tehran/Mehrabad Intl (OIII) - Tehran/ IKIA Intl (OIIE) - Zahedan/Zahedan Intl (OIZH) - Yazd /Yazd Intl (OIYY) - Isfahan/Isfahan Int'l (OIFM) - Bandar Abbas /Bandar Abbas Intl (OIKB)
4	**IRAQ**	6		
5	**JORDAN**	2	1	- Aqaba/King Hussein Intl (OJAQ)
6	**KUWAIT**	1	1	Kuwait/Kuwait Intl (OKBK)
7	**LEBANON**	1		
8	**LIBYA**	3		
9	**OMAN**	2	2	- Muscat/Muscat Intl (OOMS) - Salalah/Salalah (OOSA)
10	**QATAR**	2	2	- Doha/Doha Intl (OTBD) - Doha/Hamad Intl (OTHH)

	State	Number of Int'l Aerodromes	Number of established Runway Safety Teams	List of Aerodromes having established Runway Safety Team
11	**SAUDI ARABIA**	4	4	- Dammam/King Fahad Intl (OEDF) - Jeddah/King Abdulaziz Intl (OEJN) - Riyadh/King Khalid Intl (OERK) - Madinah/Prince Mohammad Bin Abdulaziz Intl (OEMA)
12	**SUDAN**	4	4	- Khartoum/Khartoum (HSSS) - El Obeid/El Obeid (HSOB) - Port Sudan/Port Sudan (HSPN) - Nyala/Nyala (HSNN)
13	**SYRIA**	3		
14	**UNITED ARAB EMIRATES- UAE**	8	8	- Abu Dhabi/Abu -Dhabi Intl (OMAA) - Abu Dhabi/Al Bateen Intl (OMAD) - Dubai/Dubai Intl (OMDB) - Dubai/Al Maktoum Intl (OMDW) - Al Ain/Al Ain Intl (OMAL) - Fujairah/Fujairah Intl (OMFJ) - Ras Al Khaimah/Ras Al Khaimah Intl (OMRK) - Sharjah/Sharjah Intl (OMSJ
15	**YEMEN**	5		
	Total **Percentage**	**58**	**33** **57%**	

ICAO

SAFETY

Runway Safety Programme – Global Runway Safety Action Plan

First Edition, November 2017

Contents

Background

Since the first ICAO Global Runway Safety Symposium held in Montréal, Canada, in May 2011, ICAO and the Runway Safety Programme (RSP) Partners have been working together to minimize and mitigate the risks of runway incursions, runway excursions and other events linked to Runway Safety.

The ICAO runway safety programme involves substantial collaboration with partner organizations including: Airports Council International (ACI); the Civil Air Navigation Services Organisation (CANSO); the European Aviation Safety Agency (EASA); European Organisation for the Safety of Air Navigation (EUROCONTROL); the United States Federal Aviation Administration (FAA); the Flight Safety Foundation (FSF); the International Air Transport Association (IATA); the International Council of Aircraft Owner and Pilot Associations (IAOPA); the International Business Aviation Council (IBAC); the International Coordinating Council of Aerospace Industries Associations (ICCAIA); the International Federation of Airline Pilots' Associations (IFALPA); and the International Federation of Air Traffic Controllers' Associations (IFATCA).

In January 2017 the RSP Partners established a Runway Safety Action Plan Working Group (RSAP-WG) with the aim of reviewing the RSP achievements, objectives and priorities, and to develop a global runway safety action plan to be unveiled at the Second Global Runway Safety Symposium in Lima, Peru, 20-22 November 2017. The objectives of the RSAP-WG included:

- Review runway related accident and serious incident data;
- Conduct a safety risk assessment of runway safety accident occurrence categories;
- Identify the runway safety risk priorities and high risk accident categories;
- Identify appropriate global mitigation actions; and
- Develop a Global Runway Safety Action Plan.

Through a review and analysis of runway safety occurrence data and risk analysis, the RSAP-WG identified runway excursions and runway incursions as the main high risk occurrence categories. This Global Runway Safety Action Plan provides recommended actions for all runway safety stakeholders, with the aim of reducing the global rate of runway excursions and runway incursions.

Runway Safety Teams

The Runway Safety Programme promotes the establishment of Runway Safety Teams (RSTs) at airports as an effective means to reduce runway related accidents and incidents. The requirement for airports to establish a RST was one of the main outcomes of the first ICAO Global Runway Safety Symposium held in Montréal, Canada, in May 2011. The establishment of effective RSTs has helped to significantly reduce the runway safety related risks globally since 2011, with over 200 international airports world-wide having registered a RST with ICAO.

The Runway Safety Programme Partners continue to support the establishment of effective RSTs with Runway Safety Go-Team Missions. To register a RST or to request a Runway Safety Go-Team Mission please visit https://www.icao.int/safety/RunwaySafety.

Other ICAO Initiatives

ICAO is currently undertaking several other initiatives related to improving runway safety. In 2020 an amendment to Annex 14 Vol I will

become applicable, outlining an enhanced global reporting format for assessing and reporting runway surface conditions. It is hoped that this enhanced reporting system will significantly reduce the risks associated with runway contamination, one of the leading contributing factors of runway excursions.

A third edition to the ICAO PANS-Aerodrome (Doc 9981) is planned to be released in 2018 that will include a new chapter on Runway Safety.

ICAO is also working to enhance its Safety Management Programme activities, including an amendment to the ICAO Safety Management Manual (SMM)(Doc 9859), launching of a new Safety Management Implementation (SMI) website, updated State Safety Programme (SSP) tools and organising Safety Management Regional Symposia and Workshops.

Global Priorities for Runway Safety

The current edition of the Global Aviation Safety Plan (GASP) identifies runway safety as a global safety priority. Runway safety-related events as defined in the GASP and ICAO Annual Safety Report, include the following ICAO accident occurrence categories:

- Abnormal Runway Contact
- Bird Strike
- Ground Collision
- Ground Handling
- Runway Excursion
- Runway Incursion
- Loss of Control on the Ground
- Collision with Obstacle(s)
- Undershoot / Overshoot
- Aerodrome

The ICAO definitions of each runway safety occurrence category may be found in Appendix 1.

In line with safety management principles the RSAP-WG conducted an analysis of available runway safety accident and serious incident data and conducted a risk assessment to identify the runway safety high risk categories, in order to prioritize the efforts of the Runway Safety Programme.

The result of the analysis identified runway excursions as the highest risk category with a total risk weight significantly higher than all other categories (see Appendix 2 Table 1).

ICAO and Runway Safety Partners have also identified runway incursions as a high risk category. Although the number of runway incursion accidents reported between the period of 2008 to 2016 is very low, the number of runway incursion incidents remains high (at a rate of 1 report per day according to IATA STEADES data). There is a very high fatality risk associated with runway incursion accidents. The collision between two B747s at Los Rodeos Airport, Tenerife, in 1977, was the result of a runway incursion and remains the worst accident in aviation history, with the highest number of fatalities.

Although the Runway Safety Programme will focus efforts on the runway safety high risk categories, runway excursions and runway incursions, the other runway safety categories should not be forgotten. Aerodrome runway safety teams and safety management systems should continue to focus on all the runway safety accident categories.

This action plan provides recommended actions for runway stakeholders, including ICAO, the runway safety programme partners, State Civil Aviation Authorities, Regional Safety Oversight Organisations (RSOOs), Regional Aviation Safety Groups (RASGs), aircraft operators, aerodrome operators, air navigation service providers and Aerospace Industry. The actions detailed in this document are aimed at reducing the global rate of runway excursions and runway incursions. However, regions, States and

industry may have their own unique challenges, therefore the actions are not all encompassing. States, regions and industry should conduct their own regular risk analyses to identify their own operational safety risks and appropriate mitigations.

Runway Excursion and Runway Incursion Top Contributing Factors

The following tables present the top contributing factors for runway excursions and runway incursions. The RSAP-WG identified the top contributing factors by reviewing available data and information provided by Runway Safety Programme partners as well as through expert assessment. The references used for the analysis can be found in Appendix 3.

An analysis of runway excursion contributing factors performed by IATA and shared with the RSAP-WG was utilized as the basis for identifying the runway excursion contributing factors. Runway excursions, as per IATA, include landing overruns, take-off overruns, landing veer-offs, take-off veer-offs and taxiway excursions. IATA, through the Accident Classification Technical Group (ACTG), assigns contributing factors to runway/taxiway excursion accidents to better understand the correlations. Those common runway excursion contributing factors follow the Threat and Error Management (TEM) framework. The top contributing factors can be found in *IATAs Annual Safety Report – 2016, Addendum A: Top Contributing Factors – Section 4*.

Runway Excursion Top Contributing Factors

Contributing Factor	Description / Examples
Latent Conditions – *Conditions present in the system before the accident and triggered by various possible factors.*	
Flight Operations: Standard Operating Procedures and Checking	Inadequate or absent: • Standard Operating Procedures (SOPs) • Operational instructions and/or policies • Company regulations • Controls to assess compliance with regulations and SOPs
Flight Operations: Training systems	Inadequate training of flight crews.
Regulatory Oversight	Inadequate regulatory oversight by the State.
Safety Management	Absent or ineffective: • Safety policy and objectives • Safety risk management (including hazard identification process) • Safety assurance (including Quality Management) • Safety promotion

Contributing Factor	Description / Examples
Threats – An event or error that occurs outside the influence of the flight crew, but which requires crew attention and management if safety margins are to be maintained. ***Mismanaged threat: A threat that is linked to or induces a flight crew error.***	
Meteorology	Includes thunderstorms, poor visibility/Instrument Meteorological Conditions (IMC), wind, wind shear, gusty wind and icing conditions
Airport Facilities - Contaminated Runway/Taxiway	Poor braking action as a result of contaminated runways/taxiways.
Flight Crew Errors (Active Human Performance) – An observed flight crew deviation from organizational expectations or crew intentions. ***Mismanaged error: An error that is linked to or induces additional error or an undesired aircraft state.***	
Failure to go-around after Destabilisation during Approach	Flight crew does not execute a go-around after stabilization requirements are not met.
Manual Handling/Flight Controls	• Hand flying vertical, lateral, or speed deviations • Approach deviations by choice (e.g., flying below the glide slope) • Missed runway/taxiway, failure to hold short, taxi above speed limit • Incorrect flaps, speed brake, autobrake, thrust reverser or power settings
Standard Operating Procedures (SOP) Adherence	• Intentional or unintentional failure to cross-verify (automation) inputs • Intentional or unintentional failure to follow SOPs • Pilot flying makes own automation changes • Sterile cockpit violations
Undesired Aircraft States (UAS) – A flight-crew-induced aircraft state that clearly reduces safety margins; a safety-compromising situation that results from ineffective error management. An undesired aircraft state is recoverable. ***Mismanaged UAS: A UAS that is linked to or induces additional flight crew errors.***	
Unstable Approach	Vertical, lateral or speed deviations in the portion of flight close to landing. *Note: This definition includes the portion immediately prior to touchdown and in this respect the definition might differ from other organizations. However, accident analysis gives evidence that a destabilization just prior to touchdown has contributed to accidents in the past.*
Long/floated/bounced/firm/off-center/crabbed landing	

Runway Incursion Top Contributing Factors

Contributing Factor	Description / Examples
Latent Conditions – *Conditions present in the system before the accident and triggered by various possible factors.*	
Training	Includes inadequate training for air traffic controllers, pilots or airside vehicle drivers.
Procedures	Inadequate, inappropriate or absent procedures.
Regulatory Oversight	Inadequate regulatory oversight by the State.
Safety Management	Absent or ineffective safety management.
Aerodrome Design	Complex or inadequate aerodrome design such as the complexity of the layout of roads and taxiways adjacent to the runway, intersecting/crossing runways, insufficient spacing between parallel runways, departure taxiways that fail to intersect active runways at right angles, and no end-loop perimeter taxiways to avoid crossings. Inadequate or poorly maintained visual aids (including signs, marking and lighting). Poorly maintained runways (friction etc.).
Workplace Conditions	Covers issues such as the 'sterile cockpit' environment when pilots are taxiing. For air traffic controllers human-machine interface and ergonomics affecting their ability to maintain, as far as practicable, a continuous 'heads up' visual scan of the aerodrome with unimpeded visual 'lines of sight' or the use of surveillance systems such as A-SMGCS.
Threats – An event or error that occurs outside the influence of the flight crew, but which requires crew attention and management if safety margins are to be maintained.	
Meteorology	Includes poor visibility, rain, snow and icing conditions (that may obscure visual aids).
Active Human Performance – Human Performance Limitations (directly related to OSF and CC) including false perceptions; memory lapses; and reduced situational awareness.	
Pilot Factors	Includes inadvertent non-compliance with ATC instructions, in particular take-off or landing without clearance.
Airside Vehicle Driver Factors	May include not obtaining a clearance or non-compliance with ATC instructions.
Air Traffic Controller Factors	May include clearing aircraft to land/depart on an occupied runway, not monitoring aircraft position on approach to intersecting runways and clearing aircraft to cross runway with aircraft on departure/landing roll.
Communication Errors	A breakdown in communications between air traffic controllers and pilots or airside vehicle drivers often related to the read-back/hear-back procedure.

Runway Safety Recommended Actions

The following tables contain the global runway safety recommended actions identified by the RSAP-WG. These actions are intended to assist runway safety stakeholders in reducing their risks related to runway excursions and runway incursions. Each table identifies the mitigation actions for each stakeholder and associates the actions with the top contributing factors.

The timelines for the actions are categorized by colour into short-term actions and medium-term actions. Those actions without a colour indicator are considered to be on-going actions or best practices. The colour categorization is indicated in the table below.

	Target	Colour indicator
Short-Term	By 2020	
Medium-Term	By 2022	

Stakeholder	**ICAO**	
Runway Safety Priority	**Runway Excursions, Runway Incursions**	
Actions	**Action**	**Related Contributing Factor (if applicable)**
	1. Continue to coordinate the Runway Safety Programme.	**Latent Conditions** Training Regulatory Oversight Safety Management
	2. Update and enhance the Assembly Resolution related to runway safety (A37-6).	
	3. Develop runway safety standards and recommended practices for inclusion in ICAO Annex 14 Vol I.	
	4. Publish the third edition of PANS-Aerodromes (Doc 9981) to include a dedicated chapter on runway safety.	
	5. Review and enhance the Universal Safety Oversight Audit Programme (USOAP) Protocol Questions related to runway safety.	
	6. Review, enhance and consolidate, as appropriate, ICAO recommended practices related to runway safety, such as the Manual on the Prevention of Runway Incursions (Doc 9870), ICAO Runway Safety Team Handbook, Runway Safety Go-Team Methodology etc..	
	7. Review and develop, as appropriate, runway safety recommended practices related to runway excursions.	
	8. Review and develop, as appropriate, guidance to States on the implementation of State Runway Safety Programmes.	
	9. Review and develop, as appropriate, ICAO aviation training related to runway safety, including for runway excursion prevention.	
	10. Continue to maintain and enhance the ICAO runway safety website and I-Kit.	
	11. Conduct Regional Safety Management Symposia and workshops to include runway safety.	
	12. Develop tools, as appropriate, for monitoring and sharing runway safety data, such as web applications in the ICAO integrated Safety Trend Analysis and Reporting System (iSTARS).	
	13. Deploy the Global Reporting Format for assessing and reporting runway surface conditions in accordance with Annex 14 Vol I (Applicability date 5 November 2020).	**Threats** Contaminated runway/taxiway
References	ICAO Annex 14 Vol I ICAO PANS-Aerodromes (Doc 9981)	

	ICAO Manual on the Prevention of Runway Incursions (Doc 9870) ICAO Runway Safety Team Handbook Second Edition Runway Safety IKit (www.icao.int/safety/RunwaySafety)

<table>
<tr><td>Stakeholder</td><td colspan="2">Runway Safety Programme Partners</td></tr>
<tr><td>Runway Safety Priority</td><td colspan="2">Runway Excursions, Runway Incursions</td></tr>
<tr><td rowspan="3">Actions</td><td>Action</td><td>Related Contributing Factor (if applicable)</td></tr>
<tr><td>1. Continue to convene Runway Safety Programme Partner meetings at least annually to coordinate and collaborate on global runway safety related activities.

2. Continue to collaborate on the monitoring of runway safety related data, conduct risk analysis and identify appropriate mitigations.

3. Promote runway safety best practices and conduct awareness campaigns as appropriate.

4. Disseminate and promote the Global Runway Safety Action Plan.

5. Organize a global runway safety event at least every six years so long as runway safety continues to be identified as a global priority in the ICAO Global Aviation Safety Plan (GASP).</td><td>General Actions</td></tr>
<tr><td>6. Actively engage in RASG safety risk management activities related to runway safety.

7. Continue to support the establishment of effective Airport Runway Safety Teams (RST) with RS Go-Team Missions.</td><td>Latent Conditions
Regulatory Oversight</td></tr>
<tr><td>References</td><td colspan="2">ICAO PANS-Aerodromes (Doc 9981)
ICAO Safety Management Manual (Doc 9859)
ICAO Manual on the Prevention of Runway Incursions (Doc 9870)
ICAO Runway Safety Team Handbook Second Edition
Runway Safety IKit (www.icao.int/safety/RunwaySafety)</td></tr>
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<table>
<tr><td>Stakeholder</td><td colspan="2">Regional Safety Oversight Organisations (RSOOs) and Regional Aviation Safety Groups (RASGs)</td></tr>
<tr><td>Runway Safety Priority</td><td colspan="2">Runway Excursions, Runway Incursions</td></tr>
<tr><td rowspan="2">Actions</td><td>Action</td><td>Related Contributing Factor (if applicable)</td></tr>
<tr><td>1. Collect and perform analysis of available regional safety data to identify trends, risks and contributing factors. These activities to be reviewed and conducted on a recurring basis to reassess risks.

2. Develop and implement regional action plans based on the results of analysis and develop the means to measure implementation/effectiveness. For example RASGs shall develop:
a) Safety Enhancement Initiatives (SEIs)
b) Detailed Implementation Plans (DIPs)

3. Monitor and actively manage regional action plans, including:
a) Review resources (expertise, capital, systems) requirements
b) Facilitate partnerships between regional stakeholders (States, industry, RSOO/PIRGs)
c) Update action plans as necessary

4. Identify States that may require support and ensure such support is offered.</td><td>General Actions</td></tr>
<tr><td>References</td><td colspan="2">ICAO Annex 14 Vol I - Aerodromes
ICAO PANS-Aerodrome (Doc 9981)
ICAO Runway Safety Team Handbook Second Edition
ICAO Safety Management Manual (Doc 9859)
Runway Safety IKit (www.icao.int/safety/RunwaySafety)
ICAO RASG Website (www.icao.int/safety/Implementation/Lists/RASGSPIRGS)
ICAO RSOO Website (www.icao.int/safety/Implementation/Lists/COSCAP_RSOO)
The CAST/ICAO Common Taxonomy Team Website (www.intlaviationstandards.org)</td></tr>
</table>

Stakeholder	**State Civil Aviation Authorities, Aircraft Operators, Air Navigation Service Providers, Aerodrome Operators and Aerospace Industry**	
Runway Safety Priority	**Runway Excursions, Runway Incursions**	
Actions	**Action**	**Related Contributing Factor (if applicable)**
	1. Ensure all infrastructure, radio telephony phraseology, practices and procedures relating to runway operations are in compliance with ICAO, Regional and State provisions.	**Latent Conditions** Regulatory Oversight
	2. Ensure that information is collected on all runway incidents/accidents and perform analysis and risk assessments to identify risks and contributing factors. These activities to be reviewed and conducted on a recurring basis to reassess risks.	
	3. Develop and implement action plans to mitigate identified risks and monitor the implementation/effectiveness of those action plans.	
	4. Actively participate in aerodrome local runway safety team (RST) activities. *Note: Aerodrome Operators shall establish and lead effective RSTs. Not applicable to Aerospace Industry.*	
	5. Ensure that there is in place a mechanism of protection of information and non-punitive environment inside RSTs.	
	6. Implement the elements of Safety Management and ensure the implementation of Safety Management Systems is in accordance with the applicable ICAO provisions.	**Latent Conditions** Safety Management
	7. Make use of available resources such as the ICAO Safety Management Implementation Website and its safety management tools.	
	8. Ensure appropriate Safety Management training of staff and make use of available training such as the ICAO Safety Management Training Programme (SMTP).	
	9. Ensure runway safety training (e.g. runway excursion/incursion prevention) is part of initial and recurrent/refresher training regimes for all relevant operational staff. Joint training sessions between different stakeholders groups (e.g. pilots and controllers) should be encouraged.	**Latent Conditions** Training
References	ICAO Annex 14 Vol I - Aerodromes ICAO Annex 19 – Safety Managment ICAO PANS-Aerodromes (Doc 9981) ICAO Safety Management Manual (Doc 9859) ICAO Runway Safety Team Handbook Second Edition Runway Safety IKit (www.icao.int/safety/RunwaySafety)	

	ICAO Safety Management Implementation website (www.icao.int/safety/SafetyManagement/Pages/Examples-and-best-practices.aspx) SKYbrary – Runway Excursion and Runway Incursion Portals (www.skybrary.aero) The CAST/ICAO Common Taxonomy Team Website (www.intlaviationstandards.org) ACI Runway Safety Handbook – First Edition, 2014 ACI Safety Management Systems Handbook – First Edition, 2016

Stakeholder	**State Civil Aviation Authorities**	
Runway Safety Priority	**Runway Excursions**	
Actions	**Action**	**Related Contributing Factor (if applicable)**
	1. Regulators should establish requirements and activities aimed at improving runway safety through a State Runway Safety Programme. 2. Ensure the prevention of runway safety accidents and incidents is included in the State's SSP. 3. States that need support in safety oversight should acquire support by an RSOO or other competent organisation.	**Latent conditions** Regulatory Oversight
	4. Certify aerodromes used for international operations in accordance with Annex 14 Vol I. 5. Actively engage in RASG safety risk management activities related to runway safety.	
	6. Work with aircraft operators to improve adherence to SOPs. 7. Include requirements for manual flying skills on approach and landing in recurrent training for pilots. 8. Improve foundational aviation knowledge requirements for new pilots.	**Latent Conditions** Flight Ops: SOPs Flight Ops: Training
	9. Establish requirements for operators to define and apply stabilized approach procedures, including criteria suitable for their operations, and for a mandatory go-around to be flown if they are not met and maintained.	**Undesired Aircraft States** Unstable Approach Long/floated landing
	10. Establish requirements for a reporting format for assessing and reporting runway surface conditions in accordance with the ICAO Global Reporting Format in Annex 14 Vol I (Applicability date 5 November 2020).	**Threats** Contaminated runway/taxiway Meteorology
References	ICAO Annex 1 – Personnel Licensing ICAO Annex 14 Vol I - Aerodromes ICAO PANS-Aerodrome (Doc 9981) ICAO Manual on Certification of Aerodromes (Doc 9774) Final Report to FSF: Go-Around Decision-Making and Execution Project IATA/IFALPA/IFATCA/CANSO Unstable Approaches Risk Mitigation Policies, Procedures and Best Practices European Action Plan for the Prevention of Runway Excursions Edition 1.0	

	EASA: European Plan for Aviation Safety (EPAS) 2017-2021 Runway Safety IKit (www.icao.int/safety/RunwaySafety) SKYbrary – Runway Excursion Portal (www.skybrary.aero)

Stakeholder	**State Civil Aviation Authorities**	
Runway Safety Priority	**Runway Incursions**	
Actions	**Action**	**Related Contributing Factor (if applicable)**
	1. Regulators should ensure that runway safety is included in their safety oversight activities. 2. Ensure the prevention of runway safety accidents and incidents is included in the State's SSP. 3. States that need support in safety oversight should acquire support by an RSOO or other competent organisation.	**Latent conditions** Regulatory Oversight
	4. Actively engage in RASG safety risk management activities related to runway safety.	
	5. Ensure that the content of training materials for Pilots, Air Traffic Controllers and Airside Vehicle Drivers includes runway incursion prevention measures and awareness.	**Latent conditions** Training
References	ICAO Annex 19 – Safety Management ICAO Manual on the Prevention of Runway Incursions (Doc 9870) ICAO PANS ATM (Doc 4444) ICAO PANS Aerodromes (Doc 9981) European Action Plan for the Prevention of Runway Incursions V3.0 (November 2017) Runway Safety IKit (www.icao.int/safety/RunwaySafety) SKYbrary – Runway Incursion Portal (www.skybrary.aero)	

Stakeholder	**Aircraft Operators**	
Runway Safety Priority	**Runway Excursions**	
Actions	**Action**	**Related Contributing Factor (if applicable)**
	1. Improve crew resource management (CRM) in both initial and recurrent training to improve decision making, maximize communication and coordination and minimize the chance for errors.	**General Action**
	2. Continuously review SOPs to ensure they are applicable to the operation, up to date and tailored to the operation. 3. Use SMS reporting and line operations safety audit (LOSA) assessments to identify deficiencies in SOPs and SOPs compliance. 4. Work with manufacturers to improve SOPs based on operational experience. 5. Provide SOPs with clear limits and actions to be taken following an approach deviation. 6. Encourage a policy on rejected landing to include pilot training awareness. 7. Ensure that policies, procedures and training follow available best practices. Training may include, but not be limited to, the following: a) Assessment and analysis of non-normal situations not covered by SOPs. b) Effective use of new technologies to determine landing distance in all weather conditions. c) Planning and conducting approaches with appropriate contingency plans. d) Preparing for a go-around in the event of deteriorations of weather conditions. e) Manual flying skills on approach and landing. f) Bounced landing recovery techniques. g) Train pilots in crosswind and tailwind landings up to the maximum manufacturer-certified winds. h) Enhance crew resource management (CRM) in both initial and recurrent training to improve decision making, maximize communication and coordination and minimize the chance for errors.	**Latent Conditions** Flight Ops: SOPs Flight Ops: Training

	8. Review recommendations from available resources to identify ways to increase awareness of weather and airport surface conditions by pilots.	**Threats** Meteorology Contaminated runway/taxiway
	9. Ensure that go-around policies, procedures and training follows available resources and best practices. 10. Encourage the use of manual flying on approach and landing when weather conditions allow to maintain manual manipulation skills. 11. Include awareness of results of approach deviations from SOPs during training. 12. Use root-cause analysis of SOP non-compliance to improve SOPs.	**Active Human Performance** Failure to GOA after Destabilized Approach Manual Handling / Flight Controls SOP Adherence
	13. Establish, implement, and maintain a suitable accident prevention and flight safety program, which includes a comprehensive Flight Data Monitoring (FDM) programme. 14. Work with ANSP/Air Traffic Services Unit (ATSU) to implement procedural changes to systematically reduce the rate of un-stabilized approaches to runways identified as higher risk by FDM data analysis. 15. Equip aircraft with runway overrun awareness and alerting systems, as appropriate.	**Undesired Aircraft States** Unstable Approach Long/floated landing
References	FSF Report: Go-Around Decision-Making and Execution Project FSF Report: Reducing the Risk of Runway Excursions IATA/IFALPA/IFATCA/CANSO Unstable Approaches Risk Mitigation Policies, Procedures and Best Practices European Action Plan for the Prevention of Runway Excursions Runway Safety IKit (www.icao.int/safety/RunwaySafety) FAA Runway Excursions website (www.faa.gov/airports/runway_safety/excursion) IATA Guidance Material for Improving Flight Crew Monitoring (http://www.iata.org/whatwedo/ops-infra/training-licensing/Pages/index.aspx) IATA Runway Excursion Risk Reduction Toolkit (www.iata.org/iata/RERR-toolkit/main.html) SKYbrary - Runway Excursion Portal (www.skybrary.aero) EASA: European Plan for Aviation Safety (EPAS) 2017-2021	

<table>
<tr><td>Stakeholder</td><td colspan="2">Aircraft Operators</td></tr>
<tr><td>Runway Safety Priority</td><td colspan="2">Runway Incursions</td></tr>
<tr><td rowspan="4">Actions</td><td>Action</td><td>Related Contributing Factor (if applicable)</td></tr>
<tr><td>1. Provide training and assessment for pilots regarding aerodrome signage, markings and lighting.
2. Ensure SOPs are clear, concise and follow available best practices and guidance.
3. Ensure pilots are made aware of any safety significant airport information.</td><td>Latent conditions
Training
Procedures
Active Human Performance</td></tr>
<tr><td>4. Make use of suitable technologies to assist in improving situational awareness especially during low-visibility operations, such as Improved Resolution Airport Moving Maps, Electronic Flight Bags, Enhanced Vision Systems and Head up Displays (HUD).</td><td>Threats
Meteorology
Active Human Performance</td></tr>
<tr><td>5. Assess pilot’s operational radio telephony communications. Areas that should be targeted include, but are not limited to:
a) Ensure all communications associated with runway operations at international airports are in aviation English.
b) Ensuring the use of standard phraseologies in accordance with applicable State regulations and ICAO provisions (e.g. ICAO Manual of Radiotelephony (Doc 9432)).
6. Ensure Pilots are timely and accurately informed of information about aerodrome works.</td><td>Active Human Performance</td></tr>
<tr><td>References</td><td colspan="2">ICAO Annex 10 – Aeronautical Telecommunications
ICAO Manual on the Prevention of Runway Incursions (Doc 9870)
ICAO Manual of Radiotelephony (Doc 9432)
ICAO PANS Ops (Doc 8168)
Runway Safety IKit (www.icao.int/safety/RunwaySafety)
SKYbrary - Runway Incursion Portal (www.skybrary.aero)
European Action Plan for the Prevention of Runway Incursions V3.0 (November 2017)</td></tr>
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<tr><td>Stakeholder</td><td colspan="2">Air Navigation Service Providers</td></tr>
<tr><td>Runway Safety Priority</td><td colspan="2">Runway Excursions</td></tr>
<tr><td rowspan="3">Actions</td><td>Action</td><td>Related Contributing Factor (if applicable)</td></tr>
<tr><td>1. Review processes covering the timely provision of essential information on aerodrome conditions and other safety significant information such as weather, wind and runway surface conditions.</td><td>Threats
Contaminated runway/taxiway

Meteorology</td></tr>
<tr><td>2. Reduce ATM related risk factors that can contribute to unstable approaches and take appropriate actions (Airspace design/approach, procedures, controller actions and instructions etc.).</td><td>Undesired Aircraft States
Unstable Approach</td></tr>
<tr><td>References</td><td colspan="2">ICAO Annex 11 – Air Traffic Services

ICAO PANS-ATM (Doc 4444)

FSF Report: Go-Around Decision-Making and Execution Project

FSF Report: Reducing the Risk of Runway Excursions

IATA/IFALPA/IFATCA/CANSO Unstable Approaches Risk Mitigation Policies, Procedures and Best Practices

European Action Plan for the Prevention of Runway Excursions Edition 1.0

EASA: European Plan for Aviation Safety (EPAS) 2017-2021

Runway Safety IKit (www.icao.int/safety/RunwaySafety)

FAA Runway Excursions website (www.faa.gov/airports/runway_safety/excursion)

SKYbrary – Runway Excursion Portal (www.skybrary.aero)</td></tr>
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Stakeholder	**Air Navigation Service Providers**	
Runway Safety Priority	**Runway Incursions**	
Actions	**Action**	**Related Contributing Factor (if applicable)**
	1. Ensure that runway safety is included in initial and refresher training for Air Traffic Control staff. 2. Assess and where necessary improve procedures for air traffic controllers and ensure procedures follow available best practices and guidance. Some areas where procedures should be improved include, but are not limited to, the following: a) Procedures that assist to maintain good situational awareness for controllers, pilots and airside vehicle drivers. b) Procedures for when an aircraft or airside vehicle becomes lost or uncertain of its position on the manoeuvring area. c) Procedures for runway inspections. d) Aircraft runway clearance procedures.	**Latent conditions** Training Procedures
	3. Make use of technologies (such as A-SMGCS, stop bars and ARIWS) to improve situational awareness and provide warnings of runway incursions to pilots, controllers and vehicle drivers.	**Active Human Performance** **Threats** Meteorology
	4. Enable controllers to maintain a 'heads up, eyes outside' posture with unimpeded visual lines of sight to all parts of the manoeuvring area as far as practicable, and whilst taking into consideration the availability of technological solutions that can provide an alternative view (e.g. A-SMGCS). 5. Improve the use of controller memory aids to reduce the possibility of controllers issuing conflicting ATC clearances for aircraft, vehicles or persons to occupy the runway. 6. Assess air traffic controllers' operational radiotelephony communications. Targeted areas should include, but not be limited to: a) Ensuring the use of full aircraft or airside vehicle call signs for all runway operation communications. b) Establish and follow procedures to avoid confusion due to same or similar call signs. c) Ensuring the use of standard phraseologies in accordance with applicable State regulations and ICAO provisions (e.g. ICAO Manual of Radiotelephony (Doc 9432)). d) Monitoring and ensuring the proper use of the read back procedure.	**Active Human Performance** **Latent Conditions** Workplace Conditions

	7. Ensure all communications associated with runway operations at international airports are in aviation English. 8. Use a common frequency for runway operations (to increase situational awareness of pilots, drivers, ATCOs).	
	9. Ensure all air traffic controllers are properly informed about planned aerodrome works. 10. Ensure proper coordination between the ANSP and Aerodrome Operator is in place for any planned Aerodrome works. 11. Ensure that all air traffic controllers are aware of identified runway incursion 'Hot Spots' and mitigate the associated risks.	**Latent Conditions** Aerodrome Design **Active Human Performance** Communication Errors
References	ICAO Manual on the Prevention of Runway Incursions (Doc 9870) ICAO PANS ATM (Doc 4444) ICAO PANS Aerodromes (Doc 9981) European Action Plan for the Prevention of Runway Incursions V3.0 (November 2017) Runway Safety IKit (www.icao.int/safety/RunwaySafety) SKYbrary – Runway Incursion Portal (www.skybrary.aero)	

<table>
<tr><td>Stakeholder</td><td colspan="2">Aerodrome Operators</td></tr>
<tr><td>Runway Safety Priority</td><td colspan="2">Runway Excursions</td></tr>
<tr><td rowspan="5">Actions</td><td>Action</td><td>Related Contributing Factor (if applicable)</td></tr>
<tr><td>1. All runway ends shall have a runway end safety area (RESA) as required by ICAO Annex 14 Vol I, or appropriate mitigations such as arresting systems for aircraft overruns.</td><td rowspan="2">General Actions</td></tr>
<tr><td>2. Ensure that infrastructure restrictions such as changes to the published declared distances and runway length available are communicated in a timely and effective manner.</td></tr>
<tr><td>3. Establish effective airport runway safety teams (RSTs).

4. Ensure proper interface between the airport RST and the airport’s SMS.

5. Conduct runway safety awareness campaigns that focus on local issues.</td><td>Latent Conditions
Regulatory Oversight
Safety Management</td></tr>
<tr><td>6. Implement an enhanced global reporting format for assessing and reporting runway surface conditions as set out in the amendment to ICAO Annex 14 Vol I (applicable 2020) and ensure staff are appropriately trained on its use (ICAO training material to be published in 2018).

7. Ensure that runways, runway strips, manoeuvring areas and their associated visual aids such as signage, marking, lighting, etc. conform to ICAO Annex 14 Vol I specifications. In particular, paved runways shall be constructed or resurfaced as to provide such friction characteristics at or above the minimum friction level set by the State.

8. Make use of any available technologies, such as wind shear warning systems, where appropriate.

9. Ensure that runway conditions are reported in a timely manner.</td><td>Threats
Contaminated runway/taxiway
Meteorology</td></tr>
<tr><td>References</td><td colspan="2">ICAO Annex 14 Vol I - Aerodromes
ICAO PANS-Aerodromes (Doc 9981)
ICAO Runway Safety Team Handbook Second Edition
FSF Report: Reducing the Risk of Runway Excursions
European Action Plan for the Prevention of Runway Excursions Edition 1.0
EASA: European Plan for Aviation Safety (EPAS) 2017-2021
Runway Safety IKit (www.icao.int/safety/RunwaySafety)
SKYbrary – Runway Excursion Portal (www.skybrary.aero)</td></tr>
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	ACI Runway Safety Handbook – First Edition, 2014 ACI Safety Management Systems Handbook – First Edition, 2016

Stakeholder	**Aerodrome Operator**	
Runway Safety Priority	**Runway Incursions**	
Actions	**Action**	**Related Contributing Factor (if applicable)**
	1. Through the RST conduct safety risk assessments to evaluate risks posed by operational changes such as: a) the volume and density of aircraft and vehicle traffic increases significantly; b) operations in lower visibility conditions than currently permitted are planned; and c) the aerodrome layout has changed, i.e. new runways, taxiways, or aprons are brought into operation. And develop specific recommendations to reduce identified risks. 2. Conduct runway safety awareness campaigns that focus on local issues and mitigations.	**Latent conditions** Regulatory Oversight Safety Management
	3. Establish and implement a formal "maneuvering area driver training and assessment programme" and periodically review driver guidelines. Pay particular attention to the following areas: a) Improving requirements and training for driving in adverse weather conditions, particularly low visibility and driving at night. b) Reviewing Airside Vehicle Driver training programme against available best practices and guidelines. c) Ensuring that procedures for the control of all vehicles on the maneuvering area are developed and implemented in coordination with air traffic control. 4. Co-ordinate and ensure implementation of Low Visibility procedures.	**Active Human Performance** **Threats** Meteorology
	5. Through the RST identify local runway incursion "Hot Spots" through investigation reports and other suitable data and take actions as follows: a) Publish charts showing hot spots and ensure they are checked regularly for accuracy, revised as needed, distributed locally, and published in the AIP. b) Employ suitable strategies to remove or mitigate hazards associated with identified "Hot Spots" at the earliest opportunity. 6. Consider implementing available technologies such as A-SMGCS and Autonomous Runway Incursion Warning System (e.g. runway status lights).	**Aerodrome Design** **Active Human Performance**

	7. Ensure that any new infrastructure or changes to existing infrastructure take runway incursion risks and their mitigations into consideration. Make use of available best practices and guidance materials. 8. Ensure that any planned works undergoes a safety assessment by the aerodrome RST and SMS to identify any risks and take appropriate mitigation actions. Ensure all relevant stakeholders (ANSPs, Operators etc.) are properly informed of any planned works in advance, including the results of the risk analysis. 9. Ensure that any signs with the potential for confusion during works in progress are properly concealed.	
References	ICAO Annex 14 Vol I – Aerodromes ICAO Aerodrome Design Manual (Doc 9157) ICAO PANS Aerodromes (Doc 9981) ICAO Manual on the Prevention of Runway Incursions (Doc 9870) ICAO Runway Safety Team Handbook Second Edition European Action Plan for the Prevention of Runway Incursions V3.0 (November 2017) Runway Safety IKit (www.icao.int/safety/RunwaySafety) SKYbrary – Runway Incursion Portal (www.skybrary.aero) ACI Runway Safety Handbook – First Edition, 2014 ACI Safety Management Systems Handbook – First Edition, 2016	

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<tr><td>Stakeholder</td><td colspan="2">Aerospace Industry</td></tr>
<tr><td>Runway Safety Priority</td><td colspan="2">Runway Excursions</td></tr>
<tr><td rowspan="5">Actions</td><td>Action</td><td>Related Contributing Factor (if applicable)</td></tr>
<tr><td>1. Aircraft manufacturers should monitor and analyse all runway excursions worldwide for the aircraft they produce and share the lessons learned with operators and other stakeholders.</td><td rowspan="2">General Actions</td></tr>
<tr><td>2. Continue development of on-board real time monitoring and alerting systems to reduce the risk of overrun and veer-offs during landing.</td></tr>
<tr><td>3. Aircraft manufacturers should work with operators to improve SOP guidance based on operational experience.

4. Train for effective use of new technology to determine landing distance in all weather conditions.</td><td>Latent Conditions
Flight Ops: SOPs
Flight Ops: Training</td></tr>
<tr><td>5. Continue development of stable approach and energy management monitoring and alerting systems.

6. Aircraft manufacturers should provide SOP guidance with clear limits and actions to be taken following an approach deviation.</td><td>Active Human Performance
Failure to Go-Around after Destabilized Approach
Manual Handling / Flight Controls</td></tr>
<tr><td>References</td><td colspan="2">FSF Report: Go-Around Decision-Making and Execution Project
FSF Report: Reducing the Risk of Runway Excursions
IATA/IFALPA/IFATCA/CANSO Unstable Approaches Risk Mitigation Policies, Procedures and Best Practices
European Action Plan for the Prevention of Runway Excursions Edition 1.0
EASA: European Plan for Aviation Safety (EPAS) 2017-2021
Runway Safety IKit (www.icao.int/safety/RunwaySafety)
SKYbrary – Runway Excursion Portal (www.skybrary.aero)</td></tr>
</table>

Stakeholder	**Aerospace Industry**	
Runway Safety Priority	**Runway Incursions**	
Actions	**Action**	**Related Contributing Factor (if applicable)**
	1. Develop/improve and make available pilot visual aid enhancement technologies such as improved resolution airport moving maps, enhanced vision systems and Head up Displays (HUD).	**Threats** Meteorology
	2. Consider development of runway collision avoidance systems using aircraft and airside vehicle positional data.	**Active Human Performance**
References	European Action Plan for the Prevention of Runway Incursions V3.0 (November 2017) EASA: European Plan for Aviation Safety (EPAS) 2017-2021 Runway Safety IKit (www.icao.int/safety/RunwaySafety) SKYbrary – Runway Incursion Portal (www.skybrary.aero)	

Appendix 1 – Current ICAO Runway Safety Accident Category Definitions (As per CICTT Aviation Occurrence Categories)

Category	Description
Abnormal Runway Contact (ARC)	Any landing or take-off involving abnormal runway or landing surface contact.
Bird Strike (Bird)	A collision / near collision with or ingestion of one or several birds.
Ground Collision (GCOL)	Collision while taxiing to or from a runway in use.
Ground Handling (RAMP)	Occurrences during (or as a result of) ground handling operations.
Runway Excursion (RE)	An event in which an aircraft veers off or overruns off the runway surface during either take-off or landing.
Runway Incursion (RI)	Any occurrence at an aerodrome involving the incorrect presence of an aircraft, vehicle or person on the protected area of a surface designated for the landing and take-off of aircraft.
Loss of Control on the Ground (LOC-G)	Loss of aircraft control while the aircraft is on the ground.
Collision with Obstacle(s) (CTOL)	Collision with obstacle(s), during take-off or landing whilst airborne.
Undershoot / Overshoot (USOS)	A touchdown off the runway surface.
Aerodrome (ADRM)	Occurrences involving aerodrome design, service, or functionality issues.

CICTT Aviation Occurrence Categories may be found at www.intlaviationstandards.org

Appendix 2 – Runway Safety Related Accident and Serious Incident Statistics

The Runway Safety Programme's Runway Safety Action Plan Working Group (RSAP-WG) conducted a review of available accident and serious incident data and conducted a risk assessment in order to identify runway safety priorities and to prioritize runway safety improvement initiatives.

The RSAP-WG reviewed air transport accident and serious incident data from 2008 to 2016 for aircraft with a maximum take-off weight (MTOW) greater than 5700 kg. Events related to runway safety include the following ICAO accident occurrence categories:

- Abnormal Runway Contact
- Bird Strike
- Ground Collision
- Ground Handling
- Runway Excursion
- Runway Incursion
- Loss of Control on the Ground
- Collision with Obstacle(s)
- Undershoot / Overshoot
- Aerodrome

The definition of each accident category may be found in Appendix 1.

Figure 1 below shows the trend of runway safety accidents and serious incidents for the period 2008-2016 while Figure 2 shows the number of fatal accidents within that same period. The number of runway safety related accidents remains high, although the majority of the accidents are survivable with only 4 per cent of reported occurrences resulting in a fatal accident.

Figure 1: Total Runway Safety Accidents / Serious Incidents 2008-2016 (ICAO ADREP Data)

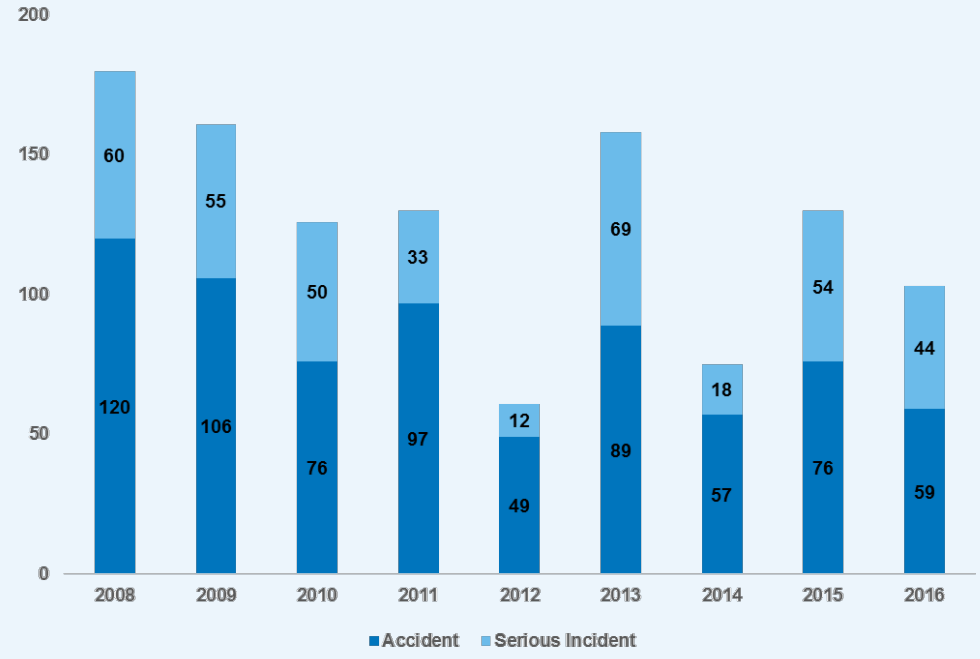


Figure 2: Number of runway safety fatal accidents per year 2008-2016 (ICAO ADREP Data)

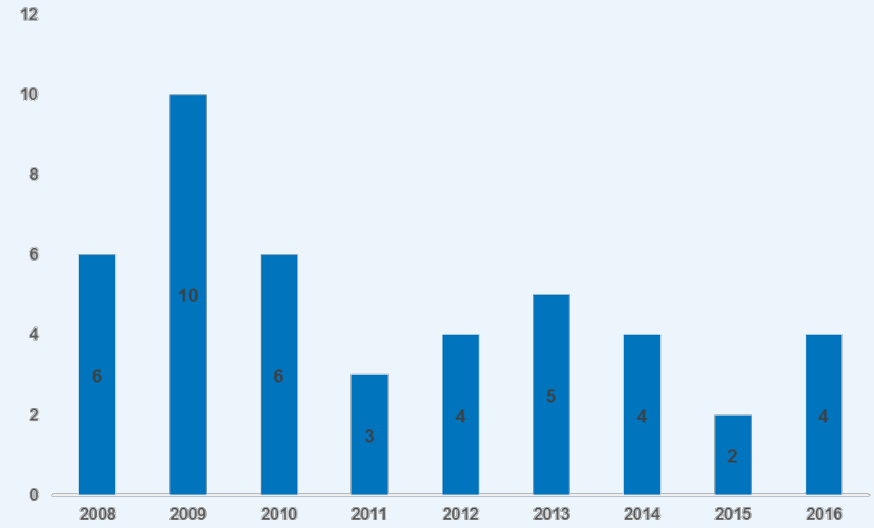
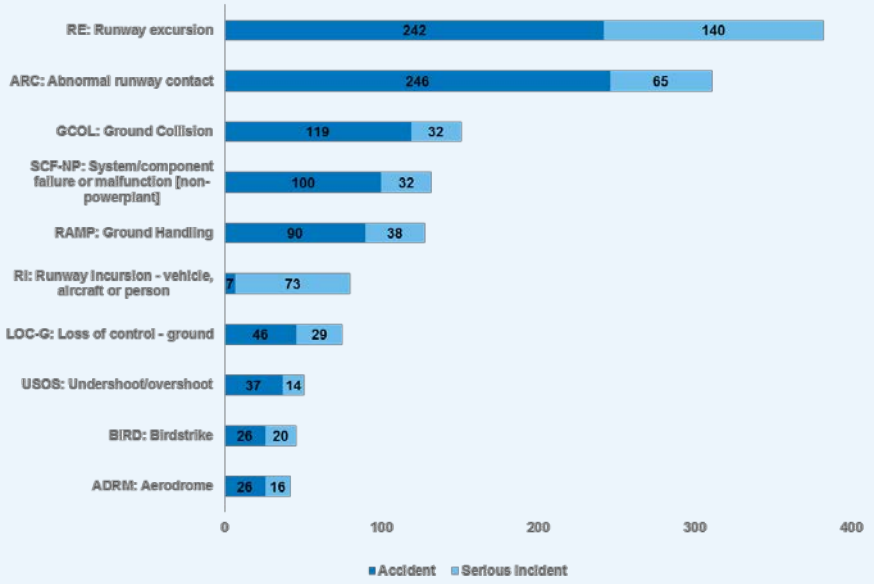


Figure 3 below shows the breakdown of runway safety accidents and serious incidents by occurrence category. Runway excursion was the top category with 34 per cent of reports. The next two highest occurrence categories reported were abnormal runway contact and ground collision, with 28 per cent and 14 per cent of reports respectively. The top three categories accounted for 76 per cent of the runway safety accidents and serious incidents during the reporting period.

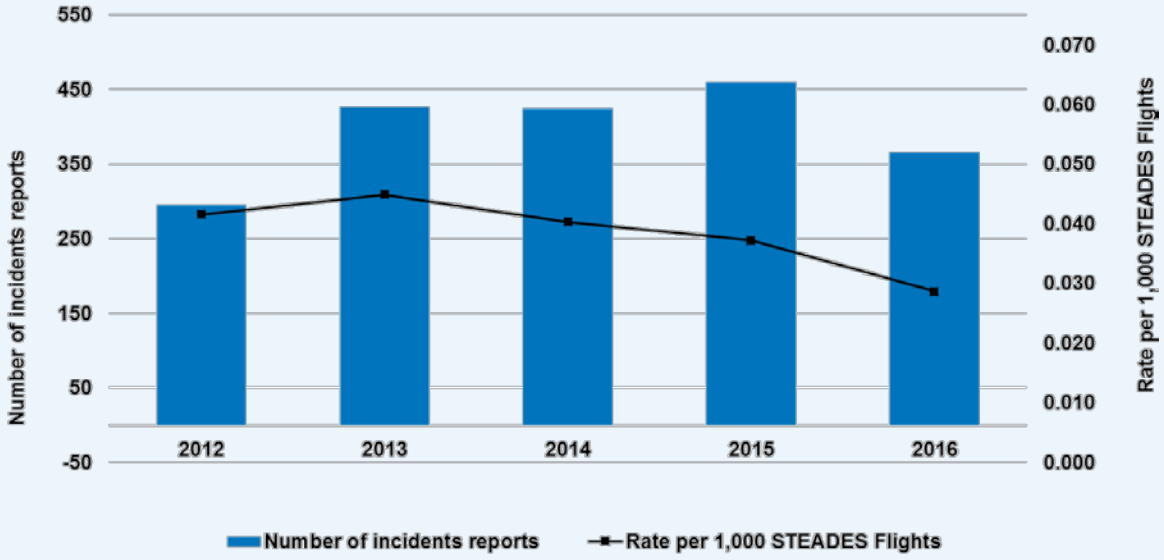
Figure 3: Runway Safety Accidents / Serious Incidents by Occurrence Category 2008-2016 (ICAO ADREP Data)



Runway Incursions

Although the runway incursion accidents reported between the period of 2008 to 2016 is very low, the number of runway incursion incidents remains high. An analysis by IATA of runway incursion incidents reported in their STEADES database shows that on average there is a runway incursion event reported in STEADES every day, with a total of 1,971 reports from 2012-2016. Figure 6 below shows the yearly distribution of runway incursion reported incidents from 2012 to 2016.

Figure 4: Runway incursion incidents yearly distribution 2012-2016 (IATA STEADES)



Runway Safety Risk Index

The RSAP-WG conducted a safety risk assessment of the runway safety occurrence categories to confirm runway safety risk priorities and to identify appropriate mitigation measures.

A runway safety risk index methodology developed by the FAA was used to assess the risk and severity of the runway safety occurrence categories. The risk index methodology uses modelling to assign risk weights to the outcomes of an event such as fatalities, injuries, aircraft damage, and each type of runway occurrence. The weights are based on "proximities" to fatalities and gives "credit" for saving lives and minimally-damaged aircraft.

Figure 7 below shows the normalized cumulative weight and the number of incidents from 2008 to 2016, while Table 1 shows the total risk weight and average risk weight per runway safety related occurrence category. Runway excursions has the highest risk category with a total risk weight significantly higher than all other categories.

Figure 5: Total runway safety events and cumulative risk weight, 2008-2016 (ICAO ADREP Data)

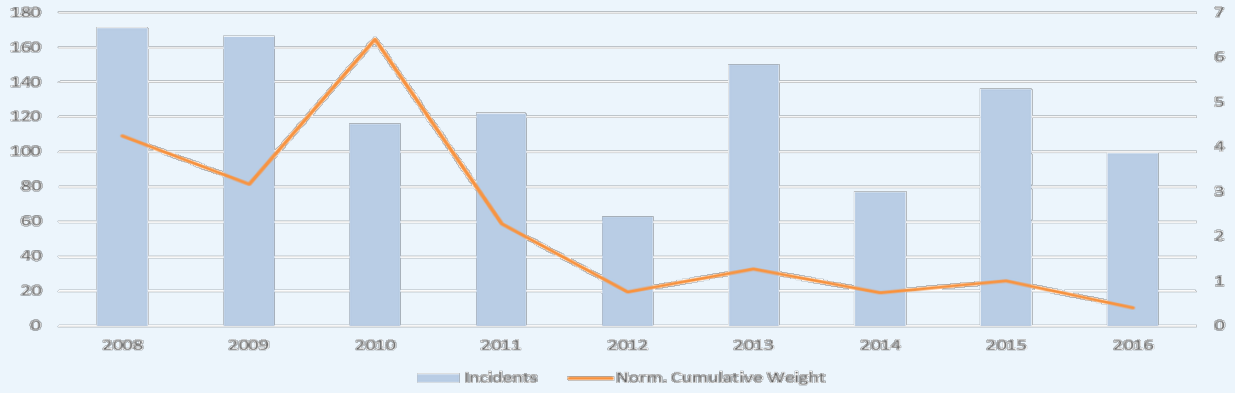


Table 1: Total risk weight and average risk weight per runway safety occurrence category

Incident Type	Total Risk Weight	Average Risk Weight
RE: Runway excursion	390.7	0.96
GCOL: Ground Collision	64.7	0.43
ARC: Abnormal runway contact	60.7	0.19
USOS: Undershoot/overshoot	57.7	1.13
CTOL: Collision with obstacle(s) during take-off and landing	32.9	1.49
LOC-G: Loss of control - ground	9.8	0.13
RI: Runway incursion - vehicle, aircraft or person	0.87	0.01

Appendix 3 – References

- ACI Runway Safety Handbook – First Edition, 2014
- ACI Safety Management Systems Handbook – First Edition, 2016
- EASA European Plan for Aviation Safety (EPAS) 2017-2021
- EUROCONTROL Study: Runway Incursion Incidents in Europe - Safety Functions Maps analysis of 2013 - 2015 data sample
- EUROCONTROL Study: Runway Incursion Serious Incidents & Accidents - SAFMAP analysis of 2006 - 2016 data sample
- European Action Plan for the Prevention of Runway Excursions Edition 1.0
- European Action Plan for the Prevention of Runway Incursions V3.0 (November 2017)
- FAA National Runway Safety Plan 2015-2017
- FAA Runway Incursion Safety Issue - Safety Risk Management Document
- FAA Runway Safety Metric Weighting Scheme
- FAA Runway Safety Report 2013-2014
- Flight Safety Foundation's Go-Around Decision-Making and Execution Project – March 2017
- Flight Safety Foundation's report on Reducing the Risk of Runway Excursions – May 2009
- IATA/IFALPA/IFATCA/CANSO Unstable Approaches Risk Mitigation Policies, Procedures and Best Practices
- IATA Annual Safety Report – 2016, Addendum A: Top Contributing Factors – Section 4
- ICAO Annex 1 – Personnel Licensing
- ICAO Annex 14 – Aerodromes
- ICAO Annex 19 – Safety Management
- ICAO Global Aviation Safety Plan 2017 – 2019 (Doc 10004)
- ICAO Manual on the Prevention of Runway Incursions (Doc 9870)
- ICAO PANS-Aerodromes (Doc 9981)
- ICAO Circular 329 - Assessment, Measurement and Reporting of Runway Surface Conditions
- ICAO Safety Management Manual (Doc 9859)
- ICAO Runway Safety Team Handbook Edition 2.0
- ICAO Safety Report 2017 Edition

APPENDIX 3F

RASG-MID SAFETY ADVISORY – xx

(RSA-xx)

March 2018

MID-Region

Apron Management

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These guidelines are developed by the Runway and Ground Safety Working Group (RGS WG), as part of MID-RAST/RGS/3 DIP deliverables, based on the work of the UAE General Civil Aviation Authority in collaboration with the Egyptian Civil Aviation Authority, ICAO MID Regional Office and the Regional Aviation Safety Group - Middle East (RASG-MID).

The guidance materials have been adapted, based on regional input, from UK CAP 642 publication as of January 2014.

Disclaimer

This document is intended to provide guidance for civil aviation regulators, aerodrome operators and other stakeholders involved in the safety oversight of Certified Aerodromes.

This document has been compiled by members of the aviation industry to enhance aviation safety. It is not intended to supersede or replace existing materials produced by the State or in ICAO SARPs. The distribution or publication of this document does not prejudice the State's ability to enforce existing National regulations. To the extent of any inconsistency between this document and the National/International regulations, standards, recommendations or advisory publications, the content of the National/International regulations, standards, recommendations and advisory publications shall prevail.

Regional Safety Advisory

TABLE OF CONTENTS

INTRODUCTION

BACKGROUND

This advisory publication was developed further to the expertise and experience of the General Civil Aviation Authority of the United Arab Emirates and Egyptian Civil Aviation Authority based on their regulation, guidance materials and processes in support of the runway and ground safety enhancement initiatives undertaken by the ICAO Regional Aviation Safety Group – Middle East (RASG-MID) and the associated Runwa`y & Ground Safety Working Group (RSG WG).

This publication provides guidance material to promote safe and efficient apron management. This publication provides a regulatory framework supported by detailed guidance material. Note that apron pavement maintenance and physical characteristics are not included within the scope of this advisory.

The Detailed Implementation Plan for the Safety Enhancement Initiative delivered by this publication is as follows:

xxxx

Without an effective safety oversight regime, States' efforts to assess and improve aerodrome runway and ground safety may be thwarted or addressed in an inconsistent manner.

Whilst this Safety Advisory provides a readily adoptable materials for regulation and guidance material related to apron safety, it is essential for all States to ensure adequate legal and regulatory frameworks.

PURPOSE

The purpose of this Safety Advisory is to provide model elements for regulation and guidance material in support of apron safety. The guidance consists of the following elements:

Model Regulation as it pertains Apron Management
(Chapter 1)

Model **Guidance Material** to be considered…
(Chapter 2)

Model **Safety Committee** guidance…
(Appendix A)

These guidelines are based on the work carried out by the General Civil Aviation Authority of the United Arab Emirates and Egyptian Civil Aviation Authority as an integral part of their commitment to enhance aerodrome ground safety through the creation of materials to support apron management.

In doing so, there is one single concern: **safety**.

This Safety Advisory serves to further empower States in their efforts to improve apron safety through provision of model regulation and processes.

USING THIS SAFETY ADVISORY

The Table of Contents provides an overview of the materials which may be used by States as part of their safety oversight of Certified Aerodromes through proactive oversight of Aerodrome Infrastructure Projects.

Each chapter of this Safety Advisory includes proposed application of the model elements for the consideration, adaptation and adoption of States. The Safety Advisory does not have to be read in order from beginning to end; particular paragraphs may be consulted as required.

The reader will choose the depth at which the Safety Advisory will be used at any given time. Reading may range from using the Table of Contents or elements of the model materials as a benchmark for gap analysis – to adopting and/or adapting the content of the model elements.

CHAPTER 1
REGULATION IN SUPPORT OF APRON MANAGEMENT

1.1 Application

National Civil Aviation Regulations should support safe management of aprons. Below are sample clauses and definitions which should be considered by each State.

1.2 Model Regulation: Definitions

1.2.1 **Aerodrome Traffic Density.**

a) Light. Where the number of movements in the mean busy hour is not greater than 15 per runway or typically less than 20 total aerodrome movements.

b) Medium. Where the number of movements in the mean busy hour is of the order of 16 to 25 per runway or typically between 20 to 35 total aerodrome movements.

c) Heavy. Where the number of movements in the mean busy hour is 26 or more per runway or typically more than 35 total aerodrome movements.

Note 1: The number of movements in the mean busy hour is the arithmetic mean over the year of the number of movements in the daily busiest hour.

Note 2: Either a take-off or a landing constitutes a movement.

1.2.2 **Air Traffic Services Unit** - A generic term meaning variously, air traffic control unit, aerodrome flight information services unit, flight information centre or air traffic services reporting office.

1.2.3 **Apron.** A defined area, on a land aerodrome, intended to accommodate aircraft for purposes of loading or unloading passengers, mail or cargo, fuelling, parking or maintenance.

1.2.4 **Apron Management Service.** A service provided to regulate the activities and the movement of aircraft and vehicles on an apron.

1.2.5 **Manoeuvring Area.** That part of an aerodrome to be used for the take-off, landing and taxiing of aircraft, excluding aprons.

1.2.6 **Movement Area.** That part of an aerodrome to be used for the take-off, landing and taxiing of aircraft, consisting of the Manoeuvring Area and the apron(s).

Note: Manoeuvring Area and Movement Area are generic terms intended to describe the 'airside' part of an aerodrome, rather than just those pavements or surfaces on which aircraft movements take place.

1.2.7 **Runway**. A defined rectangular area on a land aerodrome, prepared for the landing and take-off run of aircraft along its length.

1.2.8 **Taxiway.** A defined path on a land aerodrome established for the taxiing of aircraft and intended to provide a link between one part of the aerodrome and another, including:

a) Aircraft Stand Taxilane. A portion of an apron designated as a taxiway and intended to provide access to aircraft stands only**.**

b) Apron Taxiway. A portion of a taxiway system located on an apron and intended to provide a through taxi route across the apron.

c) Rapid Exit Taxiway. A taxiway connected to a runway at an acute angle and designed to allow landing aeroplanes to turn off at higher speeds than are achieved on other exit taxiways thereby minimizing runway occupancy times.

1.3 Model Regulation: Applicability of Regulation

1.3.1 Rule

The condition of the Movement Area and the operational status of related facilities shall be monitored in regular basis and reports on matters of operational significance affecting aircraft and aerodrome operations shall be provided in order to take appropriate action, particularly in respect of the following:

a) Construction or maintenance work;

b) Rough or broken surfaces on a runway, a taxiway or an apron;

c) Water on a runway, a taxiway or an apron;

d) Other contaminants on a runway, taxiway or apron;

1.3.2 Rule

Runway and Movement Area Inspections

1.3.2.1 Inspections of the Movement Area to assess its operational status shall be carried out each day at least twice at a Certified Aerodrome.

Guidance Material: *Where there is a potential for an increase in FOD, the inspection rate should be increased.*

Guidance Material: *The Aerodrome Operator should ensure all personnel assessing and reporting runway surface conditions are trained and competent in the assessment of runway surface friction characteristics.*

1.3.2.2 The minimum number of inspections shall be increased by one where Aerodrome Traffic Density is considered to be Medium or Heavy**.**

1.3.2.3 An Aerodrome Operator shall inspect an aerodrome, as the circumstances require, to ensure aviation safety:

a) as soon as practicable, after any Aircraft Accident or Incident;

b) during any period of construction or repair of the aerodrome facilities or equipment that is critical to the safety of aircraft operation;

c) after any period of adverse weather; or

d) at any other time when there are conditions at the aerodrome that could affect aviation safety.

1.3.3 **Rule**

Aprons should be kept clear of contaminants to the extent necessary to enable aircraft to manoeuvre safely or, where appropriate, to be towed or pushed.

1.3.4 **Rule**

The following aerodrome facilities shall be provided with a secondary power supply capable of supplying power when there is a failure of the primary power supply:

a) illumination of apron areas over which passenger aircraft are being handled;

b) floodlighting on a designated isolated aircraft parking positions if provided.

1.3.5 **Rule**

Unserviceability markers shall be displayed wherever any portion of a taxiway, apron or holding bay is unfit for the movement of aircraft but it is still possible for aircraft to bypass the area safely. On a Movement Area used at night, unserviceability lights shall be used.

Note: Unserviceability markers and lights are used for such purposes as warning pilots of a hole in a taxiway or apron pavement or outlining a portion of pavement, such as on an apron, that is under repair. They are not suitable for use when a portion of a runway becomes unserviceable, nor on a taxiway when a major portion of the width becomes unserviceable. In such instances, the runway or taxiway is normally closed.

1.3.6 **Rule**

Low Visibility Taxi Routes

a) Low visibility taxi routes shall be established and enforced in LVC to facilitate navigation, reduce traffic complexity and minimise risk of runway incursions;

b) LVP taxi routes shall minimise manoeuvring between runway and apron;

c) SMGCS and signs shall support standard LVP taxi routes; and

d) LVP taxi routes shall be indicated on charts.

1.3.7 **Rule**

Direct speech circuits shall be provided between the Air Traffic Services Unit and:

a) The unit providing approach control services;

b) Apron Control;

c) The Meteorological Office;

d) Maintenance personnel responsible

1.3.8 **Rule**

Apron Management Service

An appropriate Apron Management Service shall be provided on an apron by the Aerodrome Operator, in order to:

a) regulate movement with the objective of preventing collisions between aircraft, and between aircraft and obstacles;

b) regulate entry of aircraft into, and coordinate exit of aircraft from, the apron with the Air Traffic Services Unit; and

c) ensure safe and expeditious movement of vehicles and appropriate regulation of other activities.

1.3.9 **Rule**

When the Air Traffic Services Unit does not participate in the Apron Management Service, procedures shall be established to facilitate the orderly transition of aircraft between the apron management unit and the Air Traffic Services Unit.

Note: Guidance on an apron management service is given in the ICAO Airport Services Manual (Doc 9137), Part 8, and in the ICAO Manual of Surface Movement Guidance and Control Systems (SMGCS) (Doc 9476).

1.3.10 ***Rule***

An Apron Management Service shall be provided with radiotelephony communications facilities. All vehicles/personnel involved with the facilitating the movement of aircraft shall be equipped with a serviceable receive/transmit airband radio.

1.3.11 ***Rule***

Where low visibility procedures are in effect, persons and vehicles operating on an apron shall be restricted to the essential minimum.

Note: Guidance on related special procedures is given in the ICAO Manual of Surface Movement Guidance and Control Systems (SMGCS) (Doc 9476).

1.3.12 ***Rule***

An emergency vehicle responding to an emergency shall be given priority over all other surface movement traffic.

1.3.13 ***Rule***

A vehicle operating on an apron shall give way to:

a) an aircraft taxiing, about to taxi, or being pushed or towed;

b) an emergency vehicle; or

c) to other vehicles in accordance with local airport regulations.

1.3.14 ***Rule***

An aircraft stand shall be visually monitored to ensure that the recommended clearance distances are provided to an aircraft using the stand and to ensure the stand is clear of FOD.

1.3.15 ***Rule***

A vehicle shall be operated:

a) on a Manoeuvring Area only as authorised by Air Traffic Services Unit or an authority as defined by the Aerodrome Operator; and

b) on an apron only as authorised by the appropriate Aerodrome Operator.

1.3.16 ***Rule***

The driver of a vehicle on the Movement Area shall comply with all mandatory instructions conveyed by aerodrome markings and signs unless otherwise authorised by:

a) the Air Traffic Services Unit when on the manoeuvring area; or

b) the appropriate designated authority when on the apron.

1.3.17 ***Rule***

The driver of a vehicle on the Movement Area shall be appropriately qualified and competent for the tasks to be performed and unless unsafe to do so shall comply with the instructions issued by:

a) the Air Traffic Services, when on the Manoeuvring Area; and

b) the appropriate designated service provider, when on the apron.

1.3.18 ***Rule***

The driver of a radio-equipped vehicle shall establish satisfactory two-way radio communication with the aerodrome Air Traffic Services Unit before entering the Manoeuvring Area and with the appropriate authorisation before entering the apron. The driver shall maintain a continuous listening watch on the assigned frequency when on the Movement Area.

1.3.19 ***Rule***

The driver of a vehicle on the Manoeuvring Area should hold a valid ~~UAE~~ national driving licence, be appropriately trained for the tasks to be performed and shall hold an appropriate Airport Driving Permit. The driver of a vehicle on the apron area should be appropriately trained for the tasks to be performed and shall hold an appropriate Airport Driving Permit.

1.5 Model Process for CAA evaluation of apron Management

1.5.1 Purpose

To provide guidance to state to evaluate of apron management established by Aerodrome Operators. These process may be include in caa policy and procedure manual as part of Aerodrome Certification mechanism and during periodic surveillance audits or during the change management process.

1.5.2 Applicability

This model Procedure is applicable to evaluate of requirement of apron management

1.5.3 Regulatory System

a. Civil Aviation Law […..]
b. [Caa Regulation]
c. [Advisory Circular]
d. [Inspector Handbook/ …]
e. […]

1.5.4 Responsibilities

a. The Head of Aerodrome Safety & Standards department or (equivalent dep.) which is responsible for aerodrome certification and surveillance, Assigns team leader and team members for aerodrome certification or during aerodrome surveillance mission

c- The Team Leader (Lead Aerodrome Certification and Surveillance Inspectors, (LACSI) prepares and initiates the inspection program, Team members (Aerodrome Certification and Surveillance Inspectors, (ACSI) conduct the inspection purpose (certification / surveillance) according to templates ref. to 1.5.5.4

1.5.5 Procedure

1.5.5.1 Introduction

Apron management service is a service provided to regulate the activities and the movement of aircraft and vehicles on an apron. Depending upon volume of traffic and operating conditions, an appropriate apron management service is provided by an ATS unit, aerodrome operating authority or by a cooperative combination of these. When the aerodrome control tower partially participate in the apron management service, inspector is obligated to see that procedures are established and followed to facilitate the orderly transition of functions between the apron management unit and the aerodrome control tower.

1.5.5.2 Process:

1- The inspector needs to have planned the inspection of this area with attention to all the elements of the system including:

- responsibilities,
- operating procedures,
- reporting and communication and training as well as seeking assurances about system compliance,

2- The inspector will be keen to see evidence of coordinated and disciplined activity on the maneuvering area during normal and low visibility operations.

3- Salient points issues/areas to inspect and for audit questions

a) Arrangements between air traffic control and the apron management unit;

b) Clear bifurcation of scope of work for the ATC and Apron management.

c) Arrangements for allocating aircraft parking positions;

d) Arrangements for initiating engine start and ensuring clearance of aircraft push-back;
e) Marshalling service,
f) Arrangement for Follow me services.
g) Arrangement expeditious movement of vehicles,
h) Arrangement for the highly coordinated two way communications between the aircraft, vehicle, apron control unit and the ATC.
i) Where conditions warrant, provision of separate communication channels including procedures for use of visual signals.
j) System and procedure for aircraft and vehicle control in low-visibility operating conditions.
k) Arrangement for integrated system of surveillance, control and guidance, and communication with the use of technology applications. (ASMGCS) in these areas.
l) Procedure for reporting of incidents/ accidents.

1.5.5.3 Records:

Evaluation Forms and Correspondences are maintained in Aerodrome file no.[…**……]**

1.5.5.4 Forms

Appendix B: CAA certification checklist (apron management assessment)
Appendix C: CAA surveillance checklist (apron management assessment)

CHAPTER 2
GUIDANCE IN SUPPORT OF APRON MANAGEMENT

2.1 Application

The model guidance provides a benchmark for States in their efforts to support safety apron management.

Wherever the word "organisation(s)" is used, it shall mean operator(s)/organisation(s)….

This GM is applicable to all UAE based organisations required to comply with National Civil Aviation Regulations.

2.2 Model Guidance: Introduction

2.2.1 Purpose

The advice and guidance in this document is best described as 'accepted or best practice' and represents an acceptable way of doing things. It illustrates how risks might be identified and provides advice about how airside safety can be managed within the context of a systematic and structured management approach - a Safety Management System (SMS). Service providers and their contracted organisations (at every level) are ultimately responsible for deciding on the appropriateness and applicability of any particular safety arrangements with respect to their own specific circumstances and for monitoring the suitability and success of the arrangements collaboratively.

This GM sets out the hazards and risks that respective organisations operating in the airside environment are expected to consider but it should be noted that this guidance is not intended to be totally comprehensive in the detail provided; nor does adherence to its content absolve those responsible for securing a safe operating and working environment from considering hazards and assessing risks for themselves. It indicates the safety organisational elements which, if provided, may help demonstrate to aerodromes, airlines and other organisations operating at aerodromes, as well as regulatory bodies, that the effort to discharge safety accountabilities under the law is effective, well directed and responsible.

This document also seeks to address those operational situations which contain elements of risk and which might be considered commonplace. It is important to note that the examples reflect the management organisation that might exist at a typical regional airport and that job titles and responsibilities described therein will not necessarily be the same at individual airports.

In many cases the responsibility for performing a particular function is delegated to a particular individual or third party organisation or service provider. In such circumstances the delegation or division of responsibility should be clearly documented and accepted by all parties involved. It should be noted that delegation of a task does not absolve the organisation of the accountability of ensuring the task is carried out correctly and to the required standards.

Where information has not been provided to cover a particular situation it is expected that users will be guided by the general safety management principles set out to identify and create a safe working and operating environment.

Ensuring the safety of individuals and aircraft in airside areas is a complex undertaking and the content of this document cannot be taken in isolation. There are many associated systems and procedure documents that will affect the various organisations that operate in airside areas at an aerodrome. It is important to recognise that not only will each organisation need to develop its own systems to complement those it interfaces with but that no two aerodromes are alike and that no assumptions can be made based on the solutions used at another location.

2.2.2 Applicability

This document is intended as a guide to accepted good practice for those persons and organisations engaged in working on and around the operational areas of airports, aerodromes or heliports, or anywhere where aircraft are attended and handled; in other words it may apply to everybody working airside. Whilst the document is primarily aimed at aerodrome operators, airlines and ground handling service providers, it is equally applicable in most cases to activities at uncertified aerodromes. In these cases the term 'Aerodrome Operator' should be considered as the 'person in charge of safety at the aerodrome', or for example, the 'Accountable Manager'. Any organisation, regardless of size or complexity of operation, or whether subject to direct oversight by National Authority, should establish a Safety Management System through the application of the general principles outlined in this document and from further more comprehensive guidance issued by the National Authority or other resources such as the Eurocontrol Skybrary website.

2.2.3 The Status of this document - Airside Safety Management

This document represents an accepted way of organising and operating safe working practices which is largely endorsed by industry. The National Authority, as part of the on-going aerodrome certification process, in conducting its routine inspections and audits of the airside safety environment, shall consider these guidelines as best practice. The National Authority makes it clear that the general principles, processes and procedures set out within this document form the basis of acceptable safety arrangements airside. It is however accepted that there can be other methods to achieve an acceptable level of safety.

2.2.4 Compliance with Statutory Requirements

The requirements for the safe operation of aerodromes, with respect to aircraft safety and for the safety of individuals at their places of work, are contained within formal legislative requirements which may form part of National Civil Aviation Lay. It is therefore legally incumbent on those who provide the workplace, all employers and all employees, to comply with the safety requirements that are set out in the relevant Statutory Instructions. Nothing in this GM substitutes the requirements of the law.

Users of this document should be aware of other statutory provisions that may apply to their activities, for example, the duty to report aircraft accidents and certain occurrences. It is the responsibility of all those involved with the operation of aerodromes, aircraft and the provision of services to be familiar with their legal obligations.

2.2.5 Amendment

This document is subject to continuous review and amendment if so required. Questions, suggestions for improvement or new material should be sent to the National Authority.

2.3 Model Guidance: References

[National Authority to insert references to relevant ICAO, National Civil Aviation Regulation, guidance materials, health and safety, etc.]

2.3.1 Useful References and Further Reading

The following documents contain regulations, guidance or information concerned with airside safety. Many of the documents listed below describe in detail the responsibilities of those involved in ensuring the safety of personnel and aircraft in airside areas of airports and are key reference documents. It should be noted that the list is by no means exhaustive but is intended as an initial reference for further reading.

2.3.2 Legislation

[National Authority to insert references to relevant legislation]

2.3.3 Reference Documents

[National Authority to insert references to relevant references including AIP, advisory publications, etc.]

Airport Council International (ACI) - Visual Aids Handbook

International Air Transport Association (IATA) Airport Handling Manual (AHM) IATA Ground Operations Manual (IGOM)

Airport Council International (ACI) - Apron Signs and Markings Handbook

International Civil Aviation Organisation (ICAO) Annex 13 - Aircraft Accident Investigation ICAO Annex 14 - Aerodrome Design and Operations (Volumes I and II)

ICAO Annex 18 - The Safe Transport of Dangerous Goods by Air ICAO Annex 2 Rules of the Air

ICAO Annex 6 - Operation of Aircraft

ICAO Document 9137 Airport Services Manual ICAO Document 9157 Aerodrome Design Manual ICAO Document 9184 Airport Planning Manual ICAO Document 9859 Safety Management Manual

UK Health & Safety Executive (HSE) publication Aircraft Turnround

Department of Transport (DOT), Abu Dhabi, Environment Health Safety Management System (EHSMS) Decree 42, 2009

2.3.4 Health and Safety

[National Authority to insert references to relevant references for Local Health or Safety Authorities.]

2.4 Model Guidance: Glossary

[National Authority to update against relevant abbreviations.]

ACOP	*Approved Code of Practice*
ACI	*Airport Council International*
AGL	*Aeronautical Ground Lighting*
ANO (DG)	*Air Navigation (Dangerous Goods) Regulations*
APU	*Auxiliary Power Unit*
ATC	*Air Traffic Control*
CAAP	*Civil Aviation Advisory Publication*
CAR	*Civil Aviation Regulation*
CCTV	*Closed Circuit Television*
FEGP	*Fixed Electrical Ground Power*
FOD	*Foreign Object Debris*
GPU	*Ground Power Unit*
HS	*Health and Safety*
IATA	*International Air Transport Association ICAO*
JAR-OPS	*Joint Aviation Requirements - Operations*
LVP	*Low Visibility Procedures*
ROSI	*Reporting of Safety Incidents*
NOTAC	*Notice to Aerodrome Certificate Holders*
POB	*Persons on board*
PPE	*Personal Protective Equipment*
RT	*Radiotelephone/Radiotelephony*
SMS	*Safety Management System*
SOP	*Standard Operating Procedure*

VDGS *Visual Docking Guidance System*

VORSY *Voluntary Occurrence Reporting System*

2.5 Model Guidance: Chapter 1 - General Principles for Airside Management of Health and Safety

2.5.1 Introduction

2.5.1.1 Organisations operating on aerodromes need to manage aircraft safety and are required to have a duty of care towards occupational health and safety, in order to reduce aircraft damage and personal injuries on the ramp. However, without adequate safety **management**, legal and moral obligations cannot be met, and business and reputational losses may be incurred. Examples of such losses may include:

a) Compromised aircraft safety and the potential for a catastrophic aircraft accident;

b) Costs of replacing and compensating injured employees or others;

c) Contractual penalties or loss of revenue if flights are delayed or cancelled;

d) Damaged assets (including aircraft and equipment);

e) Loss of reputation;

f) Loss of existing and future contracts.

2.5.1.2 Global leading authority studies have shown that the uninsured costs of accidents can be up to 36 times greater than the costs of insurance premiums. Furthermore, directors, managers and nominated post holders may be held accountable for failures to control aircraft safety and/or occupational health and safety

2.5.1.3 The lessons learned from accidents to aircraft and people show that, in many cases, failures in safety management were a key causal factor. Chapters 1 and 2 of this document seek to summarise the processes by which aircraft safety and occupational health and safety can be managed, by identifying the hazards and managing the risks.

2.5.1.4 The key elements in an SMS acceptable to the National Authority are:

- Safety policy and objectives;
- Safety risk management;
- Safety assurance;
- Safety promotion.

2.5.1.5 Annex 19 describes five key elements to safety management. All five steps are fundamental.

- Policy;
- Organising;
- Planning and implementing;
- Measuring performance;
- Auditing and reviewing performance.

2.5.1.6 The precautions which protect aircraft from damage on the ramp often also protect people working on the ramp from harm and vice versa. Consequently, the management of the health and safety of people

(occupational health and safety) and the management of safety of aircraft share common themes. There are key elements which should form part of any system for managing safety:

a) A system that sets the targets and standards to be achieved, and makes clear to people what their responsibilities and accountabilities are;

b) A way of identifying hazards, assessing risks and introducing control measures;

c) A method of monitoring that controls are in place and are effective. This should include proactive monitoring, such as inspection; reactive monitoring, such as accident investigation and data trend analysis; and audit and review of standards;

d) Documenting the procedures outlined above and relevant key information, including policies, risk assessments and reports from monitoring activities.

2.5.1.7 These basic principles underpin the SMS. However, there are some notable differences in the terminology used when discussing safety management, as well as differences in the benchmarks which are applied and relative importance of some of the key elements involved. When developing an integrated airside SMS that deals with both the risks to aircraft and people, it is necessary to recognise these differences. It does not follow that organisations require separate systems to manage the safety of aircraft and occupational health and safety.

2.5.1.8 Furthermore, all the organisations and individuals involved should always be clear whether they are considering issues pertaining to aircraft safety, or occupational health and safety, or both, in order to prevent confusion arising.

Key Concepts

2.5.2 'So far as is reasonably practicable'

2.5.2.1 Duties under the health and safety law are often qualified by the term 'so far as is reasonably practicable' or 'as low as reasonably practicable' (ALARP). These terms are also sometimes used in relation to aircraft safety.

2.5.2.2 The term 'so far as is reasonably practicable' has been defined by the European courts. To carry out a duty, 'so far as is reasonably practicable' means that the degree of risk in a particular activity or environment can be balanced against the time, trouble, cost and physical difficulty of taking measures to avoid or reduce the risk. If these are so disproportionate to the risk that it would be unreasonable for the people concerned to have to incur them to prevent it, they are not obliged to do so.

2.5.2.3 Therefore, the greater the risk, the more reasonable it is to go to greater expense, trouble and invention to reduce it. If the consequences and the extent of a risk are small, insistence on great expense would not be considered reasonable. It is important to remember that the judgment is an objective one and the size or financial position of the employer is immaterial.

2.5.3 Risk Assessment – as part of a Safety Case

2.5.3.1 It is implicit when considering what is reasonably practicable, that hazards have to be identified and risks assessed.

2.5.3.2 The primary function of identifying the hazards and assessing the risks on the airside is to determine whether enough has been done to prevent an incident or accident that may lead to fatalities, injuries and ill health and/or damage to aircraft. Risk assessments assist in determining whether enough has been done to meet the requirements of aviation law and health and safety legislation and to mitigate the risk to an

acceptable level, and are a key component in any system for managing aircraft safety and occupational health and safety. Given the complexities associated with aircraft ramp operations, people and ground service equipment, it is often the case that hazards may not always be directly associated with aircraft movements.

2.5.3.3 Risk assessment can also indicate what improvements need to take priority, and thereby assist in developing action plans, budgets and business cases. Risk assessments should be undertaken on a regular basis as circumstances change, with appropriate and suitable mitigation measures implemented as necessary.

2.5.3.4 In brief, when undertaking an assessment the following key items should be considered:

a) Identify the hazards;

b) Decide who/what might be harmed/damaged and how;

c) Evaluate the risks, list any current mitigations and decide on additional precautions;

d) Record findings, allocate actions and implement them.

Note: ICAO Doc. 9859 contains a suggested Risk Assessment Process

2.5.3.5 A hazard is anything with the potential to cause harm; a hazard is any condition, potential condition, event, or circumstance which could induce an accident, lead to injury, illness, or death to people; damage to or loss of a system, equipment, or property; or damage to the environment. A hazard is a condition that is a prerequisite to an accident or incident. Risk analysis is a function of the likelihood (probability) that harm will occur and the severity of that harm.

2.5.3.6 Consideration must be given to the risks to the health and safety of employees from other organisations, visitors, members of the public and anyone else who may be affected by the activity or task.

2.5.3.7 The general principles for prevention consist of a broad hierarchy of measures:

a) Avoiding the risk;

b) Evaluating those risks which cannot be avoided;

c) Combating risks at source;

d) Adapting the work to the individual;

e) Adapting to technical progress;

f) Replacing the dangerous by the non-dangerous or the less dangerous;

g) Developing a coherent overall prevention policy which covers technology, organisation of work, working conditions, social relationships and the influence of factors relating to the working environment;

h) Giving collective protective measures priority over individual protective measures;

i) Giving appropriate instructions to staff.

2.5.3.8 In reality, a combination of such measures is likely to be required or be in place. Furthermore, precautions lower in the hierarchy (such as wheelchairs for disabled passengers with reduced mobility that are specifically designed to be moved up stairs) may be used as a temporary control measure until other measures, higher in the list, can be implemented (such as the purchase and use of an ‘ambulift’).

2.5.3.9 However, in certain circumstances, the risk will not be acceptable until permanent control measures are in place. For example, it would not be acceptable to use only a system of work as a temporary measure

to protect staff using a catering vehicle without means to prevent falls from the platform, as the likelihood and consequences of a fall remain far too high.

2.5.3.10 Notwithstanding an aerodrome's SMS, safety case and risk management processes, aerodrome operators should engage in dialogue with the National Authority prior to introduction of significant new measures which might affect aircraft safety in order to ensure that aerodrome certification conditions shall continue to be met.

2.5.3.11 A constituent part of any safety case should be the oversight and interfaces with third party organisations. A risk assessment for activities that affect people or tasks carried out by another organisation should consider the impact on the third party. Any mitigation expected to be delivered or followed by another party should be agreed mutually. For example, during the aircraft turnround phase, many activities involve interaction with a number of different organisations. These risks should be assessed collaboratively to ensure 'buy-in' of all parties involved.

2.5.4 Health and Safety

2.5.4.1 The duty of employers and the self-employed is to ensure, so far as is reasonably practicable, the health and safety of any individual who might be affected by any work activity within their control. The individuals who may be affected include employees, members of the public, contractors, visitors and other aerodrome users. Good health and safety management is key to ensuring that these duties are met.

2.5.4.2 Amongst other things, employers and the self-employed need to provide places of work which are safe, provide and maintain work equipment and systems of work which will not cause injury, protect their employees and others from hazards to health and provide welfare facilities for their employees.

2.5.4.3 Employers who share a workplace, whether temporarily (such as an aircraft stand) or permanently, must co-operate and co-ordinate their efforts to ensure a safe workplace.

2.5.4.4 Employers are also required to consult their employees on matters connected with their health and safety at work.

2.5.4.5 Organisations, such as landlords, that have some degree of control over workplaces which are made available to other employers as a place of work, need to ensure that any premises, plant and equipment or substances that they provide for others to use are safe and without risks to health. This duty is qualified by the degree of control they have over the premises, plant, equipment or substances. As the extent of control increases, so does the degree of responsibility for the management of risks.

2.5.4.6 Every worker at an aerodrome has a duty to take reasonable care for their own health and safety and that of other persons who might be affected by what they do.

2.5.5 Aircraft Safety

2.5.5.1 Organisations may also have specific responsibilities to ensure aircraft safety. Good management of aircraft safety is vital if these responsibilities are to be discharged satisfactorily.

2.5.5.2 Key amongst these are:

a) The responsibility of the aerodrome certificate holder (who may also be the aerodrome operator) to provide and maintain an aerodrome which is safe for aircraft to use;

b) The responsibility of the aircraft operator (airline) to operate aircraft in a safe manner;

c) The responsibility of aircraft ground handling organisations and ground service providers to operate safely during all ramp operations.

2.5.5.3 Every individual at an aerodrome has a duty of care to do what they can to ensure that aircraft are not damaged, and, where this is discovered, that the occurrence is immediately reported through the appropriate channels, ideally within the organisation's internal 'just culture' or open non-punitive reporting system.

2.5.5.4 The responsibilities for aircraft safety on the ground at aerodromes are essentially placed on the airline operator and aerodrome operator. However, all aerodrome users, including aircraft operators, approved maintenance organisations and ground handlers have a part to play in ensuring the safety of aircraft.

2.5.5.5 Control of Contractors/Third Party Service Providers

2.5.5.6 Organisations retain some responsibility for health and safety during activities carried out by their contractors. These legal responsibilities cannot be delegated.

2.5.5.7 There may also be benefits which accrue to those who develop partnerships with their contractors. Reliance simply on standard contract clauses requiring contractors to comply with relevant legislation, standards or guidance is unlikely to be enough to secure such benefits or comply with legal requirements. Therefore all reasonable and practicable steps should be taken to:

a) Ensure existing and prospective contractors' arrangements and organisation are adequate so as to ensure that they can carry out their tasks safely and without damaging aircraft or equipment, or risks to personnel;

b) co-ordinate and control the work they carry out; and

c) monitor their performance.

2.5.6 Assessing Contractors

It is recommended that any assessment of contractors should use a number of criteria, including:

a) At the pre-tender stage, obtaining details of relevant documents, for example the accountabilities and safety policy and copies of risk assessments for the work included in the contract;

b) Interviewing short-listed contractors and/or visiting current work to assess standards, for example, driver training schemes and vehicle maintenance;

c) Investigating past performance, as useful information can include references from current and former clients, internal audits and inspections against the aerodrome operator's safety management system, and/or the results of any audits undertaken by the aerodrome operator or another third party;

d) Monitoring performance throughout the term of the contract.

2.5.7 Co-ordinating and Controlling Performance

This can be achieved through a combination of:

a) Appointing a supervisor to oversee the activity, especially in relation to aircraft turnround (described further in Chapter 4). This could be a member of staff, or a nominated agent. They should have sufficient authority to control the activities involved. For most construction work it

is advisable to appoint a principal contractor, one of whose functions is to oversee the conduct of the work;

b) Agreeing and writing down a plan for the activity. For construction work, a health and safety plan may be required by health and safety law. For aircraft turnround, it is best practice for a plan for the turnround to be developed and agreed between those parties involved.

c) Where practicable, the undertaking of joint risk assessments for relevant processes. These assessments could inform the performance standards and the plan. Joint risk assessments will need to take account of differences between companies' management, supervision, equipment and training.

d) Agreeing performance standards, for example, frequency of vehicle maintenance and standards for training and refresher training. These may be set through reference to standards imposed on the client and contractor organisations by the aerodrome operator or AOC holder.

2.5.8 Performance Monitoring

2.5.8.1 To be effective, performance monitoring should consider several factors, such as:

a) Methods of work: standing instructions or method statements for the contractors' staff should be clear how confirmation that the plan for the activity is being followed and what procedures are in place to monitor compliance;

b) The foreseeable risks of the activity should be identified and managed. For example, measures in place to prevent falls from heights or vehicles striking aircraft and how these risks are identified and how mitigation measures are determined and implemented;

c) Aerodrome rules, as well as procedures, should be in place to ensure that these rules are complied with, should be clear to all working on the aerodrome. For example, the policies in place to ensure that contractor employees are wearing hi-visibility (hi-vis) clothing and have the appropriate Personal Protective Equipment (PPE);

d) Methods of identifying, reporting and recording deviations from instructions and rules should be clear, as should those methods that are in place to identify and monitor trends in these deviations.

2.5.8.2 Individuals monitoring performance should be trained to identify unsafe practices and should have enough resources to carry out the work.

2.5.9 Control of Contractors during Turnround

2.5.9.1 The use of contractors at aerodromes to provide services for aircraft is increasing. At many aerodromes, airline, aircraft operators and/or Ground Handling Agencies (GHA) are the clients for these services. The contracted staff are usually employed directly by the party who then contracts the provision of individual services. It is conceivable that there may be a mix of service providers; some contracted locally, others on the basis of international contracts.

2.5.9.2 Whatever the arrangements, the airline/aircraft operator/service provider should consider the elements discussed in the relevant paragraphs on apron/stand management and turnround. Further details concerning aircraft turnround can be found in Chapter 4 of this document.

2.5.10 Aerodrome Operator

2.5.10.1 The duty of the aerodrome operator (who is usually the aerodrome certificate holder) is to provide and maintain an aerodrome which is safe for aircraft and people to use.

2.5.10.2 Every Aerodrome Certificate Holder is required to maintain an Aerodrome Manual, an integral part of the aerodrome operator's system, to manage the safety of aircraft and people on the ground. The Aerodrome Manual complements the aerodrome operator's approach to quality management, including the management of the business, customer-critical processes and health and safety. The Aerodrome Manual contains all necessary information and instructions to enable the aerodrome operating staff to perform their duties and sets out information and instructions that are to be included in the Aerodrome Manual. The Aerodrome Manual should be disseminated widely so that everyone who undertakes tasks that can affect aircraft safety is familiar with the relevant parts of the document.

2.5.10.3 The standard of occupational health and safety is not considered as part of the Aerodrome Certificate, and the Health and Safety Authority's (or equivalent authority) do not licence aerodrome operators. Nevertheless, the aerodrome operator should provide an aerodrome which is safe for aircraft and people to use, as far as reasonably practicable.

2.5.10.4 This includes:

a) An aerodrome layout which is safe, for example such that pedestrians and vehicles can move about safely;

b) Equipment provided by the aerodrome operator which is safe, for example aerobridges and fixed electrical ground power for aircraft use;

c) Systems of work which ensure safety, such as an aircraft turnround plan or 'hot work' permits for contractors.

2.5.10.5 The people who need to be protected include the aerodrome operator's own employees, the staff of contractors and tenants, visitors, members of the travelling public and their friends and relatives, and other members of the public, such as spectators.

2.5.10.6 Many precautions will protect both aircraft and people, which include:

a) Properly planned and adequately maintained infrastructure;

b) Adequate standards of specification and maintenance of equipment which interfaces with the aircraft;

c) Adequate standards of specification and maintenance for vehicles, whether directly serving aircraft or not;

d) Adequate driver and operator training;

e) Properly planned and executed aircraft turnrounds;

f) Good co-operation and co-ordination between all aerodrome users.

2.5.10.7 As the central organisation at the aerodrome, the aerodrome operator has a key role in developing co-operation and co-ordination between all the users of the aerodrome. It may consider establishing committees or other discussion groups for ensuring aircraft safety, setting aerodrome-wide health and safety standards or agreements.

2.5.10.8 The operators of aerodromes should also take a proactive role in monitoring standards, for example by introducing aerodrome-wide safety assurance systems or audits of companies working at their aerodrome. The implementation of a ground operator licensing system may be a suitable solution at some aerodromes. Those aerodromes which have the power to make byelaws should consider taking positive action against organisations or persons that consistently breach their requirements.

2.5.11 Aircraft Operators (Airlines)

2.5.11.1 In addition to the risks to the safety of aircraft, the operator of the aircraft (usually the airline) will need to consider the health and safety of persons not in its employ who are affected by its activities or the activities of its contractors, as well as that of its employees.

2.5.11.2 Airlines may decide to co-operate with each other, the aerodrome operator and service providers to agree uniform standards for performance and monitoring. This may reduce the time and effort required for individual airlines to develop such standards and reduce the probability of human error resulting from a wide variety of standards.

2.5.12 Service Providers

2.5.12.1 Contractors on the apron are often required to work to tight timescales to complete their respective tasks in the time allowed for aircraft turnround. However, all those involved should take adequate account of each other's safety needs, for example ensuring that their vehicles or parked equipment is not blocking escape routes of a refuelling vehicle, and that vehicles are not parked in such a way as to hinder or prevent other vehicles having safe ingress/egress access to aircraft.

2.5.12.2 Where a handling agent has been appointed, service providers should co-ordinate with them to ensure that safety procedures are understood and implemented by the handling agent. They should be working to an agreed plan for the turnround and each service provider should ensure that they have a copy of this plan. In addition, each service provider should have a supervisor or leading hand who can control the various stages of its contribution to the turnround. In all instances plans should also be shared with the airport operator.

2.5.12.3 Service providers should ensure that any subcontractors they engage undergo an assessment, control and monitoring processes as appropriate and as may be outlined and in accordance with company procedures.

2.6 Model Guidance: Chapter 2 - Identifying the Hazards and Managing the Risks

2.6.1 Introduction

2.6.1.1 At large and complex aerodromes, as well as at small general aviation locations, the aerodrome apron is a busy and often congested place of work, particularly during peak periods of air traffic movements. Aircraft and people face many potential hazards, particularly from the movement and operation of aircraft and ground vehicles. Failure to eliminate or control such hazards may lead to accidents to aircraft and/or people or cases of ill health injury or death.

2.6.1.2 It is recognised that much of the guidance below may appear to be geared towards large aerodromes. However, safety management of the apron will apply to any aerodrome, regardless of size; only the range and magnitude of operations will vary. Managers will need to consider the degree of applicability of the detailed material presented in this Chapter and, indeed, the use of any suitable control measures additional to those described. The hierarchy of controls outlined in Chapter 1 should be referenced when considering the most appropriate combination of control measures.

2.6.2 Potential Hazards on the Apron

2.6.2.1 This section discusses some of the potential hazards commonly encountered on the apron. It is important that all aircraft operations, including turnrounds, should take full account of the need for safe working

practices. Failure to do this may result in shortcuts and bad practice which can lead to accidents, ill health and damage to assets.

2.6.2.2 Common hazards/risks at aerodromes (some of which are discussed in the following paragraphs) may include:

a) Vehicles striking aircraft, other vehicle or equipment/object and/or people;

b) Foreign Object Debris (FOD)

c) Erratic and poor apron driving discipline, monitoring and oversight

d) Inconsistent working practices and standard operating practices/procedures

e) Poor general aerodrome awareness (apron and aircraft stand layout)

f) Hazards to passengers and staff on the apron;

g) Moving aircraft (including aircraft on pushback or being towed);

h) Live aircraft engines (including prop and rotary);

i) Falls from height and falling objects;

j) Operation and movement of aerobridges;

k) Manual handling; (Lifting, pulling, pushing etc)

l) Noise; (Aircraft engines and machinery)

m) Work equipment (including machinery);

n) Hazardous substances and Dangerous Goods (including radioactive substances);

o) Inadequate, imperfect or incorrect lighting, glare or confusing lights;

p) Adverse weather conditions (Sandstorms, Low Visibility, Thunderstorms etc);

q) Slips and trips; (Oil/fuel spillages, defective pavements)

r) Electrical hazards; (Fixed Electrical Power FEP and also Static Electricity)

s) Faults and defects;

t) Refuelling.

2.6.2.3 Dealing effectively with these hazards will require good management of aircraft safety and occupational health and safety, as well as co-operation and co-ordination between the aerodrome operator, ground handlers, airlines and other aerodrome users, such as maintenance contractors. Initiatives for reducing the risk to aircraft and health and safety from these hazards should be an integral part of the planning of individual projects.

2.6.3 Vehicles Striking Aircraft, other Vehicle or Equipment and/or People

2.6.3.1 Airside vehicles constitute an ever present hazard to both aircraft and people so extreme vigilance is necessary for all those working airside. It may be possible to eliminate the risks to people in certain areas of the aerodrome by keeping aircraft, vehicles and pedestrians apart where possible, for example by the use of passenger boarding bridges (aerobridges), or, when this is not reasonably practicable, by the provision of separate designated routes, such as pavements or clearly defined pedestrian routes (green walkways painted on the ground). Well organised traffic routes, including one-way systems, adequate lighting to roads and unambiguous road markings can also assist.

2.6.3.2 It may not be possible to ensure complete segregation of aircraft, pedestrians and vehicles in all areas of the aerodrome. However, this does not mean that the whole idea of segregation can be abandoned. Wherever practicable, procedures to ensure the segregation of aircraft, people and vehicles should be put in place.

2.6.3.3 Where segregation is not reasonably practicable, there are other measures which can be employed to control the risk. For example, it may be possible to reorganise the layout of an area, so that the interaction of pedestrians, aircraft and vehicles is minimised, or the frequency of high risk activities such as reversing are reduced. Any changes to the layout of an aerodrome which affect aircraft safety should be discussed with the National Authority at an early stage, as the aerodrome certificate conditions may be affected.

2.6.3.4 Paragraphs 4.1 to 4.5 provide further advice on protecting passengers on the apron.

2.6.3.5 Some aerodromes may consider service delivery systems built into the stands, thus reducing the number of vehicles that have to attend an aircraft. Even if such systems are installed it is important that safe contingency procedures are available to cater for equipment failure.

2.6.3.6 In all circumstances, a safe system of work should be developed. This provides an opportunity for partnership in planning involving all those with a direct interest in aircraft safety and occupational health and safety on the apron. Such a system should include:

a) Traffic rules governing such issues as speed limits, especially on approach to aircraft and in the vicinity of people;

b) Correct vehicle maintenance, especially of safety critical components such as brakes and steering;

c) Driver training, airside driving permits, competency checks and refresher training;

d) Driving standards;

e) Competence/attitude of airside workers;

f) Apron management;

g) Provision of assistance and/or audible warning devices for reversing vehicles (although such audible warning devices might not be fully effective in the vicinity of high ambient noises, or if people are wearing hearing protection, and so may need to be supplemented by visual systems);

h) Procurement of suitable vehicles, e.g. vehicles offering good driver vision;

i) Regular monitoring of standards;

j) Safe parking of vehicles in such a way as to prevent interference with aircraft manoeuvring or other aerodrome users;

k) Encouragement of good practice;

l) The provision and wearing of high visibility clothing;

m) Special procedures for operating vehicles during periods of inclement weather (e.g. low visibility, thunderstorms);

n) Adequate supervision of passengers on the ramp.

2.6.3.7 Where more than one company or department attends an aircraft, effective co-ordination and co-operation is essential to prevent vehicles striking aircraft, equipment, vehicles or people. Airlines, handling agents and third party operators and aerodrome operators all have important roles in this as part of their systems

for assessing, controlling and monitoring their staff or contractors. The turnround plan is likely to be a key document in ensuring that vehicle movements are controlled around aircraft. Chapter 4 gives further advice and guidance on the turnround plan.

2.6.3.8 It is likely that a combination of measures will be required to control the risks. The exact combination may vary with location, activities and perhaps even the time of day. The effects of changes to the aerodrome, for example due to temporary works or the effect of new buildings, will need to be considered, preferably at an early stage. It is important that the risks from vehicles are assessed, as part of an overall system for managing aircraft safety and occupational health and safety.

2.6.3.9 FOD is an ever present hazard at aerodromes and must be constantly managed and procedures implemented to prevent ingestion into engines and other aircraft components. FOD (prevention and removal) is the responsibility of all apron personnel and provisions shall be in place by the aerodrome operator to ensure each head of stand has a FOD disposal bin allocated.

2.6.3.10 Erratic and poor apron driving discipline, monitoring and oversight with varying degrees of driving experience across the apron, this naturally causes a potential hazard to apron safety. The aerodrome operator shall have an Airfield Driving Permit (ADP) program that is robust and is continually controlled and monitored.

2.6.4 Inconsistent working practices and standard operating practices/procedures

Standard operating procedures on the apron (e.g. aircraft pushback procedures) should be as consistent as possible. Multiple pushback procedures introduce additional elements of risk which should be avoided. A risk assessment by the aerodrome operator in conjunction with the airlines and service providers shall be conducted prior to any change in pushback procedure.

2.6.5 General aerodrome awareness (apron layout)

2.6.5.1 Lack of aerodrome familiarity, particularly for personnel involved with aircraft headset operations and push backs is a significant hazard. Headset operator should be familiar with pushback instructions provided by ATC to ensure a safe push back manoeuvre at all times.

2.6.5.2 The aerodrome operator should at the very least have a process in place to ensure that any personnel performing head set functions have completed an induction course specific to apron geography.

2.6.5.3 The airline operator shall ensure that their employees performing the head set operation have been inducted by the aerodrome operator.

2.6.6 Hazards to Passengers on the Apron

2.6.6.1 At many aerodromes, passengers have to walk across the apron and sometimes roadways, between the terminal building and the aircraft. This may expose passengers to hazards such as vehicles moving across the apron. The risks of injury are increased as passengers are vulnerable and generally unaware of the dangers around them. Additionally, they will not be subject to the same PPE requirements (e.g. hi-viz clothing and suitable footwear) as those who work on the apron. Furthermore, passengers may inadvertently (or even deliberately) damage aircraft. The aerodrome operator, the airline operator and ground handlers all have responsibility for ensuring that the movement of passengers is strictly supervised and controlled.

2.6.6.2 Under National Civil Aviation Law the aerodrome operator may have a responsibility to provide an aerodrome that is safe for its users. The aerodrome operator, co-ordinating with organisations operating

at the aerodrome, should conduct a risk assessment. This should identify the risks to passengers on the apron, and take into account stand layout, equipment required for the turnround of the aircraft, and other user provision for passenger and ground services requirements, and airline requirements. Additionally, risk assessments may need to be conducted for specific stands or pedestrian areas and it may be further necessary for the company responsible for the movement of passengers to and from aircraft to complete their own risk assessment prior to implementation.

2.6.6.3 In designing the aerodrome layout and facilities, the aerodrome operator can make a significant contribution to the safety of passengers. For example, when the aerodrome operator provides aerobridges, passengers are not exposed to any of the hazards on the apron. Where the provision of aerobridges is not reasonably practicable, the aerodrome operator should ensure that the layout and marking of airside areas enables the safe movement of passengers to and from the terminal areas. The guidance in the preceding section is particularly relevant in this regard.

2.6.6.4 The steps that can be taken to ensure passenger health and safety on the apron will vary from aerodrome to aerodrome and from stand to stand, but will include the following measures:

a) Passengers should not be permitted to roam free. Staff should be positioned on the apron to ensure that passengers follow a safe path to the terminal/aircraft. If necessary, passengers should be led from the aircraft or terminal;

b) Where possible, the aerodrome operator should ensure that permanent traffic routes, e.g. aerodrome roads or taxiways, do not dissect the pedestrian/passenger routes between the terminal and the aircraft;

c) Where this is not possible, the aerodrome operator should provide safe routes marked on the apron surface (including safe crossing points for the apron roads) and clear, unambiguous signs to indicate the route to be followed. Positive control of vehicular traffic may be required from the airline or handling agent; co-ordination and co-operation with the aerodrome operator may be necessary to achieve this;

d) Safe routes can also be indicated by the use of moveable barriers and chains (Passenger Guidance Systems) to create a temporary safe route across the apron for passengers to follow. When not in use, it is important that such equipment is properly stowed to ensure that it does not become a source of FOD;

e) Routes to the aircraft should not pass below aircraft wings or beneath fuel vents, or close to propellers or rotors of aircraft on adjacent stands. Routes should also be clear of vehicular traffic around the aircraft, electrical cables, fuel hoses and other ramp equipment; this may require the use of temporary mobile passenger guidance barriers, also known as 'Passenger Inward Guidance Systems' (PIGS) or other suitable airport passenger guidance system or equipment;

f) Restrictions should be placed on the running of aircraft engines in the vicinity of passengers and positive measures should be taken to protect them from excessive engine noise and jet blast;

g) Passengers should be informed of the safe route they should follow into the terminal/aircraft, in accordance with instructions given by either the handling agents or cabin crew; this may also include information provided by public announcement before passengers leave the aircraft/terminal;

h) For remote stands or stands in a different location to the terminal lounge, passengers should be transported to the aircraft by bus; and

i) Information on embarking and disembarking passengers could form part of the turnaround plan, as per Chapter 4.

2.6.6.5 Relying solely on informing passengers of safe routes and marking them out is unlikely to be adequate for commercial passenger operations. Whenever passengers have to walk across the apron there should be sufficient ground staff to ensure that passengers do not wander away from safe routes. If there is insufficient staff, then passengers may need to be disembarked or boarded in small groups which can be adequately controlled by the available staff.

2.6.6.6 Responsibility for ensuring that passengers are safeguarded between the aircraft and the terminal building is shared between the airline, aerodrome operator and any ground handlers involved. It is vital that it is clear who is responsible for providing staff to supervise and/or escort passengers across the apron, and that sufficient numbers of staff are provided. Clearly, any contracts will need to take this into account. Failure to supervise passengers properly may lead to accidents with serious consequences for all involved. Consideration should be given to unusual circumstances, such as evacuation of terminal buildings or aircraft, in which passengers and other members of the public may be required to enter airside areas. Procedures should ensure that responsible persons who are familiar with the hazards that exist in airside areas are present to supervise passengers and members of the public as soon as practicable wherever there is emergency egress. Consideration should also be given to methods by which aircraft movement and other sources of hazard may be stopped in areas in which passengers and members of the public may congregate with limited supervision. Furthermore, when passengers have checked in and are proceeding to the aircraft, it is the responsibility of the airline or handling agent to escort them safely there.

2.6.7 Moving Aircraft

The movement of aircraft on the ground, either under their own power or towed, creates a number of hazards that are unique to the aviation industry. In particular operating jet or propeller engines can cause fatal or serious injuries and extensive damage to equipment or other aircraft, as detailed further in paragraph 6.5.

2.6.8 Aircraft Parking Safety Practices - General Considerations - Operation of the Stand

2.6.8.1 The following paragraphs describe typical responsibilities and accountabilities for the operation of aircraft on and off stand. Relationships might vary from aerodrome to aerodrome due to differing contractual arrangements with stakeholders, or other owner/operator agreements. Therefore, it is good practice for aerodromes and other stakeholders to develop and establish the hierarchy of responsibilities and, where practicable, conducts joint risk assessments with the aerodrome users, then seek to establish agreed safe working practices within that hierarchy.

2.6.8.2 The aerodrome operator is responsible for the rules and procedures that safeguard the arrival and departure movements of aircraft on stands and for the dissemination of information to airline/company operators. Information documents/instructions and requirements should be based upon the subjects described in the following paragraphs.

2.6.9 'Ownership' of Stand/Parking Bay

2.6.9.1 In general the aerodrome operator has the responsibility to ensure that aircraft stands remain serviceable, clean and free from obstruction. However, in the busy operation of the apron, with minute to minute changes of status and vehicle/equipment movements, ground handling staff also have specific responsibilities (see Chapter 4 Aircraft Turnround).

2.6.9.2 Whether an aircraft stand is equipped with a visual docking guidance system (VDGS) or requires the aircraft to be marshalled, when a stand is allocated for use to an aircraft operator and the arrival of their aircraft on stand is imminent, it is usually the responsibility of the handling staff to ensure that the stand and clearways are free from obstructions, FOD, and vehicles or equipment. These staff should also ensure

that, where provided, the aerobridge is fully retracted and correctly parked with the drive wheels in the parking box/circle provided before the arrival of the aircraft. These actions must be completed by the handler before the VDGS is switched on. Switching on the VDGS will normally signify to the aircraft commander that the stand is clear and is safe to enter. Once the VDGS is switched on, the stand must remain under supervision until the aircraft arrives on stand in order to ensure that it remains safe for use by the aircraft. If for any reason the stand becomes 'unsafe' or unattended before the aircraft has arrived on stand the VDGS should be switched off or 'STOP' indicated, using the Emergency Stop System if necessary.

2.6.9.3 Ideally, a Stand Supervisor or Turnround Co-ordinator (or equivalent) should be nominated to control and manage the turnround process and should be clearly identified to all staff working on the stand. As described in Chapter 4, the supervisor (or Turnround Co-ordinator) should be working to an agreed plan for the turnround and should have sufficient authority to control the activities around the aircraft. The supervisor should be present throughout the arrival, handling and departure procedures.

2.6.10 Vehicle and Equipment Operations

Further guidance for vehicle operations is contained in Chapter 5 ~~of this publication~~. of this document Prior to aircraft arrival ground equipment should be/remain parked in the equipment areas provided. Service vehicles and baggage trolleys should stay clear of the stand and equipment, such as ground power units or any other equipment with trailing cables or hoses should be fully retracted and stowed. The stand must be clear of all obstructions and equipment prior to the arrival of the aircraft allocated to the stand. Other considerations for the safe docking and parking of an aircraft are described in the following paragraphs.

2.6.11 Stand Markings

In areas or stands that can accommodate a number of variations of aircraft parking arrangements, there are often complex signs or markings, only some of which are appropriate for specific aircraft. It is important to ensure that all staff who may be involved in activities in the area are fully trained in the appropriate configuration for all aircraft types that may use the stand and the appropriate marking and signage. Further guidance and details on markings, signs and stand design considerations are contained in Chapter 3 of this document.

2.6.12 Self-manoeuvring: Stand Configurations and Safety Considerations

2.6.12.1 Self-manoeuvring is a procedure whereby an aircraft enters an apron, parks and subsequently departs under its own power. The principal methods of stand configuration are angled nose-in, angled nose-out and parallel-parking; each method involves the adjacent apron area in being subjected to high levels of engine blast, noise and fumes at some stage of an aircraft movement. Taxi-through stands can also be used for self- manoeuvring and the blast effects are smaller. Some of the busier airports also employ what is known as 'remote holding', which is where loaded aircraft might be towed from its pier stand to a remote area in order to wait for an ATC delayed slot time, therefore vacating the pier stand for another aircraft. This might often involve small/medium sized aircraft being positioned nose-out on a remote stand where self-manoeuvring off the remote stand is not considered a blast problem.

2.6.12.2 Self-manoeuvring operations do not require aircraft tugs and ground crews but the layout of stands requires approximately double the apron area of conventional nose-in pushback operations. Due to the relatively high levels of engine power likely to be used for self- manoeuvring, and dependent upon location, there is an increased potential safety threat to buildings, installations, vehicles, equipment and personnel and passengers which must be controlled and managed.

2.6.12.3 Before deciding to adopt self-manoeuvring operations aerodromes should conduct a joint risk assessment with the aerodrome users. This should include consideration of other methods of aircraft handling. Self-manoeuvring on open, unmarked aprons should be subject to special procedures and a marshalling service should be available for all aircraft arrivals. The aerodrome operator should determine which combination of aircraft stands and conditions require a marshalling service on departure.

2.6.12.4 A risk assessment should ensure that the following arrangements and requirements are met:

a) Stand entry routes, parking positions and departure routes should be marked with standard paint markings, in accordance with the requirements of National Civil Aviation Regulation or, in the event of non-mandatory markings, the ACI Apron Markings and Signs Handbook.

b) Buildings and installations adjacent to self-manoeuvring stands should be constructed to withstand the engine blast or be protected by blast screening;

c) Vehicles and equipment should not be placed in a position where they can be affected by blast, and where appropriate, equipment parking areas should be protected by blast screens or located remote from the stands;

d) Where appropriate, and as deemed necessary due to health and safety considerations, passenger areas and apron staff working areas should be protected by blast screens. Passengers should not be subjected to blast, excessive noise or fumes;

e) Safety instructions should be issued, specifying the maximum aircraft sizes to be permitted on individual stands so as to ensure that any prescribed safe clearances (such as aircraft to stand) are maintained. Pilots should also be required to exercise caution and use the minimum engine power settings needed to complete a satisfactory manoeuvre.

2.6.13 Out of Service or 'Dead' Aircraft Handling

In addition to the above considerations, the handling staff pushing back a 'dead' aircraft for towing will need to consider the following, accepting that local procedures apply depending on local circumstances, for example when using 'tow bar less' tugs may require specific less general procedure than stated here:

a) A trained staff member will normally be required to occupy the flight deck to control the brakes, monitor radio contact between tug/aircraft and ATC and control the aircraft's anti-collision and, if appropriate, navigation lights;

b) As soon as a tug crew is assigned a task associated with the movement of an aircraft on any part of the manoeuvring area it should liaise with ATC for the necessary approvals and obtain a specific clearance before entering the manoeuvring area. The tug driver is normally required to advise ATC when the manoeuvre is complete;

c) Whilst an aircraft is under tow, the tug driver is responsible for the safety of the aircraft, just as the aircraft commander is when it is taxying. It should be remembered that, irrespective of any instructions issued by ATC, in accordance with Rules of the Air regulations it is the tug driver who is responsible at all times for ensuring that the aircraft does not collide with vehicles, aircraft, buildings or other obstructions;

d) When towing an aircraft, it is particularly important to be aware of the extent of the extremities, such as wingtips, of the aircraft and their proximity to obstructions. In the event that a tug driver is unsure whether there is sufficient clearance for an aircraft under tow to be moved safely, he or she should safely bring the aircraft to a stop and request assistance. If the aircraft stops on the manoeuvring area for this reason, the driver should advise ATC;

e) For safety reasons it is important that the number of persons on board (POB) the aircraft is known for local ground movements. Companies involved with ground movements should

ensure that tug drivers ascertain the POB. In the event of an incident or other unusual circumstances involving the towed aircraft, the tug driver should be able to advise Airfield Operations or the Rescue and Fire Fighting Service (RFFS) of the POB;

f) When an aircraft is being towed during the hours of darkness or low visibility, it must display those lights which would be required when flying, i.e. navigation lights. Logo lights will usually be of assistance to ATC; however, towbar-less tugs may require specific procedures regarding the display of navigation lights that must be agreed with both the aerodrome and Air Traffic Control.

2.6.14 Preparation of Stand - Visual Docking Guidance System (VDGS)

2.6.14.1 The compliance requirements for VDGS are described in National Civil Aviation Regulation.

2.6.14.2 Where a VDGS is provided the aerodrome operator should arrange for the stopping guidance to be calibrated and indicated for all selected user aircraft, in a clear and unambiguous manner. Azimuth guidance indication should also be regularly checked for accuracy. **It is generally accepted as International Best Practice that the VDGS should only be activated when the appropriate visual stand checks have been conducted which should include a walking FOD Inspection.** It is often the case with modern or advanced VDGS that the system self-checks prior to arming, however all systems should be subject to regular serviceability checks as deemed appropriate, the results of which should be recorded in line with local maintenance and serviceability procedures. Details of VDGS available at the aerodrome should be promulgated in the Aeronautical Information Publication with serviceabilities promulgated via NOTAM.

2.6.15 Aircraft Arrival on Stand and Parking Safety Considerations

In general, some of the hazards generated during the arrival of an aircraft on stand are, jet blast, carelessly driven vehicles, indiscriminately parked or stowed ground equipment and misleading markings or signals.

2.6.16 Control of the Parking/Docking Operation

2.6.16.1 Ground handling staff are responsible for certain aspects of the control of the parking/docking operation and should only allow the aircraft on stand once all the necessary stand checks have been completed, which includes a walking FOD Inspection. Once the aircraft has entered the stand, and where a marshaller is responsible for guiding the aircraft on to the stand, local instructions should clearly indicate the point at which responsibility is transferred from the marshaller to the handling staff. The nominated supervisor should control the progress of the operation and the actions of the handling team and should include the consideration with regard to the protection of the marshaller whilst carrying out the task, particularly where they are required to be positioned on an airside road. However, under all circumstances, it is the Commander of the aircraft who retains ultimate control and responsibility of taxiing the aircraft onto stand and bringing the aircraft to a halt. The aircraft remains under the responsibility of the aircraft commander until the appropriate indication is given to ground personnel that the aircraft has stopped and the aircraft engines have spooled down.

2.6.16.2 Wing-walkers - On some particularly compact stands, a wing walker/wingman may be required to ensure safety oversight of wing tip clearances; particularly on wide bodied aircraft.

2.6.17 Brakes/Chocks

2.6.17.1 On arrival, when the aircraft is positioned to the pilot's satisfaction and finally stopped, the appropriate aircraft wheel brakes should be engaged by the pilot until the aircraft has been safely and properly chocked (emergency situations such as dangerously hot or failed brakes shall be addressed under operator company procedures). Wheel chocks should not be inserted until the pilot has indicated/signalled that the aircraft has finally stopped, engines are off and spooled down and any propellers have stopped turning. In addition to aircraft marshalling hand signals, it is standard practice for the pilot of a jet-engine aircraft to indicate to ground crews that it is safe to insert chocks by turning off the anti-collision beacons and shutting down the engines. However, as aircraft engines and the anti-collision beacons are not coupled for all aircraft types, they should not be considered as the only indication for ground crews to assume it is safe to approach the aircraft. Personnel should not be permitted to approach an aircraft unless it has been secured as described above. However, under certain operational circumstances and/or for emergency (aircraft) operational reasons, the approaching of aircraft for the purpose of connecting Fixed Electrical Ground Power (FEGP)/Ground Power Units (GPU) whilst anti-collision lights remain illuminated and when aircraft engines are running may be acceptable. Under any other circumstances the airline must produce a safety case that includes a risk assessment that is acceptable to the aerodrome operator.

2.6.17.2 To avoid the possibility of the aircraft climbing or ejecting its chocks, ground markings showing aircraft stop positions should not be used as a positive indication to insert chocks or that the aircraft has reached its final position. When not in use chocks should be safely stowed and not left on the apron surface or the Fixed Electrical Ground Power (FEGP) 'bucket' or any on any other type of equipment, for example, a baggage belt unless appropriate cradles are fitted and the chocks cannot fall off and become a safety hazard to other aircraft and vehicles. A chock and cone 'combo' storage trolley could be provided at the appropriate head of stand areas.

2.6.18 Flap and Control Surface Movement

Staff should be aware of the dangers of the movement of aircraft flaps and other under wing devices when an aircraft is on stand. These areas should be avoided by staff, and vehicles and equipment should not be driven or parked in such a way that damage would be caused by flap and other control surface movements.

2.6.19 Wheels

2.6.19.1 When an aircraft is in motion staff should keep well clear of all wheels to avoid becoming trapped. When an aircraft arrives on stand, tyres and particularly brake assemblies can remain very hot for some time. Ramp staff should exercise care when required to work in the vicinity of aircraft wheels. Where there is some free movement of aircraft wheels, care must be exercised to ensure that clothing and hands or feet do not become trapped.

2.6.19.2 Following the placement of chocks, a visual arrival inspection of the aircraft fuselage should be conducted. The appointed ground handler personnel should conduct an inspection of their 'work area' (i.e. cargo door frames, toilet and water service panels) prior to opening.

2.6.19.3 The engineer should conduct a full fuselage damage inspection. Any damage noted must be communicated to the engineer and airline representatives.

2.6.20 Marshalling of Aircraft

2.6.20.1 The marshalling service is normally, but not necessarily exclusively, provided by the aerodrome operator. The principal considerations are as follows:

a) The aerodrome operator, as part of its SMS, should provide for the training, testing and authorisation of aircraft marshallers. This provision may be also met by the approval of trainers

from handling agents, or third party organisations providing the training. To ensure compliance with regulation and standards, it is recommended that this is audited by the aerodrome operator and findings communicated and followed up as required in any corrective action plans. Only the standard (ICAO) marshalling signals, as laid down in the 'Rules of the Air Regulations 2009' should be employed. Only trained, experienced marshallers in regular practice should be permitted to marshal aircraft unsupervised;

b) Except where full self-manoeuvring is permitted, a marshalling service should be provided automatically on stands not equipped with VDGS or where the VDGS or other stand facilities have known unserviceabilities. A marshalling service should also be available on request;

c) In certain circumstances, such as a non-standard taxiway routing or on request from a visiting pilot, unfamiliar with the aerodrome, and/or in poor visibility, a 'Follow me' vehicle should lead the pilot to a marshaller or the designated parking place directly.

2.6.21 Fixed Electrical Ground Power (FEGP)/Auxiliary Power Units (APU)/Ground Power Units (GPU)

2.6.21.1 In accordance with local airport environmental policies and rules, concerning noise and emissions predominately, the running of all types of engines on the apron should be kept to the minimum necessary to maintain operational needs. Where FEGP units are provided on stands they should be used in preference to other forms of auxiliary power. The running of aircraft Auxiliary Power Units (APUs) and engine driven Ground Power Units (GPUs) should be strictly controlled to the minimum operational requirement. Airlines should be encouraged to use GPUs with the quietest engines available. At large aerodromes consideration can be given to the provision, on stand, of pre-conditioned air units to reduce the running of APUs for cabin conditioning.

2.6.21.2 When entering a stand, it is desirable that flight crews use the minimum power needed to carry out a normal arrival manoeuvre. Where possible the aircraft should be kept moving to avoid the need to apply 'break away' power to continue the approach to the stand. This may be particularly important in locations where there are stands on the opposite side of the taxiway or taxilane.

2.6.21.3 Thrust levers should not be exercised for any purposes when the arriving aircraft is on stand, unless specifically approved by the aerodrome operator.

2.6.21.4 Fundamental to the safe management of an aircraft movement is the timely attendance of the dispatcher/aerobridge operator to initiate those actions necessary to promote a safe arrival sequence. A full functional check of the aerobridge should be completed in good time before the aircraft arrives. To maintain aircraft and personnel safety and to ensure that the prescribed safe clearances between aircraft and bridge are maintained, the following precautions should be taken into consideration by the team leader:

a) Before the aircraft enters the stand, ensure by personal visual inspection that there are no potential hazards (such as FOD or vehicles illegally parked or equipment poorly positioned) to a safe parking operation;

b) A visual inspection of the serviceability of the aerobridge tyres should also take place to verify that there is sufficient pressure in the tyres (where applicable, some are fitted with solid rubber tyres) before manoeuvring of the bridge can take place.

c) Before the aircraft enters the stand, the drive wheels of an apron-drive aerobridge must be positioned in the marked parking box/circle provided or, in the case of a rail-drive aerobridge, must be fully retracted;

d) Before the aircraft enters the stand, confirm that the stand is set up for the approaching aircraft type;

e) A careful check should be made to ensure that no vehicles or equipment are obstructing the horizontal or vertical movement of the bridge while ensuring that the aerobridge remains in the appropriate position;

f) The aerobridge cab should be adjusted vertically and in azimuth to suit the incoming aircraft type;

g) Only when the aircraft has stopped, the wheel chocks are in place, the engines have run down and the aircraft anti-collision beacon has been extinguished, can the aerobridge be driven from its parking position and docked to the aircraft, or steps be positioned beside the aircraft;

h) The aircraft passenger door should remain closed until the aerobridge has been docked, the canopy has been lowered on to the fuselage and the autoleveller device has been set;

2.6.22 Stop Short System

On stands equipped with VDGS, an indicator system should be provided to advise the pilot to Stop Short; this may be because the aerobridge is unserviceable and passenger steps must be used, or due an obstruction or due to works at the head-of-stand for example. The Stop Short indication may be an electronic sign associated with the VDGS display, or conspicuous painted signs may be used, normally fixed to the aerobridge. In Stop Short conditions a marshalling service should be provided.

2.6.23 Location of Controls

2.6.23.1 The determination of the best positions for VDGS, Stop Short and Emergency Stop switches may vary from aerodrome to aerodrome, or even from stand to stand. However, it should be an objective of the safety system to standardise the location of switches on all stands at a particular aerodrome. The following locations offer the best control positions:

a) Emergency Stop switches: One gated switch located in the aerobridge cab and clearly marked. A second gated switch, working in parallel with the first, located in a prominent and easily reached position at the head-of-stand and conspicuously marked. A person should be positioned adjacent to each switch until the aircraft has successfully parked.

b) Stop Short and VDGS Switches: These switches should ideally be grouped together with the emergency stop buttons, fuel cut-off switches and emergency telephones. One set of VDGS switches should be located in the aerobridge cab and clearly marked. A second set of VDGS switches working in parallel with the first should be located at a prominent easily reached position at stand level and conspicuously marked. Which of these positions is the primary VDGS switching position will depend on which position gives the operator the best view of the stand area.

Note: It is important the VDGS controls are located in a position such that the operator has an unimpeded view of the specific apron parking position whilst the controls are being used.

2.6.24 Departure and Post Turnround Responsibilities - Aircraft Departure

2.6.24.1 Aircraft departure is a critical phase of flight. Notwithstanding the pressures that often call for expeditious movement to meet schedules, clearances and 'slot' allocations, the safe management of departure procedures is paramount. For the purposes of this section the departure phase is considered to be from the time the aircraft starts an engine, or pushback movement starts (if earlier), to the point where taxi clearance is issued by ATC. Guidance covering the various methods of aircraft departure is given in the following paragraphs.

2.6.24.2 To avoid damage and to maintain a safe clearance from the aerobridge the following precautions should be observed before aircraft pushback is initiated:

a) The aircraft passenger doors must be closed;

b) The aerobridge canopy and autoleveller must be retracted;

c) The aerobridge safety barrier should be erected or the doors should be closed;

d) An apron drive bridge or steps should be withdrawn and the drive wheels placed in the parking position provided;

e) A rail drive bridge should be fully retracted; and

f) A check should be made that there are no vehicles, FOD, equipment or personnel obstructing the movement of the aerobridge before it is moved. A check should also be made to confirm that the ground equipment is configured to meet any specific settings for the aircraft type.

2.6.25 Pushback Procedures

2.6.25.1 Aircraft pushback operations have the potential for accidents involving personal injury/fatalities for ground crews and damage to aircraft, vehicles and equipment. During the pushback sequence the stand centreline should be followed by the pushback driver until the main landing gear has reached the back of stand safety line and should also be monitored by the head set operator. Any deviations from the centreline prior to the safety line then the push should be stopped.

2.6.25.2 As part of an SMS, it is recommended that all stakeholders (aerodrome operators, airlines and ground handlers) conduct and coordinate risk assessments to establish and promulgate general rules and requirements for the safe conduct of pushback operations. The development of detailed procedures, within the guidelines issued, may remain the responsibility of airline operators/handling agents. Aerodrome operators should maintain safety management arrangements to audit compliance with pushback requirements including the use of Tug Release Points (TRP) where required. When considering rules for pushbacks the following should be taken into account:

a) Detailed written operating procedures should be produced by airline operators/handling agents for use by their staff. These procedures should ensure the safety of the aircraft and the personnel involved; ideally this information should be contained within the aircraft turnround plan or similar associated documentation which should include instruction in regard to simultaneous pushbacks on adjacent stands;

b) A visual fuselage external check of the aircraft to ensure that there are no missing panels or damage has occurred and all doors/holds are closed;

c) Unless required to ensure the safety of the aircraft, personnel involved in the pushback should stay within the aircraft tug. Personnel working outside the aircraft tug, such as the headset operator, are particularly vulnerable to injury and employers must have risk assessments and safe working practices in place to address the hazards. Where risk assessment has shown it to be advisable, 'tail look-out' and/or 'wing-walkers' should be used to safeguard the rearward movement of the aircraft and prevent collisions with other aircraft, vehicles or personnel. Procedures for these personnel should be written down and should ensure the safety of the aircraft and the people involved. Personnel should be trained to ensure they are familiar with the procedures;

d) During the pushback process, head set operators should not 'ride' the pushback tug and should walk alongside the aircraft. The side at which they walk (port or starboard) should be dictated by the most prominent hazard at either side of the aircraft.

e) Tug drivers should not commence the push if the head set operator is riding the tug.

f) All tug drivers should be trained and competent to drive aircraft tugs in all weather conditions;

g) Pushback supervisors should be nominated, trained and certificated as competent, as in c) above;

h) The supervisor should, ideally, be in verbal contact with the flight deck crew throughout the pushback. Where there is a possibility that verbal communication will not be available for any reason, the supervisor and other members of the ground crew should be trained to use internationally agreed hand signals;

2.6.25.3 In the case of a departing aircraft being pushed back from its stand, the pilot of the aircraft will usually obtain approval to push back from ATC and pass this information to the headset operator who will then communicate this to the tug driver. It is imperative that the Tug Driver is provided with all the ATC clearance information in regard to 'standard' or 'non-standard' pushbacks.

2.6.26 Power-back procedures (Reversing under Power)

2.6.26.1 Powering back an aircraft is inherently less directionally accurate than pushback or powering forward; there may also be an increase in noise and blast effect. Accordingly, the use of this technique should be limited to those aircraft types authorised in the aircraft's flight manual to reverse under power and for which procedures can be agreed which do not adversely affect apron safety in respect of engine noise, vibration and blast effects.

2.6.26.2 Before approving power-backs the aerodrome operator should conduct a risk assessment taking into consideration aircraft characteristics, apron layout/stand density, the stand clearances available and any gradients involved on stands or taxiways.

2.6.26.3 The following items should also be considered:

a) The procedures are authorised in the aircraft manufacturer's manual;

b) The procedures to be used are incorporated in the airline's operations manual;

c) Pilots are trained and experienced in power-back operations;

d) The aircraft is directed by a trained handling agent/marshaller using standard power-back marshalling signals;

e) Wing walkers are employed to safeguard the rearward movement of the aircraft, particularly wing tip clearances, to prevent collisions with other aircraft or vehicles or personnel. Procedures, training and personal protective equipment should be employed which ensure the safety of these personnel during power-back operations;

f) A trial of a live power-back is carried out using the engine settings, aircraft weight and procedure intended for operational use in which the safety of the operation is demonstrated.

2.6.26.4 The aerodrome operator should assess the effects of noise, vibration, blast and fumes, observed during the trial, in order to decide the suitability of the procedure demonstrated. It is not possible to state the finite limits of noise, blast and fumes to suit all locations and all aircraft types; aerodrome operators should decide the local limitations to be met.

2.6.26.5 Power-back operations should not be permitted when passengers are being boarded or disembarked on adjacent stands unless it is necessary for operational reasons. In such circumstances, the aerodrome operator should specifically risk assess the associated hazards and put in place control measures to reduce the risks to as low a level as reasonably practicable.

2.6.27 Engine Management on Aircraft Arrival/Departure

2.6.27.1 When entering a stand, it is desirable that flight crews use the minimum power needed to carry out a normal arrival manoeuvre. Where possible the aircraft should be kept moving to avoid the need to apply 'break away' power to continue the approach to the stand. This may be particularly important in locations where there are stands on the opposite side of the taxiway or taxilane. A trained member of airline or handling staff should ensure that the area behind the aircraft and the zone immediately in front of the engine intakes are clear of personnel, vehicles FOD and equipment before engine start.

2.6.27.2 The aircraft anti-collision beacon(s) must be switched on before an engine is started.

2.6.27.3 The number of engines started before pushback commences should be the minimum to meet technical and passenger service needs.

2.6.27.4 During start up and pushback, engine power settings should not normally exceed ground idle.

2.6.27.5 Aircraft leaving the inner stands of a cul-de-sac should be towed forward to a safe distance from the blast screen (noting that not all airports provide blast screens at the end of a cul- de-sac where a rear-of-stand road is provided for example) before the tug and towbar are disconnected. This position may be marked on the taxiway centreline for additional guidance to the tug-crew.

2.6.28 Multiple Pushback Procedures

2.6.28.1 Multiple aircraft pushbacks from a run of stands, or in a cul-de-sac, are an accepted method of achieving a faster pushback and departure rate, but they must be conducted with due regard to the additional health and safety requirements that arise for ground crews and for overall aircraft safety.

2.6.28.2 Approval for start of 'pushback' normally rests with ATC and if there are apron areas of an aerodrome where the ground movement controller does not have a full view of the aircraft, then any procedures must take this into account.

2.6.28.3 The principal safety threats in multiple pushback operations where aircraft end up positioned nose to tail are:

a) Aircraft positioned too close to each other when the pushback phase is completed;

b) Excessive levels of engine blast and fumes for pushback crews positioned behind aircraft with engines running.

2.6.28.4 In order to avoid excessive blast and fumes, the safe separation distance behind an aircraft must be determined by conducting collaborative a risk assessment involving all interested parties, including the air navigation service provider, which should make reference to aircraft engine manufacturer's specific guidance. The distance may vary according to aircraft type and engine fit. Experience gained from other aerodromes may be useful in deciding what practical separation distances can safely be used. It is impractical for pushback crews or operational staff to measure exact distance each time, so a practical rule of thumb should be established to permit multiple pushback operations to be managed and sequenced safely. Aircraft maintenance manuals will also include guidance on this topic.

2.6.28.5 The acceptance of a clearance from ATC to push back into an area in which other aircraft are being manoeuvred will normally assume that the prescribed safety distance criteria will be achieved. The decision to accept a clearance for a 'multiple pushback' remains with an aircraft commander as does the responsibility to ensure that the pushback crew are fully aware of any limitation or conditions to be adhered to. Clearly there is a need for prior planning, co-ordination and information exchange between

the aerodrome operator, the aircraft operators and ATC before such manoeuvres are adopted as standard practice at any aerodrome.

2.6.29 Engine Hazards

The associated safety hazards caused by exhaust blast, vibration, fumes, turning propellers and rotors and the intake suction of jet engines are well recognised. As part of the safety management system, aerodrome operators should ensure that rules and procedures for safe engine running on the aerodrome are promulgated and understood by flight crews and handling staff. All personnel (including contracted employees) should have successfully completed an apron safety awareness course (Induction) prior to release to working airside, acceptable to the aerodrome operator.

2.6.30 Blast, Vibration, Noise and Fumes

Even at idle power the blast effects, ingestion, vibration and fumes from all sizes of aircraft engines can be significant. As engine size and power settings are increased, the potential for personal injury and damage increases. The amount of fumes produced is directly related to the engine running time and the power settings used. Engine running on the apron and adjacent taxiway areas should be limited to the minimum necessary to meet aircraft operating needs. In formulating safety rules the issues detailed in the following paragraphs should be considered.

2.6.31 General

2.6.31.1 Vehicles and personnel should not pass behind running engines. Staff should not approach aircraft whilst engines are running and/or whilst anti-collision beacons are illuminated unless it is part of their job function and is necessary for the task at hand, in which case a risk assessment of the procedure, leading to control measures and mitigations which protects aircraft safety and health and safety of ground personnel have been jointly agreed with all relevant stakeholders.

2.6.31.2 Drivers and pedestrians should be vigilant at all times on the apron. A common indication to ground staff that aircraft engines are running, or are about to be started, is the illumination of the aircraft's anti-collision beacon(s).

2.6.31.3 Where possible, blast screens should be provided to protect buildings, installations and vehicle and staff areas that are vulnerable to blast. These screens should be designed to withstand blast from the aircraft types expect to use those stand areas.

2.6.31.4 An assessment and consideration should be given to the location and building design (including protection to minimise the effects of blast, vibration, noise and fumes for the occupants) where contractors are required to use temporary buildings (i.e. portacabins etc) on the apron or other airside locations,

2.6.32 Engine Test Running

Engine ground runs and check starts should be controlled and only carried out with prior approval from air traffic control and the aerodrome operator who should specify the conditions to be applied, for example:

a) Where possible, engine ground runs should be carried out on agreed, selected and prepared remote areas, preferably equipped with engine baffles/detuners;

b) Engine ground runs at above idle power should not be permitted in cul-de-sacs or, for example, in areas where the jet efflux would impinge on stands, equipment areas or works areas;

c) Engine ground runs on stands in regular use in apron areas should be limited to check starts and idle power only;

d) Where engine running is permitted on the apron, a remote area should be chosen where the jet-blast will not affect other apron areas and busy taxiways;

e) Where necessary, engine ground runs should be safeguarded by Airfield Operations staff who should arrange for any rear-of-stand roads and, if needed, sections of taxiway to be closed;

f) The area behind and adjacent to the cone of the blast should be clear of equipment and aerodrome signage and the ground must be firm and without loose tarmac, stones or other material;

g) The engineer in charge of the ground run must ensure that the aircraft wheels are safely chocked and that the aircraft cannot move forward under any circumstances;

h) Ground running must not take place when passengers are being embarked/ disembarked on any adjacent or opposite stands, except when such passengers are using an aerobridge;

i) A trained member of airline or handling staff is to be positioned on the stand and should be in verbal contact with the flight deck and ATC. He/she will communicate by R/T or interphone with the flight deck to ensure that the engine(s) are shut down if persons or vehicles move into the danger area in front of, behind or in the vicinity of a live engine. For this purpose and if the R/T or interphone link is unserviceable, hand signals by day and light signals by night may be used.

2.6.33 Propellers

2.6.33.1 Aerodrome operators should issue instructions to safeguard apron operations around propeller driven aircraft. Apron staff must be alert to the dangers of running propellers and should be educated by suitable awareness campaigns. At some aerodromes there are relatively few propeller driven aircraft and ramp staff are likely to be less familiar with precautions that need to be observed, particularly for staff of airlines which themselves offer no propeller driven services. In these circumstances it is the airlines responsibility to communicate such risks to the relevant handling organisation and other stakeholders to ensure that the safeguarding of 'propeller areas' is included in operating safety procedures.

2.6.33.2 Aerodrome operators should provide suitable apron layouts and facilities that provide compliant clearances for the operation of propeller aircraft types, with particular emphasis on ground clearance for propeller tips and the proximity of ramp equipment when the aircraft is at, or approaching, its parking position. Stands at which this cannot be achieved should not be used for propeller aircraft.

2.6.33.3 Passengers must not be permitted to walk on aircraft parking stands when propellers of an aircraft on that stand are turning. Where it is operationally essential to have the propellers turning, passengers must be effectively controlled by the relevant handling company's safety procedures.

2.6.34 Rotors

2.6.34.1 Helicopter operations, particularly those of large helicopters, should be segregated from fixed-wing apron operations where possible. In addition to the provision of standard clearances for rotors in the apron layout, due regard should be given to the other characteristics of rotary operations, including:

a) The heavy down draught produced by helicopter movements;

b) The vulnerability of helicopters and aircraft to jet blast, strong winds and rotor downwash from other helicopters;

c) The risk of reduced ground clearance caused by the drooping of the rotor (blade sailing) as it runs down following engine shut down or drive disconnection;

d) The ease of approach to the chosen helicopter stands in hover and hover-taxi mode and the least interference from/for taxying fixed wing aircraft;

e) The risks associated with tail rotors.

2.6.34.2 Dependent on aircraft type characteristics, procedures should include arrangements whereby:

a) Helicopter arrivals are marshalled, unless the helicopter apron is remote and configured for self-manoeuvring. Marshalling assistance/safeguarding may also be required for departure;

b) Ideally passengers should not be allowed to walk on the apron when rotors are turning. Where it is operationally essential to keep rotors running passengers must be effectively controlled;

c) Staff, vehicles and ground equipment should remain well clear of the rotor disk until it has come to rest. If as above, running the rotors is essential, handling staff must be trained accordingly;

d) Suitable signs should be provided to warn drivers and apron staff that they are approaching an area where helicopter operations are handled. All airside drivers and handling staff should be briefed to maintain a good look-out and also should be trained to look upwards as well as horizontally to detect and give way to helicopter movements.

2.6.35 Fumes and Noise

In approving engine running or self-manoeuvring on the apron, the following should be taken into account:

a) The concentration of fumes present in an aerodrome area is in direct relation to the length of time engines are run, the type of engine and power settings used and the strength and direction of the surface wind;

b) Where workplaces, such as cargo-sheds and engineering facilities, have to open directly on to stand areas, a specific risk assessment is required to determine how best to operate all facilities safely and without risks to health, in respect of noise and fumes.

2.6.36 Suction - Ingestion

2.6.36.1 Personnel entering the danger zones in front of a running jet engine expose themselves to the risk of being sucked in, almost invariably resulting in serious or fatal injury. The intake suction of jet engines is a hazard, even at idle power, and the flow characteristics of air into an engine are such that items can be picked up from in front of, from below, and from the sides of the intake. Even small items ingested can damage the engine, but the larger engines are quite capable of ingesting large objects from several metres away with catastrophic effect.

2.6.36.2 The extent of the danger zone depends on the size of the engine, the mounting height and the power setting. Managers of aircraft handling staff should calculate and promulgate to their staff the safe distances for operating around the types of aircraft they operate.

2.6.37 Foreign Object Damage

2.6.37.1 Foreign object damage' or 'foreign object debris', both abbreviated to FOD, are a potential source of catastrophic damage to aircraft, particularly engines. FOD can also be a tripping or slipping hazard resulting in injury to personnel and passengers. Foreign objects may be ingested into aircraft engines causing damage leading to engine failure, which is critical if it occurs during the take-off phase of flight. At best, such damage leads directly to premature engine removal and replacement. In addition, damage caused by foreign objects can occur to tyres and undercarriages, control systems and other parts of the airframe. All such damage could lead to in-flight failures and inevitably requires expensive repairs to be made. All foreign objects are a threat to aircraft safety.

2.6.37.2 Dealing with the temporary sources of risk, such as FOD, requires the whole aerodrome community to play a part. Loose items should be removed by whoever notices them; some of them will only be suitable for the FOD bin. Larger items, such as cables, should be reported to the owner of the piece of equipment concerned, who should in turn have the items removed or tidied away promptly. If the owner of a larger piece of equipment cannot be established, the FOD should be reported to the aerodrome operator.

2.6.37.3 FOD is a general term which applies to all loose objects which are a danger to the safety and integrity of an aircraft and which, therefore, must not be left in any area so as to constitute a hazard. The list of FOD items most frequently found on the apron is long and principally includes:

a) plastic and paper bags/sheets;

b) rags;

c) empty oil and hydraulic fluid cans;

d) empty soft drink cans;

e) nuts and bolts, tools and equipment;

f) luggage wheels and baggage tags;

g) metal cutlery;

h) burst ballast bags;

i) broken wooden items and miscellaneous rubbish.

2.6.37.4 The presence of FOD is due mainly to the carelessness of staff and their lack of understanding of the consequences. Every individual has a responsibility to ensure that the risk of damage to aircraft from FOD is minimised. Any item of FOD found by any staff member in the course of their work should be removed and placed in the bin provided. An item of FOD seen in an area that a staff member is not authorised to enter or which they are unable to remove for any reason should be brought to the attention of their supervisor and the duty manager airside operations. All operators should introduce staff procedures that reflect these responsibilities.

2.6.37.5 Aerodrome operators should include instructions, services, facilities and initiatives to combat the risks arising from FOD, establish a programme to educate all apron users on the hazards and requirements associated with FOD, and stress the responsibilities of all personnel employed on the apron to minimise risks from FOD.

2.6.37.6 Aerodrome operators should ensure that there are programmes of regular apron sweeping, cleaning and inspection, including appropriate and timely response to fuel and other liquid and chemical spillages in accordance with agreed procedures. They should also provide facilities for the disposal of solid and liquid aircraft waste and FOD protection, with particular attention to such prime FOD generators as contractors' areas, bin, compactors and baggage facilities all of which should be regularly checked. FOD bins should be located in the vicinity of the head of each stand.

2.6.37.7 All vehicles and equipment used on the aprons should be maintained in a clean and serviceable condition, not only for reasons of safe vehicle operation but also to minimise the leakage of fluids and depositing of FOD from these vehicles (See Chapter 5 for additional guidance on the management of airside vehicles.).

Generally, airport operators should have in place agreed policies and arrangements for the removal of hazards from the apron such as abandoned vehicles and equipment.

2.6.38 Falls and Falling Objects - General

2.6.38.1 Access to external elevated levels on and around aircraft will be required when aircraft are on the stand. Such work includes catering, cargo and baggage handling at the aircraft holds, some cleaning activities and maintenance.

2.6.38.2 It is not sufficient merely to indicate the presence of an edge from which a person may fall. There must be suitable and effective measures to prevent any person falling a distance likely to cause personal injury. Measures must also be taken to prevent aircraft or people being struck by falling objects. Preference should be given to providing a safe place of work (e.g. elevated platforms with edge guards) rather than relying on personal protective equipment, information, instruction, training or supervision to prevent these events. Nevertheless, even where all other reasonably practicable measures have been taken to prevent falls, personal protective equipment (PPE), for example a safety harness and lanyard, may still be necessary if a significant risk of falls remains.

2.6.38.3 The necessity and provision of head protection should be determined by the employer's risk assessment of staff carrying out tasks on the ramp. Head protection may be necessary for other activities on the apron, such as construction work or maintenance of plant.

2.6.38.43 By its very nature all access equipment has to be used in close proximity to the aircraft. Drivers may need to seek assistance, especially from a person appointed to guide the vehicle, to ensure the correct positioning of the access equipment so that there are no gaps large enough for a person to fall through, as well as preventing the access platform or its chassis striking the aircraft. Drivers should also make allowance for the change in height of an aircraft during loading/unloading as this might cause the aircraft to touch the access equipment resulting in damage to the aircraft.

2.6.38.5 Suitable access equipment should always be used to gain access to heights. Work from surfaces such as vehicle cabs, roofs of buildings and equipment is not acceptable unless these places have been designed or adapted to make them safe for such work. Mobile elevating work platforms (MEWPs) provide flexible and safe means of access to heights. They should be used in accordance with a safe system of work and procedures which minimise the risk of injury and damage to the aircraft. Passenger steps should be equipped with non-slip devices to mitigate the potential for falls, particularly in humid conditions.

2.6.38.6 Some places may be temporarily adapted to make work at heights safe. For example, some aircraft have attachment points on their wings for running lines and harnesses. The health and safety of the engineers preparing such places of work for use should be considered, as well as the prevention of damage to the aircraft.

2.6.38.7 Work at heights above should only be undertaken from equipment fitted with guardrails to all sides in order to meet best practise guidance or requirements.

2.6.38.8 Where guardrails or barriers cannot be fitted, other means, such as the use of PPE, should be considered. It should be noted that where the potential height of a fall is less than four metres, the use of lanyard and

harness systems as fall arrest devices may not prevent injury as the worker may hit the ground before the device becomes effective. Advice should be obtained from the equipment supplier.

2.6.38.9 Where the potential height of a fall is less than two metres, each situation should be assessed for the likelihood of injury and aircraft damage, and appropriate preventive measures taken. For example, the likelihood of injury is increased if there are obstructions, such as low profile equipment with sharp edges, onto which people may fall, or the work is taking place alongside a traffic route. The availability of safety guard rails on Main and Lower Deck Loading equipment and passenger steps should be mandatory. Conveyor belts should be equipped with safety guard rails and should be utilised, especially when used on wide body aircraft.

2.6.38.10 As with all equipment, means of access and means for preventing falls (including those integral to the aircraft) should be maintained in efficient working order and in good repair if continued protection against injury and aircraft damage is to be ensured. A regime of inspection may also be required to ensure that any deterioration in the equipment which may affect health and safety or aircraft safety is detected and rectified in good time. This inspection should be carried out by people with sufficient knowledge, experience and training to identify and prioritise defects. The results of inspections should be recorded and kept until at least the next inspection and longer if the inspection results are used for monitoring serviceability trends.

2.6.39 Access to Aircraft Doorways

2.6.39.1 Safe access to aircraft entry/service doorways is particularly important as the height of fall from the doorway of an aircraft may result in a fatal injury. Aircraft doors and doorways are also particularly vulnerable to damage. Such damage may go undetected for some time. For example, damage to escape slides may not be immediately apparent and may not be discovered until the next periodic inspection of the slide assembly or until it is used in an emergency. Equally, for example, damage to door sills can cause aircraft depressurisation; therefore all damage, even seemingly insignificant, should be reported via the local incident/accident reporting procedures (See Chapter 7 Safety Performance Management and Measurement for more details about reporting).

2.6.39.2 Airline operators should ensure that doors are not to be opened unless ground equipment is in place. This must be communicated to ground handlers and other service providers. A door safety lanyard is not sufficient mitigation as it does not act as a weight bearing safety device. During maintenance/hangar input the use of a door safety net should be considered.

2.6.39.3 Proper planning, safe systems of work and instruction and training are required to ensure that aircraft doors are opened in such a way that no one is exposed to the risk of a fall, and the risk of damage to the aircraft is minimised.

2.6.39.4 Airlines should ensure that they do not require aircraft doors to be opened in a manner which exposes people to unnecessary risk. The types of vehicles commonly used to service aircraft rarely have means to prevent falls from the edge that is adjacent to the aircraft when in use. In some circumstances the access equipment can be brought close to the aircraft before a person has to approach the leading edge. Examples are when the aircraft doors open inwards upwards, are powered open and closed, or otherwise avoid the need for people to approach the edge of the access equipment or the aircraft doorway.

2.6.39.5 Where the aircraft has outwards opening doors, which may foul the access equipment during opening and closing, employers should establish whether the safest option, for both the worker and the aircraft, is to open the door from inside. This may require co-operation and co-ordination with the airline operating the aircraft.

2.6.39.6 If opening the door from the inside is not the safest option, employers should ensure that people work at the unprotected edge of the access equipment for the shortest time that is practicable. The floor on which the employee is standing should not have any defects that are likely to cause them to slip, trip or fall. Secure handholds should also be provided.

2.6.39.7 Where an extra wide platform can be positioned against the aircraft, the increased width can provide additional protection against falling and reduce the risk of damage to the aircraft door. There should be a safe system of work in place for opening the door, and employees should be given information, instruction and training on the task.

2.6.39.8 Whatever platform is used, the moveable side guardrails should be adjusted to be close enough to the aircraft to protect the workers without causing damage to the aircraft; it must be kept in mind that a gap of more than 300 mm will not ensure the safety of the workers and that the aircraft may move during loading and unloading. Guardrails should be moved into position as soon as is practicable and certainly before the doorway is used. The last task before the access equipment is withdrawn from the aircraft should be to retract the guardrails. It is equally important that any controls that move the platform should be located so that the operator has a clear view of the platform in order to prevent the platform striking the aircraft. For vertical height fluctuations, particularly as an aircraft is being loaded/unloaded and refuelled during a turn around, it is recommended that some guidance is given to ground handlers as to the maximum safe height clearance. A useful guide is 29mm. A clearly defined horizontal guidance marker line is also recommended (dependant on the ground movement characteristics of the aircraft type).

2.6.39.9 Sometimes aircraft doors are left open for reasons other than access, for example to keep the aircraft cooler in hot weather whilst cleaners etc. work inside. When doors are left open, suitable means to prevent a fall should be in place. These include placing aircraft steps at the doorway; although particular aircraft operator's or aerodrome operator's security requirements need to be kept in mind.

2.6.39.10 The straps and their attachments which are often fitted to aircraft doorways are not sufficient as a means to prevent a fall, as they are not designed to withstand the forces generated by a person falling or leaning against them.

2.6.39.11 If other means of preventing a fall cannot be provided, then the aircraft doors should be kept shut. If necessary, the aircraft's air conditioning should be used to keep working temperatures comfortable. Where possible, this should be provided by a safely positioned mobile air conditioning unit, rather than the aircraft's auxiliary power unit (APU), as the APU generates considerable noise for those working outside the aircraft. Any aerodrome policies on the use of GPU/APUs should be followed.

2.6.39.12 Access to parts of the aircraft other than the doorway may be gained by a suitable MEWP, although other measures may be used if they are suitable and effective. The edge protection around the working platforms should be maintained so as to prevent persons falling.

2.6.39.13 Lightweight fall restraint devices incorporating a lanyard and harness have been found to be effective for over-wing access. Any equipment which interfaces with the aircraft surfaces should be approved by the aircraft manufacturer. Some aircraft manufacturers provide attachment points for harnesses on wings of their aircraft and, in such cases, the manufacturer's guidance on their use must be followed.

2.6.39.14 A significant number of accidents occur as the result of falls through uncovered access points in the internal floors of aircraft when covers have been temporarily lifted. Accordingly, covers should be replaced when the access way is not in use and uncovered access points should be provided with a temporary barrier.

2.6.40 Aerobridge Operations

2.6.40.1 There have been several incidents involving aerobridges which have occurred globally which had potential for major aircraft damage and/or serious injury to personnel. These have included:

a) Collapse and other extensive structural failure, in particular the service steps which are often overloaded with cleaning staff waiting to access the aircraft;

b) Un-commanded or unexpected movements;

c) Obstructions, such as vehicles and equipment, being struck by the aerobridge, due in part to the failure of detection devices;

d) Rotten floors and leaking roofs creating slip and trip hazards.

2.6.40.2 These incidents have commonly been caused either by incorrect installation or inadequate maintenance of the equipment, or poor procedures leading to operator error.

2.6.40.3 The efficient and safe in-service operation of these walkways depends on their correct installation. Therefore, they should be inspected after installation and before being put into service for the first time.

2.6.40.4 Detailed advice cannot be given on the content of such an inspection, but it is unlikely to be adequate unless it is based on the findings of a risk assessment. Such an assessment will need to cover the appropriate issues outlined in paragraph 9.12.

2.6.40.5 The process of installation may be subject to any requirements of the Construction (Design and Management) Regulations.

2.6.40.6 The following auxiliary equipment should be fitted to apron drive aerobridges:

a) Audible and visual warnings that operate automatically when the bridge is in motion;

b) In order to overcome downward and rearward blind spots for the operator, CCTV or sight mirrors should be fitted to cover blind areas in which the aerobridge is able to manoeuvre;

c) Pressure sensitive safety hoops which, when they touch an object, cut out the motive force thus stopping movement of the bridge;

d) Means to prevent falls from the leading edge of the aerobridge, such as doors or guardrails, for use when the aerobridge is not in place against an aircraft.

2.6.40.7 Apron-drive aerobridges are vulnerable to obstructions. Significant damage has occurred when items of equipment have been parked in the operating area of aerobridges. For stands equipped with an apron-drive aerobridge, ground marking in the form of a hatched area should be provided to delineate the area within which the parking of vehicles and equipment must be prohibited. The aerodrome operator should enforce this parking restriction and aerobridge operators should bring improperly parked vehicles to the aerodrome operator's attention.

2.6.40.8 For stands equipped with an apron-drive aerobridge, a ground marking in the form of a parking box should be provided to show the position of the aerobridge wheels when it is fully retracted so that the prescribed safe clearance can be maintained between any aircraft and the bridge structure. The parking box should be clearly defined at all times, particularly during night operations. Any unserviceable markings should be reported to the airport operator immediately.

2.6.40.9 To assist marshallers and tow-on crews, painted stop marks should be provided across the stand centreline and designed for each aircraft type permitted to use the stand. These stop marks should be harmonised with the VDGS stopping positions for the particular aircraft.

2.6.40.10 The extendable portion of rail-drive aerobridges should be highlighted by conspicuous marking (such as retroflective chevrons) to indicate to pilots, drivers and apron staff that the bridge is extended.

2.6.40.11 Aerodrome operators should establish a schedule of preventative maintenance and cleaning, including inspection by competent people.

2.6.40.12 Such inspection and maintenance regimes are unlikely to be adequate unless they consider the following points:

a) The structural integrity of the aerobridge, including components vulnerable to catastrophic failure and the potential for water ingress to cause corrosion to the walkway or its control and drive systems;

b) The electrical safety of the aerobridge and the potential for electrical failure to cause un-commanded or unexpected movement;

c) The mechanical integrity of the drive and control systems of the aerobridge, including the condition of the hydraulic fluid and the components on which it impinges;

d) The conditions of wheels and tyres;

e) The devices for detecting obstructions (if any), such as closed circuit television (CCTV) or sensor rings:

f) The cleanliness of aerobridge cab windows to provide unobstructed vision to the ramp and a FOD-free cab.

2.6.40.13 Aerodrome operators should establish and promulgate a formal reporting system for aerobridge faults. The procedure should include immediate response activities by engineering and airfield operations staff, where necessary withdrawing the aerobridge from service until remedial action is taken, to maintain safe aircraft and passenger handling.

2.6.40.14 Aerodrome operators should ensure that they develop and promulgate Standard Operating Procedures (SOPs) for aerobridges. These should include emergency back-off and wind-off procedures. Instructions for emergency back-off action should be displayed in the aerobridge cab and in the case of manual wind-off, at the point of operation.

2.6.40.15 Procedures that are specific to the stand or aerobridge should normally be displayed at the aerobridge control position. This is particularly important if the procedures relate to different configurations for particular aircraft types.

2.6.40.16 In the event of an emergency whilst the aircraft is on stand, the aerobridge should remain attached or be re-attached to the aircraft until all passengers and crew have evacuated the aircraft.

2.6.40.17 A system should be established for the training, testing and licensing of aerobridge operators. An Aerobridge Operator's Licence (or permit), endorsed for the appropriate type of aerobridge, should be issued by the aerodrome operator or delegated trainer provider when a satisfactory level of competence has been demonstrated. The demonstration of competence should include a practical test. Procedures should be established to ensure that aerobridge operators attempt to operate only those types of aerobridge on which they have been assessed as being competent. Aerobridges with different operating characteristics or control/warning systems are be considered to be different types of aerobridge.

2.6.40.18 Licences should only be issued to those staff who regularly operate aerobridges as part of their job function, as it is these staff who remain fully familiar, in good operational practice and up to date with operational changes and aerobridge modification states. Licence holders should be subject to regular revalidation to confirm that they remain competent to operate the equipment. The aerodrome operator should also establish an audit system to ensure aerobridge operator competency and adherence to standards. Records of aerobridge incidents and major faults should also be examined. If responsibility for training and/or testing of aerobridge operators has been delegated to a handling agent or a third party, the airport operator should conduct regular audits of the performance and actions of these organisations in order to ensure that adequate levels of safety are achieved. Following an accident or incident, aerobridge operators should be subject to revalidation on request of the aerodrome operator and it should be possible to suspend an operator's licence pending re-training.

2.6.40.19 If a new type of aerobridge is introduced, all aerobridge licence holders who will be required to operate (or trainers who will be required to give instruction on) the equipment, should undertake training and testing to demonstrate their competency and familiarity with the new equipment before being permitted to use it operationally.

2.6.40.20 Aerobridges should not be left unattended when passengers are being embarked or disembarked. Should the bridge go out of limits while loading or unloading is taking place, the bridge is to be removed and repositioned.

2.6.40.21 When bridges are not being used for passenger loading or unloading they should be retracted into their parking box and closed down. Airlines and handlers are advised that whenever a bridge is docked to an aircraft a qualified aerobridge operator should be in attendance, unless an approved and serviceable safety shoe device is employed.

2.6.40.22 Aircraft operators are reminded that they are responsible for the security of their aircraft and docked aerobridges make aircraft vulnerable. To prevent unauthorised access via aerobridges, airlines should either deploy personnel to control access to their aircraft or remove the aerobridge from it.

2.6.40.23 The aircraft passenger door is to remain closed until the aerobridge has been correctly docked and must be closed before the bridges is retracted. Additionally, aerobridges must not be moved when passengers are on the aerobridge.

2.6.41 Manual Handling

2.6.41.1 Manual handling is the term that applies to activities such as lifting, lowering, pushing, pulling or supporting a load by hand or bodily force. Commonplace manual handling activities in the industry include, for example, ground crew operations such as the loading or unloading of an aircraft and lifting tow bars onto and from aircraft or towing vehicles. The provision of assistance for incapacitated or disabled passengers will require particular thought.

2.6.41.2 Some Handling Agents have developed Handling Operations Manuals which set out the requirements.

2.6.41.3 The best means of avoiding risk is to eliminate the hazard altogether, for example, by mechanised handling techniques. These include the use of ambulifts to assist the movement of incapacitated or disabled passengers onto the aircraft and handling aids for baggage. Where it is not reasonably practicable

to eliminate the hazard, and ground staff are required to undertake manual handling, best practice requires that:

a) A suitable and sufficient risk assessment is made of each task which is considered to present a risk of injury. This should address the task, the load, the working environment and the capabilities of the individuals concerned;

b) Action is taken on the results of the assessment, appropriate steps are taken to reduce the risk of injuries from manual handling;

c) Information is provided on the weight and centre of gravity of the loads that are to be lifted where it is reasonably practicable to do so.

2.6.41.4 Baggage handling potentially, gives rise to more manual handling problems than any other activity at aerodromes. The following may help reduce injury from baggage handling. All these suggestions will require co-operation and co-ordination between the aerodrome operator, airlines and ground handling companies:

a) Proper planning of new and refurbished facilities can provide significant reductions in the risk of injury, as well as increasing efficiency;

b) Examine the entire handling operation (where possible, from the first moment a bag is handled by a worker to the last) and consider whether a change of process or equipment could eliminate any stages of manual handling;

c) Handling systems should be integrated with each other where possible. Different pieces of equipment should be compatible with each other and positioned to prevent unnecessary handling between, for example, security scanners, conveyors, dollies and aircraft loading equipment;

d) Use conveyors (or similar) that are of a suitable height to minimise the risk of injury from lifting or lowing items to or from such equipment. 650 mm above the floor is commonly found to be an acceptable height, but this might vary depending on local circumstances and should not be applied rigidly;

e) Consider the environment in which manual handling is undertaken. Floors should be dry and adequately maintained. There should be sufficient space to allow people to turn whilst handling, if such turning is unavoidable. There should be no gaps between equipment that result in people having to throw baggage. Lighting should be sufficient to allow tasks to be carried out safely. Ambient temperature should be kept at a reasonable level (e.g. in baggage halls), or warm/cool clothing provided where this is not possible (e.g. on the apron);

f) Ensure that automated systems are properly maintained to minimise consequential poor manual handling techniques;

g) Ensure that training is relevant to the tasks that people are undertaking. It may be necessary to target training to specific activities such as moving bags in the confines of the aircraft baggage hold;

h) Provide general indication of the weight of each bag. This could be achieved by the attachment of a ‘heavy bag’ label at check in with instruction and training given to employees on how to deal with such baggage.

2.6.41.5 The primary objective must be to reduce the requirements for manual handling. It is good practice to review each stage of the baggage handling process with the aim of eliminating any unnecessary stages. For example, it might be possible to eliminate some stages by using a baggage transfer vehicle that can adjust to the correct height of the aircraft hold door. This eliminates manual handling from the transfer vehicle to a belt loader.

2.6.42 Noise

2.6.42.1 There are many sources of noise on an aerodrome. Excessive noise exposure can result in both short-term and permanent hearing loss. It can also compromise effective communication during safety-critical tasks.

2.6.42.2 The primary source of noise on aerodrome aprons are aircraft engines, APUs and support equipment such as mobile ground power units. Many of these sources are highly mobile and exhibit variability in their noise emissions. Therefore, the level of ambient/background noise and, potentially, levels of personal noise exposure, can fluctuate very significantly and can greatly exceed the action levels.

2.6.42.3 Employers should try to reduce the noise exposure of both their employees, and others at work on the apron exposed to the noise created by their activities, without relying on hearing protection. Some suggestions are:

a) Where fixed electrical ground power units (with power generation sited away from employees on the apron) and fixed air conditioning units are provided on the stands, aircraft operators should make full use of these facilities to minimise the need for APUs or mobile units which generate high levels of noise;

b) Where existing noisy ground support plant is used it should be engineered to minimise noise output. In some instances this may require retrospective remedial action, e.g. partial enclosure, to reduce noise emission;

c) Before the procurement of new plant, noise emission data provided by the supplier, should be taken into account in deciding whether to purchase, and whether further protective measures may be needed. The aerodrome operator may set minimum standards for new equipment;

d) The amount of time that workers spend in the vicinity of noisy plant and equipment should, if possible, be minimised by planning and organising work accordingly;

e) Work associated with cargo holds or other service points near the APU could be undertaken when it is not running;

f) For vehicle operators an acoustic cab could be fitted, provided that the vehicle can be operated with the doors and windows kept closed. If this is not reasonably practicable, it may be feasible for drivers to use hearing protection.

2.6.42.4 The areas in which hearing protection is required should be marked and warning notices displayed, so far as is reasonably practicable. This may be difficult on the apron itself, but relatively easy within or on equipment, e.g. in cabs of vehicles where the second action level may be exceeded for part or all of the time. Signs should also be placed at all apron access points.

2.6.42.5 On the apron one employer's activities may cause the employees of other employers to be exposed to noise. For example, high levels of noise from an APU will affect baggage handlers and others working in the vicinity of the aircraft. The various employers involved will usually need to agree who is to co-ordinate their action on noise. Normally, this will be the employer in overall control of the work. This employer should make sure that the noise exposure that his work activity generates is assessed and reduced, and that the information on noise is made available to all affected employees; the actual employer of each worker provides any training and personal protective equipment needed. In most cases exchange of information and collaboration between employers will be needed to ensure that duties are fulfilled without unnecessary duplication.

2.6.42.6 Where communication between personnel is essential or audible alarms are used to assure safety, a thorough risk, health and safety assessment of the environment must be carried out to ensure that any risks that result from the use of hearing protection are properly managed.

2.6.43 Work Equipment (including machinery) - General

2.6.43.1 Work equipment includes every item on the apron, including vehicles, specialist equipment such as cargo loaders, fixed equipment such as aerobridges and FEGP Units and hand tools.

2.6.43.2 The hazards to health and safety and aircraft safety from work equipment can arise when it is moved, installed, used, maintained or dismantled. They include hazards from:

a) Machinery;

b) Hot or cold surfaces;

c) Instability (collapsing or overturning);

d) Objects or people falling or being ejected from the equipment;

e) Disintegration, deterioration or malfunctions in the equipment or its controls;

f) Improper use of the equipment (for example using it for a purpose for which it is not suitable);

g) Fire or overheating.

2.6.43.3 Dependent on the process involved, the hazards may always be present with the equipment, (such as its weight which may affect how easily it can be moved or lifted), or transitory (such as the risk of striking the aircraft when equipment is raised or lowered).

2.6.43.4 In order to protect aircraft and people, all companies at aerodromes should ensure that:

a) Equipment is suitable (i.e. with regard to its initial integrity, the place where it will be used and the purpose for which it will be used);

b) Equipment is maintained in a safe condition;

c) Equipment is inspected in certain circumstances to ensure that it is, and continues to be, safe for use. Any inspection should be carried out by a competent person and a record kept until the next inspection and longer if the inspection results are used for monitoring serviceability trends.

2.6.43.5 Companies should also ensure that the risks created by the use of the equipment are: Eliminated, where possible or controlled by:

a) taking appropriate 'hardware' measures, e.g. providing suitable guards, protection devices (such as buffers to surfaces which interface with the aircraft), markings and warning devices (such as Emergency Stop buttons); and

b) taking appropriate 'software' measures, such as following safe systems of work (e.g. ensuring maintenance is only performed when equipment is shut down) and providing adequate information, instruction and training.

2.6.43.6 The measures should be selected on the basis of an assessment of the risks. As part of this assessment, the hierarchy of controls outlined in Chapter 1 should be considered. In many cases, a combination of measures may be necessary.

2.6.43.7 Whatever the combination of measures, stakeholders need to ensure that people using work equipment have received adequate training, instruction and information for the particular equipment.

2.6.43.8 Mobile work equipment poses additional hazards to aircraft and people. Such equipment or vehicles may strike aircraft, people, or other work equipment. Furthermore, unless it is operated correctly and loose articles are suitably secured, objects may fall and strike aircraft or people nearby and may also create a FOD hazard.

2.6.43.9 Consequently, stakeholders and their staff should ensure that where mobile work equipment is used for carrying people or objects, it is suitable for this purpose (i.e. there is proper seating and stowage areas). In some cases, measures may need to be taken to reduce the risks to the operator, any other people being carried, anyone else who might be affected (such as passers-by) and aircraft. This may include measures to prevent the work equipment rolling over, or people or objects being thrown from the equipment (i.e. seatbelts or other restraints). The measures should be based on the findings of a risk assessment. In all cases it is important that loads carried in vehicles are appropriately secured, with vehicle side and rear flaps fastened. An equipment 'health check' should be carried out by the operator prior to use.

2.6.43.10 Aircraft may be struck and damaged by lifting equipment as it moves up or down. Lifting equipment also poses risks to people. People may fall from elevated working positions, or may be struck by loads falling or released from the equipment. Lifting equipment may overturn or collapse, resulting in injury and damage.

2.6.43.11 All lifting equipment and lifting operations (except those done solely by manual effort without assistance from equipment) are subject to a 'Lifting Operations and Lifting Equipment' serviceability check and issued with an appropriate certificate from the manufacturer.

2.6.43.12 In order to ensure that the risks to aircraft, people and are controlled, lifting equipment should be:

a) strong and stable enough for the particular use and marked to indicate safe working loads;

b) positioned and installed to minimise any risks;

c) used safely, i.e. the work is planned and organised, and is performed by competent people; and

d) subject to on-going thorough examination and, where appropriate, inspection by competent people. The aerodrome operator should lay down maximum periods between examinations, depending on the nature and use of the equipment.

2.6.43.13 It may sometimes be difficult to determine what is, and what is not, lifting equipment. At aerodromes, the following should always be considered to be lifting equipment:

a) Catering vehicles, ambulifts and other hi-loaders;

b) De-icers with a boom assembly;

c) Cargo loaders;

d) Mobile elevating work platforms (MEWPs, 'cherry pickers');

e) Lifting platforms on toilet and potable water servicing vehicles and refuelling vehicles including Forklift trucks.

2.6.43.14 The following are not regarded as lifting equipment or lifting operations:

a) Aerobridges (any lifting which occurs during manoeuvring is entirely incidental to their main function);

b) Escalators.

2.6.43.15 Before purchasing a machine, users need to consider:

a) Where and how it will be used;

b) What it will be used for (is it fit for purpose);

c) Who will use it (skilled employees, trainees);

d) What risks to aircraft safety and staff health and safety may result;

e) Comparison of how well these risks are controlled by different manufacturers' equipment;

f) Human factors – does the equipment determine the process or working practice, or vice versa.

2.6.44 Hazardous Substances and Transport of Dangerous Goods Substances Hazardous to Health

2.6.44.1 Some substances are defined as hazardous to health. Some of these substances may also damage aircraft, for example, by corroding control surfaces and fuselage. These substances can be toxic, corrosive, irritant or otherwise harmful to health (e.g. biological agents).

2.6.44.2 Substances can be:

a) Used in a work activity (such as hydraulic oil or cleaning products); or

b) Those that arise or are encountered during a work activity (such as engine exhaust fumes, microbes in aircraft toilet waste, leaks from damaged packages of dangerous goods).

2.6.44.3 Cargo that is hazardous to health may also be subject to the requirements for the carriage of dangerous goods.

2.6.44.4 Companies should assess the risks arising from the work with hazardous substances. This assessment should consider the risk created by the use, handling, or release of the substance. First and foremost, the assessment should show whether exposure to the hazardous substance can be eliminated - for example, could a less hazardous substance be used instead?

2.6.44.5 If exposure cannot be prevented then it should be adequately controlled. This could be achieved, for example, by ensuring chemicals cannot splash onto aircraft or people, or that fumes cannot accumulate near to aircraft or people. Personal protective equipment (PPE) should not be relied upon alone to protect people from harmful substances. However, personal protective equipment may be a useful back-up for employees undertaking such tasks as emptying and cleaning toilets, who might use protective gloves, and overalls. Eye/face protection might also be useful in some circumstances.

2.6.44.6 Certain substances used on aircraft, where appropriate, should be approved by the aircraft manufacturer. Any control measures selected must be effective and in some instances it may be necessary to monitor the exposure of people to hazardous substances to ensure that they are not exposed to harmful levels.

2.6.44.7 Exposure to substances which emit radiation can cause damage to health. Radiation may cause immediate harm, e.g. radiation burns, or may cause changes in cell DNA, which can eventually lead to cancers.

2.6.44.8 Companies need to assess the risks from exposure to radiation and to ensure that exposure is restricted. They should also have in place contingency plans. Staff working with radioactive substances, including those handling radioactive cargo should be competent in order to ensure their safety, the safety of those working with them and the safety of the aircraft.

2.6.44.9 Companies may have to appoint Radiation Protection Advisors to give competent advice on the measures needed to protect staff health and safety. Some radioactive substances may also be toxic or corrosive etc. Radioactive substances which form part of a cargo consignment may also be subject to the requirements relating to the transport of dangerous goods.

2.6.44.10 As with substances hazardous to health, flammable substances may be used as part of a process (such as aircraft repairs), handled as cargo, or encountered accidentally, for example as the result of a fuel spillage. They may be solid, liquid or gaseous. Fire and explosion are the main hazards associated with these substances. Such events may cause considerable damage to aircraft and injury to people. However, these substances may also be hazardous to health or may damage aircraft in other ways, for example because they are corrosive.

2.6.44.11 The risks from work involving flammable substances, including storage and transport, should be assessed. Where possible, the flammable substance should be eliminated, or substituted for a substance which is non-flammable. There may be a balance to be struck between the risks involved, for example, if the proposed substitute carries a greater hazard to health than the flammable substance. Where the substance cannot be eliminated, or substituted, then appropriate precautions need to be in place. Control of the risks of flammable substances can be considered in terms of removing at least one side of the 'Fire Triangle'.

2.6.44.12 This may include a combination of:

a) Safe storage, away from sources of ignition, incompatible substances (such as oxidisers) and mechanical damage;

b) Adequate ventilation to remove flammable vapours or gases;

c) Dispensing and decanting in a way which reduces spills and releases;

d) Use of equipment specifically designed for use with flammable substances;

e) Good housekeeping to remove flammable residues;

f) Adequate procedures and equipment for dealing with emergencies and spillages, including training, information and instruction for staff.

2.6.44.13 The flammable substance which is likely to be found in the greatest quantity at aerodromes is aircraft fuel. Guidance on working with fuel safely is not reproduced in this publication. Please refer to the Code of Safe Practice in the Petroleum Industry Part 7. Most aerodromes will also operate 'Hot work permits' intended to reduce the risk of fire, including fuel fires.

2.6.44.14 Currently, there is no specific legislation on the use of flammable substances on the apron.

2.6.44.15 Flammable cargo is also subject to the requirements relating to the transport of dangerous goods.

2.6.44.16 Transport of dangerous goods by air is also subject to the requirements of the ICAO Technical Instructions, which are reflected in the IATA Dangerous Goods Regulations.

Note: Compliance with these standards does not necessarily mean that the requirements of the National Civil Aviation Law covering transport of Dangerous Goods by other modes of transport have been met. However, requirements for the carriage of dangerous goods by road include an exemption permitting the carriage of dangerous goods that are intended for air transport, to or from an aerodrome when not fully meeting the road requirements, providing that the ICAO Technical Instructions have been complied with.

2.6.45 Task Lighting, Glare and Confusing Lights

2.6.45.1 During darkness and periods of low visibility, apron areas must be provided with lighting of sufficient coverage and level of luminance to enable pilots and ramp staff to operate safely and effectively.

2.6.45.2 The levels of luminance on aircraft stands should comply with the standards described in National Civil Aviation Regulation.

2.6.45.3 It is equally important that every workplace has suitable and sufficient lighting to ensure people can work safely. In general, lighting should achieve a reasonably uniform luminance on all relevant work areas and should avoid sudden changes in luminance (for example, where apron roads run underneath buildings). There may be a need for local lighting (for example, task or vehicle) at specific areas where people are at work).

2.6.45.4 Aerodrome operators should introduce arrangements to control and co-ordinate the provision and installation of any general airside (apron) and aeronautical lighting systems.

2.6.45.5 Area lighting is normally mounted on pylons or gantries and should be subject to the following:

a) The intensity, beamspread, setting angles and mounting height of the luminaires should achieve the specified apron luminance without causing dazzle to pilots and other persons;

b) The layout of lighting pylons should be such that overlapping cover is provided which does not give rise to areas of deep shadow;

c) Floodlighting, including mobile equipment, in contractors' work areas should be strictly controlled and subject to regular checks to ensure that glare/dazzle are eliminated.

2.6.46 Adverse Weather Conditions (including Winter Operations)

2.6.46.1 Adverse weather conditions affect the safety of aircraft operations on aprons, principally strong surface winds and low visibility conditions. As part of the safety management system, aerodrome operators should issue instructions about the precautions to be taken in anticipation of these conditions and with emphasis on the safety requirements for apron operations.

2.6.46.2 Strong wind conditions can give rise to hazards from wind-blown items and in very strong winds there is a possibility of structural damage to aircraft. The principal threats are of engine ingestion or airframe damage to aircraft on stands, taxiways and runways; the severity of the threat of obstruction of a runway to an aircraft taking off or landing cannot be stated too strongly. There is also a danger of personal injury for apron staff and damage to vehicles and equipment. Some aerobridges also have operating design limits during periods of strong winds which should be understood and adhered to.

2.6.46.3 When meteorological warnings of strong winds are received, they should be promptly relayed to all relevant organisations including airlines, ground handling organisations and operators.

2.6.46.4 When strong wind conditions are experienced, one of the first problems encountered is FOD being carried across the airfield, causing engine ingestion threats to aircraft on stands, taxiways and runways. Plastic bags and sheeting are particular problems.

2.6.46.5 As wind speeds increase, baggage containers, unsecured equipment, and large debris (mostly from the aprons), can be blown across the movement area causing a damage hazard to aircraft in all areas. There is also a risk of personal injury and damage to vehicles and equipment by 'flying' debris. Action must be taken to ensure that covers are securely fastened on all waste containers and to ensure that parking brakes are applied to all vehicles and equipment. All non-essential equipment should be removed to a protected area or stillage, secured to a fixed object or removed from the ramp area. Additionally, aircraft may require enhanced chocking in line with airline requirements.

2.6.46.6 It is not always feasible or necessary to position a large aircraft into wind at aerodromes. Where there is a requirement for aircraft to be positioned into wind and/ or picketed, this should be the responsibility of the airline manager, agent or owner concerned. Aerodrome operators may assist by the allocation of suitable stands and other airfield areas for this purpose. As wind speeds rise, there is a requirement for airline managers, agents or owners concerned to ensure that wind milling propellers and rotors are tethered and/or secured.

2.6.46.7 Aerodrome operators will have in place comprehensive arrangements and rules to safeguard low visibility operations on the manoeuvring area and these issues are not discussed in detail here.

2.6.46.8 In most airfield layouts, aprons border directly on to the taxiway system. Therefore, when LVPs are in force, there is an impact upon apron operations and there is a requirement for ramp staff to be aware of the implications for taxiway operations and to comply with any requirements and limitations that are notified.

2.6.46.9 When visibility is reduced, it must be ensured that staff are aware of the additional safety requirements to maintain safe operations. All users should make themselves aware of the additional restrictions that are required in low visibilities. These may include escorts for vehicles normally allowed to operate on the manoeuvring area, warning signs should be placed at airside access points and safeguarding barriers on airside roads as required.

2.6.46.10 During periods of low visibility, vehicles should be operated with dipped headlights, and where fitted, fog lights should be illuminated. Drivers should proceed with extreme caution, and vehicle obstruction lights should be switched on. Staff should be alert to the sudden appearance of an aircraft entering a stand and be prepared to give way accordingly.

2.6.46.11 Managers of aerodromes that continue to operate during severe winter conditions are recommended to issue an ‘Adverse Weather Warning’ to all airside users and to agree and publish an Adverse Weather Plan to include operations during thunderstorms and sandstorms.

2.6.46.12 During adverse weather conditions additional precautions and arrangements are required, by all those involved with airside operations. Safety instructions should be issued to highlight the hazards of adverse weather operations and detail the measures to be taken to mitigate the effects on the apron. The aerodrome plan should involve all relevant business partners where required, and it is good practice to arrange briefings for the managers and staff of user airlines/companies on working and operating in adverse weather conditions.

2.6.46.13 The aerodrome operator should establish that they, airlines and handling agents have arrangements in place for the following:

a) The clearance of sand in critical areas peripheral to stands such as loading bridge movement areas, bridge steps and drive wheels, passenger routes (including external steps and ramps), FEGP units and other fixed service equipment;

b) When meteorological warnings are received and when thunderstorm conditions are expected or observed, warnings should be transmitted to all apron operators and staff by the best local means;

c) Additional apron inspections to detect sand build up on perimeter roads and around aerodrome signage etc.

2.6.46.14 Simple precautions that can reduce risks should be taken as follows:

a) Allow additional time for all ramp activities;

b) Take extra care when driving, especially when approaching an aircraft, or on the approaches to a road junction. When driving, bear in mind that vehicles require a greater distance in which to stop safely;

c) Do not leave a vehicle unattended with the engine running simply to keep the cab cool/warm or to charge the battery;

d) Ensure attention is given to vehicle inspection prior to use. Check the operation of lights, battery condition, brakes and tyres;

e) Surfaces, particularly painted areas, initially become more slippery during very wet conditions. Staff and passers should be warned to exercise extra care in these circumstances;

f) High visibility clothing should be worn in accordance with current instructions;

g) Make allowance for other staff whose movements may be restricted by difficult working conditions;

h) Avoid the unnecessary formation of sand on apron and road surfaces;

2.6.47 Slips and Trips

2.6.47.1 Slips and trips account for almost a quarter of accidents to people at aerodromes. Whilst some of these accidents are difficult to prevent, many could be avoided by simple measures which can and should be taken.

2.6.47.2 Slips and trips may be caused by a variety of obstructions, loose items and defects in walkways, stairs and other areas. Loose items include FOD, which is of course a source of risk to aircraft as well. Improperly stowed cables (for example, from fixed or mobile electrical ground power units) can also cause people to trip over. Slips can be caused by spillages, for example from hydraulic leaks. Marshallers are specifically at risk of trips and falls due to the focus being concentrated on the aircraft so procedures should not encourage them to walk backwards during the docking of aircraft.

2.6.47.3 The initial design and construction of work areas can contribute as much to the risk of slips and trips as to its reduction. Sudden changes in level, poor drainage, and insufficient surface roughness of the floor can all increase the risk of slips or trips. The aerodrome operator should ensure that the risks from slips and trips are considered at the design of new or refurbished facilities, and are eliminated or controlled by good design, as much as possible.

2.6.47.4 Poor maintenance of surfaces can also contribute to the risk of slips and trips. Damage such as potholes and excessive wear increase the risk that slips will occur, as well as also being a potential source of FOD. Aerodrome maintenance programmes should be developed by the aerodrome operator to discover areas in need of attention before they become a source of danger. Airlines and ground handlers should assist, for example by reporting parts of the apron which have been damaged, or are becoming excessively worn.

2.6.48 Electrical Hazards

2.6.48.1 There are a variety of sources of electrical hazards on the apron, including lighting, fixed or mobile electrical ground powers units, power supplies to other apron equipment (such as aerobridges) and the aircraft itself.

2.6.48.2 Again, design and installation can significantly reduce risk. Proper means of isolation should always be provided to electrical systems. These should be lockable. Where possible, isolators should be designed so that people cannot gain access to parts which carry dangerous electrical currents unless the power is switched off. The aerodrome operator should ensure that redundancy is designed into systems where isolation would cause severe inconvenience (for example, as with the AGL system), so that one circuit can be isolated and worked on safely, whilst the second circuit keeps vital services operating.

2.6.48.3 Electrical equipment should always be used safely. Plugs should be used with the sockets for which they were designed. Circuits should not be overloaded, and should be suitable for the environment in which they are used. Cables should not be left in positions where they could be damaged.

2.6.48.4 Of particular note is the use of ground power units (GPUs). Many GPUs have an electrical interlock which detects when the aircraft is connected. This interlock can be bypassed. However, this facility is intended for maintenance purposes only. Interlocks should not be bypassed, even temporarily, whilst the GPU is in normal use. If the GPU will not operate unless the interlock is bypassed, then the GPU is faulty, and it should be withdrawn from service for repair.

2.6.48.5 All electrical systems should be properly maintained. This will require a programme of inspection and test to identify defects before they become a source of danger. It also requires everyone to report promptly to their employer, and/or the operator or owner of the equipment, any defects they discover during the course of their work. All maintenance of electrical systems should be carried out by competent people to an adequate standard.

2.6.48.6 Where contractors are to be used to undertake electrical work, they should be subject to the assessment, control and monitoring arrangements outlined in Chapter 1.

2.6.49 Faults and Defects

2.6.49.1 Aerodrome operators should promulgate and maintain comprehensive fault reporting procedures for all apron equipment and installations provided by the aerodrome. Clear instructions should be issued and repeated by notice at main installation sites.

2.6.49.2 For staff of airlines or operators, simple ‘one shot’ fault reporting is best. Faults on vital operational equipment, or facilities, that could affect aircraft safety, such as aerobridges and VDGS, should be reported to a single agency. By this means the appropriate and immediate safety decisions can be taken and at the same time a prompt engineering response can be initiated.

2.6.49.3 Details of all reported faults and their rectification should be recorded for management audit purposes.

2.6.49.4 Some faults may also be serious enough to require reporting to the Safety Department, even if they also qualify as a ROSI. These include the collapse or overturning of any lifting equipment, certain electrical short circuits or fires, and collapse of certain scaffolding.

2.6.49.5 Reports submitted under company reporting procedures should be made via the aerodrome operators SMS.

2.6.49.6 All employers should ensure that there are systems in place to enable staff to report defects and faults in company equipment. Action should be taken on these reports, within in a timescale which reflects the seriousness of the defect or fault and the risk to aircraft and/or people.

2.6.50 Movement Area Inspections

2.6.50.1 The requirement for inspections and maintenance of airfield facilities is implicit in the aerodrome certification process and the associated legislation. The Aerodrome Manual must contain the requirements and accountabilities for the inspection and auditing of all the safety systems airside on a systematic basis. The results should be recorded/ reported and fed back into the safety management system.

2.6.50.2 Aerodrome operators should maintain inspection schedules for all apron equipment and facilities it provides. The results of these inspections should be recorded. Serviceability/availability records should be maintained on the principal systems for audit and management purposes.

2.7 Model Guidance: Chapter 3 - Aprons and Stands

2.7.1 Introduction

2.7.1.1 The guidance in this Chapter takes account of good practice at major International airports, and applies equally to terminal-contact and remote stands. Stand and aerodrome design needs to be dynamic to allow for changes to aircraft type, dimensions, aircraft mix and other operating characteristics.

2.7.1.2 Aprons are provided to accommodate aircraft for the purpose of loading or unloading passengers, mail or cargo, fuelling, parking or maintenance. They usually comprise individual stands, apron areas divided into separate stands, Multi-Aircraft Ramp Systems (MARS) or a Multi-Choice Apron (MCA). The location and purpose of the stand may impact on its design; whether the stand is being used for passenger traffic, freight or remote parking or whether the stand is used in a 'taxi or nose-in, push back', 'self-manoeuvring' or 'drive-through' configuration.

2.7.1.3 'Best Practice' has highlighted some of the hazards that may occur on apron areas, and therefore it is important to provide stands and aprons that are designed to reduce the hazards where possible and to facilitate aircraft turnrounds and other activities as safely as possible.

2.7.1.4 Congested operating conditions may impact on a safe apron environment and the degree of ramp congestion is often, though not exclusively, related to the total numbers of vehicles and equipment permitted/required to park and operate on the apron. Operators should take into account the delivery targets and service/safety level agreements between airlines and ground handling organisations. The business models of many airlines reply on short aircraft turnround times; on some occasions without using the aerobridges that are provided. This, together with the general increase in the volume of baggage/cargo and servicing products, may put pressure on the aircraft stand area available to support increased activity. The aerodrome operator can contribute to the safety and efficiency of aircraft turnrounds by providing aprons and stands which take into account the actual practices at the airport and by enforcing agreed operating principles.

2.7.1.5 The introduction of future and next generation aircraft design features, such as winglets or blended wings on aircraft, may result in aerodromes having to modify some stands to accommodate increased wingspan generated by the new wing designs. This may lead to reduced clearances between stands, which results in a more demanding environment for the ground handlers to complete the safe turnround of the aircraft. To address these challenges, and to allow for future increases in aircraft size, aerodromes may wish to consider, as appropriate, generic stands, linked to aircraft code rather than specific aircraft type, in the development of future aprons.

2.7.1.6 Consideration may also be given to addressing the shift towards containerisation of the smaller aircraft (e.g. A320 type) and the effect this operation places on the available space within the stand area. One solution may be the employment of offset centrelines, which provide an increased area on the starboard side of the aircraft. This allows for a greater manoeuvring area for the increased amount of large equipment employed during an aircraft turnround. The location of other services such as fuel hydrant pits, FEGP, aerobridge, PCA etc, will need to be considered.

2.7.2 Physical Characteristics

2.7.2.1 A stand is a 'box' of designated apron space intended to be used for the parking and turnround servicing of an aircraft, and individual or groups of stands should have a design maximum size of aircraft to be served. The boundaries of a stand are:

a) Front: boundary with the head-of-stand road, equipment area or building line;

b) Rear: boundary with the rear-of-stand road or taxilane /taxiway strip;

c) Sides: measured laterally from the wingtip of the largest span aircraft.

2.7.2.2 Stand design should provide minimum clearances around the extremities of the largest aircraft type expected to use the stand, as set out in National Regulation.

2.7.3 Multi-Aircraft Aprons

2.7.3.1 Flexibility for changing aircraft size can be accommodated by adopting Multi-Aircraft Ramp System (MARS) stands or a Multi-Choice Apron (MCA) concept.

2.7.3.2 Multi-Aircraft Ramp System (MARS) stands allow either two smaller aircraft or one larger aircraft to be parked on the same stand, for example, two B737-400s or one B747-400. Clearances will be as described above, except that it is recommended that the clearance between the wingtips of the two smaller aircraft as one passes the other be as required in National Civil Aviation Regulation. Guidance for vehicles to pass safely between the wingtips of the two smaller aircraft on MARS stands may be indicated by ground paint markings known as wingtip guidance lines or 'MARS Bars'.

2.7.3.3 A Multi-Choice Apron (MCA) is a defined area of pavement accepting more complex combinations of aircraft than MARS (for example: three smaller aircraft or two larger ones). Clearances around the edges of the MCA will be as described above. Good practices for MCA design are as follows:

a) A set of adjacency rules will be required for stand allocation;

b) No two centrelines should be closer than 10 m;

c) A distinct sequence will be required for stand numbering (i.e. no L, C and R suffixes);

d) Stand numbers will be marked beside the lead in arrows at the taxiway centreline and repeated at the double white line marking the tail of stand;

e) Both elements of VDGS (azimuth and stopping) should be provided and co-located directly ahead of the cockpit;

f) Inter-stand clearways or airside roads will be provided, as required, at the extremities of the area defined as MCA.

2.7.3.4 Normally wingtip guidance lines (MARS Bars) are not provided within the MCA as these have proven difficult to provide in an unambiguous way. The major advantage of aprons using MCA layouts is the

flexibility provided to meet different aircraft mix requirements at different times. However, there are also a number of possible disadvantages, as follows:

a) Lack of markings other than centrelines requiring additional operating procedures, such as the use of cones around wingtips, affecting airline and handling agents training and costs;

b) Problems in providing service connections to serve all parking combinations, particularly aerobridges and FEGP. Underground service pits may have to be considered;

c) Multiplicity of the humps associated with fuel hydrants which cause problems for positioning of equipment when serving the aircraft;

d) Reduction in area available for head-of-stand equipment parking due to the increased number of tug lanes and other factors, leading to increased requirements elsewhere.

e) The human factors element: MCA layouts provide potential for both ground staff and pilots to become confused about the correct positioning of aircraft and equipment due to multiple ground markings.

2.7.4 Self-manoeuvring Stands

Safety clearances around self-manoeuvring stands will need to be increased from those used for nose-in/pushback stands to take account of jet blast/prop wash. There may also be requirements for jet blast protection, which may include blast diffuser screens and/or an area clear of equipment, roadways, buildings and activity.

2.7.5 Access Roads

2.7.5.1 Stands should, wherever possible, have a head-of-stand road, used not only to access the stand but also to provide a route for traffic to move around the terminal area. Where this is not possible, a rear-of-stand road may be provided but this should lie entirely outside both the taxilane strip and beyond the rear-of-stand.

2.7.5.2 Normally, a head-of-stand road is preferable to a rear-of-stand road because, on the latter, traffic would be held up as an aircraft enters or is pushed back from the stand, and at least one additional member of staff is normally required in the pushback ground handling team to check that traffic has stopped. The main exception may be at smaller airports where the passenger handling is carried out without aerobridges, at ground level resulting in a tail of stand road being preferred, as this reduces the risks associated with vehicles and pedestrians.

2.7.5.3 A reserved area should be located at the head of each stand for the pushback tug. Width should be a minimum of 6 m for small and medium stands and minimum of 7.5 m for large stands and above, equally disposed about the stand centreline. Access from the head-of- stand airside road should not be restricted by building columns, particularly where the head-of-stand road is one way providing less space to make the turn into the reserved tug area. On stands without a head-of-stand road, a greater length will normally be required.

2.7.6 Equipment Parking/Storage

2.7.6.1 Aerodrome operators should take a proactive approach in ensuring this is included in development plans for future projects.

2.7.6.2 It is generally accepted that equipment areas are divided into a number of locations, those on the stand/apron, support areas and dedicated areas for specific operations (e.g. ULD storage, and large vehicle operations). However, growing pressures to achieve shorter turnround times have forced ground handling companies and aerodrome operators to develop initiatives which support the objectives of the airlines, but at the same time, using the opportunity to increase the safety aspects of the turnround operation. Enhanced methods of managing the 'on stand' equipment areas may be suitable, for example the establishment of dedicated areas on the stand for the storage and parking of equipment, seen as essential to the efficient turnround of aircraft provided clearances are maintained.

2.7.6.3 The aerodrome operator, in co-operation with the ground handling companies, should identify the equipment that is required close to the apron to support the shorter turnround times. It is important that the design of the stand is fine-tuned to identify the greatest possible area that could be allocated to equipment storage, taking into account the capacity of the stand and its layout (e.g. MARS, MCA). Allocation of the equipment area to specific equipment types should be jointly agreed and supported by the marking of the area to ensure it is effectively managed.

2.7.6.4 Demands on space caused by aerodrome development may cause pressure to reduce the levels of equipment areas. Aerodrome operators should be aware of their responsibility to ensure parking/storage space is allocated for aircraft and the equipment required to service it.

2.7.6.5 At some airports it may be the responsibility of the Turnround Coordinator, or other such person with responsibility for the aircraft turnround, to ensure all equipment used in the turnround process is returned to its allocated space when the process is completed.

2.7.6.6 Aerodrome operators, airlines and ground handlers may wish to consider the use of equipment pre-positioning areas. Temporary waiting areas are identified and marked on the stand, which allow vehicles and equipment, intended to be utilised in the turnround, to await the arrival of the aircraft. To ensure the areas are not used as permanent parking areas, it is advised that the areas are identified in a different colour to that used for the existing equipment parking areas.

2.7.6.7 Allowance should be made for parking areas for ground service equipment and vehicles, for areas on and close to stands for vehicle positioning prior to an aircraft's arrival, and for longer term fleet parking areas, preferably close to crew room accommodation. Where crew rooms are close to stands, it may be necessary to split the nearby equipment areas between the two requirements. The factors affecting the area required include routes served (i.e. long-haul or short-haul), aircraft type (i.e. narrow-body or wide-body), whether it is a local based airline, and the number of handling agents.

2.7.6.8 Ideally as a suggestion, an area equivalent to a figure between 12.5% of the stand area for short-haul, narrow-body aircraft, and 22.5% of the stand area for long-haul, wide-body aircraft has been assessed as necessary for equipment parking. The higher figure is because long-haul passengers have greater baggage allowance and wide-body aircraft use baggage containers whose storage is space consuming. However, where a higher proportion of aircraft use containerised baggage, additional parking and Unit Load Device (ULD) container storage facilities may be required. Only part of this requirement (no more than 7.5%, often less) is met by the head-of-stand areas either side of the pushback tug reserved area. These figures are strictly net and will, for purposes of calculation, exclude all fixed installations, items not relevant to the operation of the individual stand and those portions of the area available which are not considered to be accessible or of reasonable size or shape. Stand area is the length multiplied by the width. Special considerations apply on aprons used by cargo aircraft.

2.7.6.9 The parking areas needed for longer term parking are additional to the above, as are any areas required for cargo consolidation, Unit Load Device (ULD) container storage facilities, and areas required for the repair and maintenance of ground service vehicles and equipment and where practicable located off or

away from the ramp. In general, parking areas should be sized to meet the needs of all the stands in a particular apron area. They should be sited so that they are accessible from both stands and crew accommodation whilst ensuring that travelling distances are minimised.

2.7.6.10 Where apron space is short, consideration should be given to the provision of multideck 'stillage' for the storage of baggage containers.

2.7.6.11 Provision may also be required in parking areas for the recharging of electrical vehicles and equipment.

2.7.7 Passenger/Staff access

Safety principles places importance on the segregation of pedestrians, whether staff or passengers, and vehicles. Therefore pedestrian routes on aprons and associated with airside roads are required to be clearly marked. A clear unobstructed walkway of at least 1m width should be provided, between the point(s) where pedestrians leave the terminal building to the side of the aircraft nose on the aircraft commander's side. This should be painted green with a non-slip surface and showing a white 'pedestrian' figure motif every 20m, or as necessary. Where these cross a roadway, a 'zebra' crossing should be painted and traffic control lights or other control measures should be considered.

2.7.8 Surface Markings

2.7.8.1 Guidance on ground markings is provided in the 'ACI Apron Markings and Signs handbook'.

a) A lead-in arrow, aligned with the stand centreline, should be painted on the taxiway surface to delineate the stand centreline intersection with the access taxiway or taxilane-lane. The stand number should be painted alongside this arrow;

b) Aircraft nosewheel stop marks, painted perpendicular to and across the stand centreline, should be provided towards the head of the line such that the aircraft parking position provides sufficient access for any aerobridge and such that all service vehicles can access the appropriate part of the aircraft. Aircraft types are to be stencilled alongside the relevant stop bar, abbreviated i.e. 'A332'/'B744';

c) Aerobridge manoeuvring areas should be cross-hatched or 'starburst' in white, with a white circle or rectangle denoting the normal retracted position;

d) Active and redundant fuel hydrant positions should be outlined and differentiated colour wise;

e) Inter-stand clearways should be outlined in white zig-zags;

f) Fire hydrants should be cross-hatched in red.

g) Should a stand have undergone a reconfiguration process over time, the previous markings should not be visible with the naked eye. This has the potential to confuse pushback and flight crews, especially during night or adverse weather operations whereby a clearly defined centreline and associated markings are crucial.

2.7.9 Services and Equipment

2.7.9.1 The safety aspects of stand operation are of paramount importance and should not be compromised. Of particular concern is the large number of vehicle movements on the stand which presents a safety hazard to aircraft and people (airport personnel and passengers). Collisions between vehicles and aircraft can cause considerable expense and disruption due to delays to passengers as well as the cost of repairs, and,

with the presence of aviation fuel, are potentially very dangerous. The overall design objective therefore, must be to reduce the number of vehicle movements, particularly the large and less manoeuvrable vehicles such as aviation fuel tankers and apron passenger vehicles, by the use of fixed services wherever practical.

2.7.9.2 In addition to providing space for vehicles to service an aircraft and for equipment parking, stand and apron design must allow for the range of other facilities that may be required:

2.7.9.3 **Aircraft Cleaning and Disposal of Aircraft Refuse** - Airline ground handling staff or their agents will clean the interior of the aircraft during the turnround and remove the waste generated, together with the waste generated from in-flight catering, etc. Additionally, some airports may allow aircraft to be washed on stand. Where this is allowed, the design of the pavement drainage system will need to accommodate this.

2.7.9.4 When the weather conditions, particularly thunderstorms, reach certain limits, the airlines or their handling agents should have specific procedures in place to reduce the risk of a lightning strike to staff working on the aircraft particularly the headset man.

2.7.9.5 **Aircraft Electrical Supplies** - Most aircraft types are equipped with an Auxiliary Power Unit (APU) which provides power to run the aircraft systems when the aircraft's engines are shut down and to start those engines. However, they can be noisy, polluting and not particularly economical to run for long periods. Therefore, the provision of ground power is normally required. This can take the form of a mobile Ground Power Unit (GPU), or a Fixed Electrical Ground Power (FEGP) system with an outlet associated with each stand centreline. GPUs suffer from the same problems as the APU, as they can also be noisy, polluting and not particularly economical to run. In addition, local planning constraints or airport procedures may limit or ban the running of APUs and GPUs at certain times because of their noise and emissions. Therefore, the provision of FEGP should be considered in the design of all stands. FEGP may be supplied from a cubicle located in the head-of-stand equipment area via a cable mounted on a pantograph (or 'crocodile'), from below an aerobridge or from a pit in the stand. The addition of an AC/DC converter may be required on stands used by the smaller turbo-prop aircraft. Experiments in the past to route FEGP along the aerobridge have not been entirely successful, with problems created when the aerobridge is unserviceable, and aircraft damaged when the aerobridge has been backed off before the power cable was disconnected. Typical power requirements are:

a) Code A-C stands: 115v 400Hz 90kVA ;

b) Code D-F stands: 115v 400Hz 180kVA (double-unit).

2.7.9.6 **Aircraft Maintenance** - Routine minor maintenance is carried out during the aircraft turnround on stands. However, on occasion, minor repair work may be carried out involving the use of engineering platforms, etc. For major repair work, the aircraft would normally be towed to the maintenance area or a remote stand.

2.7.9.7 **Aircraft Refuelling** - Aircraft may be refuelled from large fuel tankers or from an underground pipeline via a hydrant service vehicle which regulates the flow rate, filters the fuel and records the amount delivered. At airports without hydrant fuelling facilities, long- range wide-bodied aircraft may need several of the largest tankers to refuel, and as the elimination of large vehicles is encouraged, the provision of fuel hydrants should be considered in the design of all stands at airports with the necessary infrastructure. Each stand with fuel hydrants should have an emergency fuel cut-off button provided at the head-of-stand in an easily accessible position, prominently signed and close to the telecommunications link and apron-level emergency aircraft stop facility.

Example diagram:

2.7.9.8 **Aircrew Handling** - At some airports aircrew are taken to and from the aircraft by coach; sometimes separate coaches for flight deck crew and cabin crew.

2.7.9.9 **Apron Floodlighting** - Stands used at night shall be lit so that the turnround activities can take place safely.

2.7.9.10 **Assembly Points** - To cater for evacuation from the passenger terminal and/or pier, assembly points need to be provided in accordance with the H & S requirements.

2.7.9.11 **Baggage Handling** - Passenger baggage is normally conveyed between the aircraft and the terminal building in containers on dollies or loose on small trailers, a string of which will be towed by a small tug. Except for the smallest aircraft, the baggage will be loaded/unloaded using specialist mobile equipment. Some late baggage may be checked in at the gate and descend to the apron level by lift or chute.

2.7.9.12 **Cargo Handling** - Much cargo now travels in the under floor holds of passenger aircraft and on the main deck of combi-aircraft (i.e. where the main deck has separate sections for passengers and freight), as well as on dedicated cargo aircraft. This will be conveyed between aircraft and the cargo terminal by vehicle, while loading into the under floor holds will use the same equipment as for passenger baggage (see above). Main deck loaders are large/wide vehicles and clearances must allow for their safe passage.

2.7.9.13 **Catering Supplies** - Prepared meals are delivered to the aircraft and empty containers removed during the turnround by specialist vehicles which can be raised to the upper and main deck levels.

2.7.9.14 **Disposal of Aircraft Sewage** - This is normally emptied from the aircraft into a specialist vehicle and taken to the sanitation building.

2.7.9.15 **Disposal of Refuse Generated during Aircraft Turnround Activities** - Aircraft maintenance and other turnround activities generate waste, particularly hydraulic fluid cans and the boxes they come in. Some airports do not provide refuse bins on stands as they expect waste to be removed, but this requires a high level of apron discipline and monitoring. Other airports provide refuse and FOD (Foreign Object Debris) bins sometimes in pairs for 'dry' and 'wet' (i.e. any liquid, including oil) waste. In the latter case the bins may be labelled POL (Petroleum, Oil and Lubricants). Some airports provide large compactors every few stands which take both aircraft and stand waste. Provision on new stands should take local practice into account.

2.7.9.16 Emergency Facilities (particularly at larger aerodromes) - In addition to the VDGS Emergency Aircraft Stop button the following provisions should be considered:

a) A fuel hydrant Emergency Shut-Off switch. This should be situated alongside the emergency telephone at the head-of-stand, and clearly signed;

b) Portable fire extinguishers shall be readily available at the head of stands in conjunction with procedures agreed between them and the airport's rescue and fire fighting service;

c) The provision of fire hydrant equipment on the apron is explained further in National Civil Aviation Reguation;

d) Spillage response kits should be provided.

2.7.9.17 **Engine Starting** – Normally, engine starting uses internal (APU) or external (FEGP or GPU) power. However, a back-up system requires the use of mobile air-start units providing high- pressure air.

2.7.9.18 **Fuel Hydrants** – Should be provided for each underwing position required by the aircraft types intended to use the stand. Hydrants should be located no more than 10 metres from the fuelling points of the aircraft types intended to use the stand. This may require the installation of more than one hydrant head per stand, as determined by the airport operator and the airlines utilising the stand.

2.7.9.19 **Passenger Handling** – Passengers arrive and depart from an aircraft in one of three ways; directly between a pier and an aircraft via an aerobridge, by walking across the pavement to/from a nearby building or via an Apron Passenger Vehicle (APV). In the latter two cases one or more sets of aircraft steps will be required to enable them to reach or leave the aircraft cabin, unless the APV is of the type that can be raised to cabin level, or the aircraft is equipped with airstairs. Where an aerobridge is not available, or is unserviceable, disabled passengers will be conveyed to/from the aircraft by specialist vehicles (ambulift) which can be raised to cabin level. Areas reserved for aerobridge manoeuvring, passenger walkways and/or APV manoeuvring will be required.

2.7.9.20 **Pre-Conditioned Air** - Low-pressure pre-conditioned air may be required when an aircraft has been standing for some time in very high or very low temperatures. This can be supplied by a specialist vehicle or generated locally at each stand.

2.7.9.21 **Pushback Tractor** - Most aircraft types require their own towbar, leading to a requirement for sections of equipment parking areas to be allocated for their storage. The introduction of towbarless tractors may reduce this particular need in the future. However, towbarless tractors tend to be wider than the conventional type leading to a possible need for wider reserved tug areas.

2.7.9.22 **Replenishment of Potable (Drinking) Water** - Potable water is normally delivered to the aircraft by a specialist vehicle. Providing potable water as a fixed service directly to stands is not recommended as water hygiene standards cannot be ensured where water is required to be put through pipe work and branches to individual aircraft stands.

2.7.9.23 **Telecommunications** - The Stand (Emergency) Telephone is a weatherproof unit, which is usually restricted to calling airport-only extensions, and is normally provided at apron level at, or readily accessible from, the head of each stand. The facility should be conspicuously signed with the emergency numbers and its location prominently marked. Where two remote stands are located head to head, they could share the telephone, the emergency aircraft stop button and emergency fuel cut-off button. Consideration should also be given to providing an intercom system between gate room level and apron level on pier-served stands.

2.7.10 Visual Docking Guidance System (VDGS)

2.7.10.1 Visual Docking Guidance Systems (VDGS) provide alignment and stopping guidance to an aircraft entering the stand (also known as Stand Entry Guidance (SEG)). As required by ICAO Annex 14, VDGS providing both azimuth and stopping guidance should be installed where it is necessary to indicate, by a visual aid, the precise positioning of an aircraft on a stand. All VDGS must meet the requirements specified in ICAO Annex 14, where aircraft intended to use that stand require precise stop positions, due to aerobridge, fuel hydrant or stand infrastructure or furniture. On stands where VDGS is not provided,

or where systems are unserviceable or incorrectly calibrated for the type of aircraft assigned to the stand, an aircraft marshaller or alternative method may be used as appropriate.

2.7.10.2 Visual docking of an aircraft involves three elements, aircraft type identification, alignment (azimuth) guidance and stopping guidance. The type of stopping guidance to be provided depends on the number of stopping positions required and their location, which in turn depends on the fixed services to be provided, particularly aerobridge and fuel hydrants and is achieved by automation with modern and advanced VDGS.

2.7.10.3 The accuracy required from VDGS is a maximum aircraft mis-park of 0.6 m to the left, right, forward or aft. Where a rail-drive aerobridge ('noseloader') is involved, the forward and aft mis-park maximum may need to be reduced to 0.3 m.

2.7.10.4 MARS stands should be equipped with a VDGS on all lead in lines, unless aircraft are marshalled, and there should be an interlock in the switching arrangement such that when VDGS for the left, right or centreline is selected, VDGS for the main centreline cannot be switched on, and vice versa. Similarly, Emergency Aircraft Stop signs and buttons will be provided in association with each centreline. The Aircraft Emergency Stop sign should be activated by any button on the stand which will cause the STOP signs on all centrelines to be illuminated and all SEG to be switched off. Similar arrangements will be required on Multi- Choice Apron (MCA) stands.

2.7.10.5 To minimise the loss of already scarce equipment parking areas, VDGS should be mounted on the terminal building or pier structure, wherever practical. Where columns are required, their number should be kept to the minimum necessary. On stands designed for nose loading cargo aircraft, special consideration may need to be given to mounting of SEG such that it does not hinder the loading and unloading of the aircraft.

2.7.11 Alignment Guidance

2.7.11.1 Alignment guidance is primarily provided by the painted stand centreline. However, to comply with National Civil Aviation Regulation requirements, where precise positioning of the aircraft is required on nose-in/pushback stands, alignment and stopping guidance should be provided in a single unit mounted directly in front of the cockpit and usable by either pilot. If there is a building located at the head-of-stand, then the VDGS should be mounted on it, wherever practical. If no suitable building is available, it should be placed on a column or gantry. However, where constrained by local conditions and infrastructure, an operational risk assessment may be utilised in order to determine the optimum position of stand entry guidance, in order to meet the requirements. It is recommended this assessment be carried out in co-ordination with the airline(s) and ground handling organisation operating on that stand.

2.7.11.2 For other stands, where a combined unit is not provided, alignment guidance, in addition to a painted stand centreline, should be provided on nose-in/pushback stands. An example of this is an AGNIS (Azimuth Guidance for Nose-In Stands) unit. If there is a building located at the head-of-stand, then the AGNIS should be mounted on it, wherever practical. If no suitable building is available, it should to be placed on a column or gantry, together with any other VDGS elements provided. Where provided, it should be aligned with the left-hand pilot who requires an offset from the centreline of, normally, 0.53 m, and mounted at a height within the angle of view from the cockpits of the types of aircraft for which the stand is intended.

2.7.12 Stopping Guidance

2.7.12.1 Precise stopping guidance is be required on nose-in/pushback stands equipped with aerobridges and/or hydrant refuelling, due to the variety of positions and accuracy required in the stopping of aircraft. On

these stands, ICAO Annex 14 compliant systems are necessary and such devices must provide guidance to both pilot positions without turning his/her head.

2.7.12.2 On self-manoeuvring stands and on nose-in/pushback stands without aerobridges or hydrant refuelling, stopping guidance may be provided by units offset from the stand centreline, a mirror, a paint marking in the form of one or, occasionally, two stop lines, which usually takes the form of a Stop Arrow (also known as Stop Line). These are aligned with the pilot's eye position when parked and are normally located to the left of the stand centreline, but may be provided on the right or both sides as circumstances dictate. The mirror is normally used on stands with a rail-drive aerobridge ('noseloader') where there would be a small number of stopping positions close together. A Parallax Aircraft Parking Aid (PAPA) unit is normally required where there are a number of widely spaced stopping positions due to the slope requirements in an apron drive aerobridge and/or fuel hydrant requirements. A Stop Arrow (stop line) is appropriate where there are few such limitations or where a small group of similarly sized aircraft are served by an apron-drive aerobridge, such as on the left-hand centreline of a MARS stand.

2.7.13 Stand Identification

2.7.13.1 Stand identification is provided by a Stand Number Indicator Board (SNIB) displaying the stand designation which should be located close to the stand centreline where it can be seen both by the pilots of an aircraft approaching along the taxiway and, on nose- in/pushback stands, from the cockpit of a parked aircraft prior to pushback. In exceptional circumstances it may be necessary to provide two SNIBs. The SNIB will need to be illuminated (normally internally) if the stand is to be used at night, with lighting control usually by a photo-electric cell.

2.7.13.2 European aerodrome certification specifications allow other conspicuous combinations to be used, except for combinations including red'.

2.7.13.3 Additionally, the stand designation should be painted beside the taxiway centreline directly opposite the stand together with a lead-in arrow aligned with the stand centreline. On MARS and MCA stands, the designation for each stand centreline should be repeated beside the stand centreline at the double white lines marking the tail of stand.

2.7.14 Pushback Allowance

The normal pushback manoeuvre requires the aircraft to be turned through 90° and aligned with the taxiway centreline. When pushing-back from the last stand in a cul-de-sac to a blast screen, the space required to carry out this manoeuvre is ideally about one and a half times the length of the aircraft, measured from the stand centreline. However, this can be reduced if the airlines and handling agents are prepared to adopt the 'snaked' or 'swan- neck' method, particularly if it involves a small aircraft being pushed back into a taxiway wide enough for a much larger aircraft.

2.8 Model Guidance: Chapter 4 - Aircraft Turnround

2.8.1 Introduction

2.8.1.1 The aircraft turnround is a complex, busy and a potentially hazardous activity involving people from various companies working together in close proximity to aircraft, vehicles and equipment. The hazard associated with the aircraft turnround may be affected by time constraints, environmental factors such as noise and weather and the adequacy of lighting. This chapter addresses the turnround of aircraft for the purpose of providing generic information to assist airport and aircraft operators and ground handling

organisations when developing their own plans. It focuses on the activities undertaken on the ramp so that risks are properly identified and appropriate measures taken, with the aim of reducing aircraft damage and the number of personal injuries and other incidents connected with the aircraft turnround, which, apart from the pain and suffering caused to individuals and their families, may also cause significant disruption and financial loss to various stakeholders. The provision of this guidance does not infer a requirement; it is recognised that there are complexities and sensitivities in both the provision of plans and the accountabilities of turnround coordination; nevertheless, this guidance seeks to reflect what may be considered good practice, where such plans exist. Further guidance on aircraft turnround may be obtained from the IATA Airport Handling Manual (AHM) and IATA Ground Operations Manual (IGOM).

2.8.1.2 The guidance in this chapter is intended to provide a common framework for those organisations involved with the turnround of aircraft.

2.8.1.3 The responsibility upon all parties to conduct the turnround procedure safely is enshrined in the Safety Management System (SMS). Effective safety management within the turnround procedure will not only reduce the number of accidents and incidents but also improve efficiency and on time performance.

2.8.2 Turnround Plan

2.8.2.1 Where more than one company or organisation is attending an aircraft, effective co- ordination and cooperation between all parties is essential in order to prevent vehicles, equipment or people striking aircraft. Airlines and airport operators have a key role in this as part of their safety management systems for assessing, controlling and monitoring third party contractors operating in the airside environment. The aircraft turnround plan is therefore a key document in describing how an aircraft turnround shall be carried out safely, in describing the roles and responsibilities of each contractor. All contractors involved in aircraft turnround should have a copy of the plan, or have developed their own company procedures in accordance with a higher level turnround plan produced by either the airport operator, or their customer airline.'

2.8.2.2 An aircraft turnround plan should describe the activities involved in the generic aircraft turnround process and what should be considered at each stage. Individual airlines, ground handling organisations and ramp service providers should produce their own detailed turnround plans. The plan for the turnround should describe how the turnround will be carried out, and should enable every contractor to carry out their work safely and without endangering others. All the contractors involved should either have a copy of the plan, or have ready access to it.

2.8.2.3 The turnround plan should cover the processes involved in an aircraft turnround, for which each company and/or operator will have their own procedures for carrying out the activities below:

a) Pre-flight planning;

b) Pre-aircraft arrival;

c) Aircraft arrival;

d) Aircraft on stand;

e) Passenger disembarkation;

f) Catering;

g) Baggage offload/onload;

h) Refuelling;

i) Cleaning;

j) Toilet and potable water servicing;

k) Engineering maintenance;

l) Passenger embarkation;

m) Aircraft stand departure;

n) Post-aircraft departure;

o) Emergency procedures.

2.8.2.4 Additionally, airlines and/or ramp service providers should be responsible for the following on each turnround operation:

a) Ensuring that risk assessments for all activities are in place;

b) Identifying and appointing a competent Turnround Co-ordinator;

c) Ensuring that staff roles, responsibilities and risks are defined;

d) Ensuring that all staff are correctly trained and are doing the right job in the safest way;

e) Ensuring that the plan is confirmed by the Turnround Co-ordinator and any deviations communicated to the relevant parties;

f) Ensuring that the appropriate correct and sufficient Personal Protective Equipment (PPE) is provided for all staff;

g) Ensuring sufficient human and equipment resources and contingency plans for any shortfalls

h) Ensuring all incidents are reported

2.8.3 Co-ordination of the Turnround

2.8.3.1 The airport industry is continually being challenged to improve its safety performance, so effective safety can only be provided through co-operation and co-ordination between all organisations and companies involved during the turnround process, i.e. a 'total system' approach. Therefore, the provision of a 'Turnround Co-ordinator' appointed to be in control of the activity should be considered as best-practice. The Turnround Co-ordinator's role is to ensure that safe practices of work (as detailed in the plan) are adhered to and that the turnround plan is as efficient as possible. The co-ordinator is deemed to be in control of all co-ordination aspects of such turnround.

2.8.3.2 The airline or ground handler in charge of the turnround should nominate an individual to be the turnround Co-ordinator who will be in overall control of the ground handling activity of the aircraft turnround. The co-ordinator should have sufficient knowledge and authority to control the activities around the aircraft.

The requirements and nature of the aircraft operation and, on occasion, the operating procedures of the airline operator, may result in the Turnround Co-ordinator responsibilities being transferred from one member of staff to another. On such occasions transfer of the role must be clearly understood and acknowledged by both parties. The Turnround Co-ordinator should be clearly identifiable to all other companies involved in the turnround and they should ensure that work proceeds in accordance with any agreed turnround plan.

2.8.3.3 The Turnround Co-ordinator is also responsible for ensuring that all required resources are in place and that individuals are aware of their tasks and responsibilities. The Turnround Co- ordinator should be clearly identifiable to all other companies involved in the turnround and they should ensure that work proceeds in accordance with the appropriate policies.

2.8.3.4 As the role is important to ensure safety and that the turnround plan is as safe and efficient as possible, the co-ordinator role should fulfil the following requirements:

a) **Competence:** It is important that the role profile/job description and person appointed to undertake the role has the necessary competencies to understand and manage the safety and operational aspects of the turnround process. This includes an understanding of risk assessments and the mitigations built into the turnround plan.

b) **Authority:** It is essential that the co-ordinator has the authority to manage and direct the wide range of contractors and sub-contractors that may be involved in the turnround process. This authority should be formalised and, in the event of an airline delegating this task to one of its service suppliers, the delegation of authority to manage the turnround process should be covered within any contractual arrangements;

c) **Workload:** The co-ordinator should have sufficient available capacity to fulfil the obligations of this role as priority. A risk assessment of the complexity and timescales of the turnround to be managed will be able to inform the ability of the co-ordinator to undertake additional duties.

2.8.3.5 It is recognised that the turnround plan will address a typical aircraft turnround and other associated activities that may be involved. In these circumstances, together with the ramp service providers, it is the airline's responsibility to produce a plan that ensures that all activities are properly controlled and co-ordinated accordingly. A key element to ensure both aircraft and personal safety will be to identify who is responsible at each stage of the turnround.

2.8.3.6 Similarly, for operators of non-commercial aircraft it is the airline or ramp service provider's responsibility to have a turnround plan that complies as much as possible with the guidance contained in this document.

2.8.4 General Turnround Planning

Airlines and/or ramp service providers should be responsible for the following on each turnround operation and should have plans that include the following:

a) Identification of and confirmation that the Turnround Co-ordinator function is discharged. Where provided, the co-ordinator should be clearly visually identifiable, for example: different coloured vest with title or specific recognised headwear;

b) Ensuring that the appropriate authorities are informed of company flight schedules in advance, to allow for any special arrangements;

c) Ensuring that both the load plan and the turnround plan are confirmed by the Turnround Co-ordinator and any deviations communicated to relevant parties;

d) Ensuring that the appropriate Personal Protective Equipment (PPE) is provided for all staff and is being utilised effectively;

e) Ensuring that sufficient resources (staff and equipment) are in place, along with contingency plans for any shortfalls;

f) Ensuring that all staff and contractors are familiar with the aerodrome rules and emergency procedures;

g) Ensuring that risk assessments are in place;

h) Agreed parking arrangements where possible, giving as much prior notice as possible;

i) Ensuring that the necessary security arrangements are in place;

j) Ensuring that all staff are competent and tasked to do the job.

k) Ensuring that any safety related hazards or incidents during the turnround are duly reported through the company's corporate safety reporting system.

2.8.5 Turnround Process

2.8.5.1 Additional to generic planning for the operation the turnround may be divided into separate phases, as shown below:

a) Pre-stand arrival;

b) Aircraft arrival on stand;

c) Aircraft on stand;

d) Aircraft stand departure;

e) Post-aircraft stand departure.

2.8.5.2 Shown below is a generic list of turnround activities (not exhaustive). It is recognised however, that the various third parties operating on the ramp may have their own set of standard operating procedures and checklist for aircraft pre-arrival. The turnround process depends upon the allocation of all necessary roles and suitable co-operation to ensure a workable contractor/client relationship.

2.8.5.3 It should be the Turnround Co-ordinator's responsibility to monitor the turnround process and report back failures of contractors so that non-compliance or safety issues can be resolved.

2.8.5.4 Typically, the aerodrome operator's main considerations, which may impact upon the turnround process, are the timely allocation of stands and effective communication and co- ordination of any changes.

2.8.6 Pre-Stand Arrival

Immediately prior to aircraft arrival on stand, a turnround coordinator/procedure should be in place to ensure the following:

a) Turnround plan confirmed by Turnround Co-ordinator and any deviations communicated;

b) All safety and security procedures are in place;

c) Communication of any special loads, dangerous goods, and any procedures which must be followed in relation to these;

d) During periods of low visibility and/or the hours of darkness, check that the parking stand is sufficiently well lit and (where applicable) the aircraft Stand Number Indicator Board (SNIB), if available, is illuminated;

e) The Turnround Co-ordinator must consider adverse weather conditions when planning the turnround, ensuring the safety of the passengers, staff and the aircraft. This may include thunderstorms, strong winds, heavy rain, excessive heat etc. Weather must also be considered with regard to unloading of items such as animals and dangerous goods;

f) The Turnround Co-ordinator must ensure that all resources are in place and individuals are aware of their roles;

g) Ensure correct use of PPE and the safety of all staff, contractors and equipment providers undertaking the aircraft turnround, high visibility vest should be fastened to ensure conspicuity;

h) Walking inspection of the stand to remove FOD and report spillages or obstructions;

i) Confirm stand equipment availability (e.g. chocks, cones, Passenger Inbound Guidance (PIGs) etc);

j) Check that there is sufficient access; no trip, slip or fall hazards;

k) Ensuring all equipment is parked within vehicle parking bays;

l) Ensure correct position and serviceability of aerobridge or other passenger embarkation/disembarkation equipment.

m) Person near emergency stop button to manage aircraft arrival;

n) When the stand is clear, give instruction to, or activate the VDGS, if available. Where a VDGS is unserviceable or is not available marshalling assistance should be sought.

2.8.7 Aircraft Arrival on Stand

2.8.7.1 Once indication has been provided by the aircraft commander that engines are off and anti- collision beacons extinguished:

a) Monitor the safe arrival of aircraft ensuring all staff and equipment remain clear;

b) Where VDGS is available, a nominated person should be in position to activate the VDGS emergency stop. (Where a VDGS is unserviceable or is not available then Airfield Operations should be contacted);

c) The emergency stop button must not be used to stop aircraft on the nose wheel mark;

d) Use of aircraft marshalling hand signals where appropriate for initial communication with pilot;

e) Nominated person to chock aircraft;

f) Nominated person to connect Ground Power Unit (GPU or FEGP) if available, or requested;

g) Authorised person to communicate with flight deck crew, either through hand-signals, or on a headset (if available);

h) When the aircraft engines have shut down and reached a safe condition to approach, the anti-collision lights are off and chocks are in place, the aircraft can be approached and coned as required. Some airlines may require permission to be given by engineers or ground staff to confirm it is safe to approach, particularly in the case of propeller aircraft or helicopters;

i) Switch off VDGS.

2.8.8 Aircraft on Stand

2.8.8.1 Once the aircraft is parked on the stand, with its engines and anti-collision lights off and chocks in place, unloading and servicing can proceed as is highlighted below. Not all events will occur in the same

sequence and some will occur concurrently. There will also be some variations dependent on type of aircraft and the length of the turnround period. This stage is often carried out over a very short time scale and this coupled with increased vehicle activity around the aircraft and passenger movement leads to an inherently hazardous environment. Procedures should be developed to ensure that a thorough damage inspection of the 'work areas' such as cargo doors and servicing panels are conducted by the ground handling personnel. The ground engineer should also conduct a thorough inspection of the aircraft fuselage.

2.8.8.2 Any damage must be reported immediately to the engineer and airline representatives and a safety occurrence report filed through the airport/company safety reporting system.

2.8.8.3 There are three elements listed here:

a) Offload

b) Servicing

c) On load

2.8.9 Offload Process

a) Ensure equipment is in position; serviceability of brakes checked on equipment prior to positioning on the aircraft;

b) Check that the offload and emergency routes are available for passengers, and that all safety measures are in place including Passenger Inward Guidance Systems (PIGS)

c) Position rear and front steps where applicable;

d) Communicate ready to proceed;

e) Aircraft doors opened;

f) Information passed to airline representative regarding disembarkation;

g) Appropriate control measures utilised when manoeuvring vehicles (e.g. the use of banksman);

h) Re-assess plan in respect to any unplanned changes;

i) Co-ordinate offloading needs:

1 People

i. Special needs wheelchairs, hi-lifts, ambulance dispatched first;

ii. Very Important Persons (VIPs), Unaccompanied Minors (UMNRS) etc;

iii. Monitored safe exit of passengers to bus or terminal, marshalling passengers to ensure they remain within the designated safe areas;

iv. Crew issued with local instructions.

2 Animals

i. Quarantine procedures in force;

ii. Appropriate unloading, cages/containers;

iii. Hazardous material awareness.

3 Cargo Load

i. Positioning of equipment correctly;

ii. Order of work scheduling followed, taking sequential unloading into consideration to avoid the risk of tipping;

iii. Offload of any dangerous goods following procedures laid out in the IATA Dangerous Goods Manual;

iv. Offloading bags/freight/cargo/mail/value goods complete.

v. Check aircraft hold(s) are empty (where applicable).

2.8.10 On Load Process

a) Reposition equipment if required;

b) Loading Instruction Report Form completed and passed to relevant people;

c) Re-check aircraft hold(s) are empty (where applicable);

d) Co-ordinate onloading:

1 People

i. Special needs loading;

ii. Monitor safe arrival of passengers for boarding.

iii. Ensure the passengers have not been able to deviate from the departure route.

2 Animals

i. Quarantine procedures followed;

ii. Appropriate loading, safe cages, animal welfare (water food).

3 Cargo Load

i. Awareness of dangerous goods and special loads and any relevant procedures which need to be followed;

ii. Check order of work scheduling, taking into consideration sequential loading to avoid the risk of tipping;

iii. Positioning of equipment correct;

iv. Load bags/freight/cargo/mail/value goods complete and correctly secured.

e) All documentation checked and details to aircraft Commander:

1 Loading instruction report form must be signed to show it has been loaded in accordance with the instructions shown, and any deviations reflected and communicated to load controller;

2 Weight and Balance document completed, including any Last Minute Changes (LMCs);

3 Maintenance sheet signed off;

4 Fuel report sheet;

5 Other, i.e. firearms (where located);

6 Cargo manifest;

7 Passenger manifest (if required by the airline);

8 Information provided to the pilot-in-command concerning dangerous goods and any special loads.

2.8.11 Aircraft Departure

2.8.11.1 Once loading is complete, the aircraft is ready to depart and the final checks below should be completed.

2.8.11.2 Aircraft departure is a critical phase of any flight. The pressures for quick turnrounds to meet schedules, clearances and slot allocations highlight the need for safe management of the departure procedure. For the purposes of this guidance the departure starts from checks of security of dead loads and nets (if applicable) or doors closing.

a) Check dead loads secure and net sections are in place;

b) Clear signal to close doors, close aircraft doors;

c) Check hatches and latches are all secure and any damage reported immediately to the engineer and airline representative;

d) Check the stand is clear of FOD and obstructions;

e) Steps removed and equipment (including cones and chocks) parked or positioned safely (banksman used if required);

f) Monitor to ensure correct pushback procedures are followed;

g) Pushback must not start until:

1 Communication has been established between ground crew and the flight deck;

2 Ground crew have completed an inspection of the aircraft, checking all doors and latches are secure, there are no leaks, loose wires etc and any damage reported immediately to the engineer and airline representative;

3 The head set operator is on the ramp and ready to walk alongside the aircraft;

4 Wing walkers, if required, are in place;

5 Aircraft anti-collision lights are on;

6 The aircraft commander has indicated that clearance to pushback has been received from ATC;

7 Any aircraft approaching the stand along the taxiway/apron taxiway has passed well clear of the vicinity of the planned pushback, unless ATC instructions to each applicable aircraft indicate otherwise.

8 All vehicles and equipment have been withdrawn to the equipment areas;

9 Pushback clearance and any special instruction therefore must be heard and/or confirmed by the tug driver and head-set operator;

10 Carry out pushback/self-manoeuvring procedures;

11 Signal pilot all equipment clear, headset un-plugged and by-pass pin removed.

2.8.12 Post-Aircraft Stand Departure

Shown below is what the Co-ordinator should check at this stage:

a) That a walking inspection is undertaken to check that the stand is clear of obstruction and FOD;

b) That all equipment has been shut down and correctly parked or stored and the equipment areas are free of FOD;

c) That any safety management shortfalls or near misses (e.g. fuel spills, trips, and slips) are reported through applicable reporting systems to the aerodrome operator or appropriate control authorities.

2.9 Model Guidance: Chapter 5 - Aircraft Turnround *(airside vehicle operation)*

2.9.1 Introduction

2.9.1.1 Every vehicle operating in airside areas should have an individual Airside Vehicle Permit (AVP) to meet the National Authority's security requirements. These should be conspicuously displayed in the vehicle and be visible to a person standing on the ground at all times when the vehicle is operating airside. The requirement for an aerodrome to have an Airside Driving Permit (ADP) scheme is contained in National Civil Aviation Regulation.

2.9.1.2 The aerodrome operator should establish and promulgate local minimum standards for vehicles operating in airside areas. These standards should ensure that each vehicle is fit for its intended purpose and that its condition is such that it will not endanger vehicle users, other vehicles, pedestrians, aircraft or property. Airside vehicle permits should not be issued to any vehicle which cannot meet the specified standards.

2.9.1.3 Before a permit is issued a vehicle should be inspected by a competent person appointed by the applicant. Periodic inspections should be conducted thereafter to ensure that it continues to meet the minimum standards. An inspection should also be conducted if information or reports indicate that a particular vehicle may not be meeting the specified standards.

2.9.1.4 All vehicles should normally be required to meet the requirements appropriate for the grant of a vehicle licences by the Local Authority.

2.9.1.5 The AVP displayed on a vehicle must include a clear identification and details of any limitations imposed. Additionally, vehicles should be readily identifiable by their specific equipment number, livery or by the prominent display of the vehicle operator's name.

2.9.1.6 The aerodrome operator must ensure operators are aware of requirements for the maximum height, width and length of vehicles for airside operations or for operation within specific areas. Height is particularly significant where airside bridges exist, and should be displayed in the driver's cab. It may be necessary for the aerodrome operator to specify minimum manoeuvrability standards. It is important that companies' operating vehicles airside ensure that their drivers are fully aware of any limitations imposed by the manoeuvrability or size of particular vehicles.

2.9.1.7 Because of the potential for serious damage to aircraft and their engine caused by foreign objects it is essential that all practical steps are taken to minimise the risk of such damage from vehicle operations. The aerodrome operator must ensure that all vehicle operators are aware of the need for strict control of the security of loads, as well as vehicle equipment and FOD on and in the vehicle. This is particularly important in respect of items such as chocks, fuel tank caps and hub caps, the loss of which is not particularly significant during normal road operations; the standards set by the aerodrome operator may include a requirement that such items are secured in such a way as to ensure that they cannot become unintentionally detached from the vehicle.

2.9.1.8 Vehicles holding AVPs should normally be equipped with flashing yellow obstruction lights which meet the specification published in National Civil Aviation Regulation.

Note: Additional lighting requirements apply to vehicle trailers.

2.9.2 Vehicle Operating Rules

2.9.2.1 The following paragraphs set out definitions and operating rules, which have proved to be satisfactory over many years of operation at aerodromes in Europe. Whilst local operating conditions determine the exact procedures at individual aerodromes, it is recommended that the basis of this guidance material be considered for incorporating into an airport local instruction for airside rules at all aerodromes.

2.9.2.2 The following colours should be used to distinguish between ground surface markings used by aircraft and those applicable to the movement and control of vehicles and equipment:

YELLOW: Markings for the guidance of aircraft;

WHITE: Markings for the guidance of vehicles and equipment, and where applicable, pedestrians (for pedestrian crossings for example).

2.9.2.3 The boundary between the apron and the manoeuvring area (vehicle limit line) should be indicated by a continuous double white line, to indicate DO NOT CROSS. Entry into and movement between these areas should be strictly controlled. Apart from pushback vehicles and crews, no vehicle (other than RFFS, other allocated vehicles and with free- ranging privileges) should normally enter the manoeuvring area other than at designated vehicle crossing points unless the vehicle driver is in radio contact with air traffic control and has been cleared to enter the manoeuvring area.

2.9.2.4 No markings or signage of any sort should be permitted in the airside area without the express permission and approval of the aerodrome operator.

2.9.3 Traffic Rules

General

a) The aerodrome operator should determine speed limits applicable to the airside area. Different limits may be applied to sections of roadway subject to local conditions. This information should be published and signs displayed as appropriate;

b) On the airside road system vehicles should always keep to the right when passing an approaching vehicle, particularly to avoid confusion where there are no road markings. On apron areas different rules may be promulgated;

c) No vehicle should be left unattended anywhere on the airside area with its engine running. This is to prevent risks such as overheating and consequent fire in the vicinity of aircraft, and uncontrolled or unauthorised vehicle movement;

d) Vehicles should remain in the airside area only long enough to conduct their legitimate business;

e) To ensure that no object is dropped on the apron or manoeuvring area, all doors and shutters on vehicles must be closed while the vehicle is moving. All loads and equipment, and all parts of the vehicle must be properly secured and checked for potential FOD Hazards before a vehicle enters the apron or manoeuvring area. Objects dropped can cause serious hazards to aircraft and personnel;

f) Obstruction lights meeting the National Authority's requirements must be displayed at all times by vehicles operating on the manoeuvring area. Unless there are specific instructions to the contrary, dipped headlights should always be used in conditions of darkness and reduced visibility;

g) All parking restrictions must be strictly observed;

h) Vehicle drivers should follow designated routes, giving way, where appropriate, to routes provided for pedestrians and aircraft;

i) Vehicles must not be driven across aircraft stands, unless they are directly involved in the operation of the aircraft using or about to use the stand;

j) Vehicles must give way to aircraft at all times;

k) When aircraft engines are running, vehicle drivers must ensure that they stay well clear of areas behind the aircraft where slipstream and jet efflux may cause damage or danger to the vehicle or its occupants. The minimum safe distance should be determined (usually by the aerodrome operator) and promulgated to all vehicle drivers;

l) Vehicles should not be driven in reverse on the manoeuvring area or apron unless directly engaged in aircraft manoeuvring or servicing, or during parking positioning. When reverse movement is essential, guidance should be provided to the driver by a person outside the vehicle (banksman) or other means. The fitting of reversing alarms and CCTV cameras should be considered as part of risk management of reversing operations;

m) Vehicles must remain at least one metre away from any part of an aircraft unless they are engaged in a task that specifically requires them to operate closer to the aircraft.

2.9.4 Control of Vehicles

2.9.4.1 Control of vehicles on the manoeuvring area is normally the responsibility of Air Traffic Control. On apron areas, control of taxying aircraft and aircraft under tow is the responsibility of Air Traffic Control but the control of vehicles is subject to rules and instructions issued by the aerodrome operator.

2.9.4.2 Irrespective of any clearance or instruction issued by Air Traffic Control, drivers of vehicles and of vehicles towing aircraft are responsible for ensuring that their vehicle (and any part under tow) does not collide with any other vehicle, aircraft, people, building or obstruction.

2.9.4.3 In all cases, signs displayed at airside area entry points, and at crossing points within the area, must give adequate information to drivers about the procedure to be followed for movement into and within the airside area. Signs should describe any relevant control methods, such as traffic lights or signal lamps. Uncontrolled crossings should be clearly marked as such, and the conditions of use displayed. Particular attention should be given to the need for the clear statement of prohibition of entry to airside areas by unauthorised pedestrians.

2.9.4.4 Aerodrome operators may wish to issue specific instructions about the classes of vehicle permitted to access the movement area (including active runways), subject to the issue of a clearance by Air Traffic Control. The conditions for entering or crossing active runways should be clearly set out in a document published by the aerodrome operator and signed by the relevant vehicle operators and drivers.

2.9.5 Operations at Night and in Poor Visibility

2.9.5.1 The aerodrome operator should promulgate instructions dealing with vehicle operation at night and in conditions of poor visibility.

2.9.5.2 Instructions for operations at night should include descriptions of the airport lighting, including that which is displayed in areas that are not normally used by vehicles, and the lighting required on vehicles.

2.9.5.3 Where practicable trailers operating at night should display red rear lights, or be fitted with conspicuous retro-reflective markings.

2.9.5.4 Certain navigational aids for the operation of aircraft in conditions of reduced visibility are provided in accordance with the requirements of the National Civil Aviation Regulation. Airport operators must ensure that all drivers are aware of the meaning of aids such as runway guard lights where these are provided, and of the significance of ILS protection areas. Access to the manoeuvring area in conditions of reduced visibility should be limited to experienced and suitably trained drivers, and permitted only in exceptional circumstances.

2.9.5.5 Low Visibility Procedures implemented by the Air Traffic Control and the aerodrome operator should include the following procedures for vehicle control:

a) Confirmation that all entry points into the movement area are either brought under positive control or closed off;

b) Confirmation that all runway guard lights or holding point board lights, that are required under operational procedures, are fully operational;

c) Warnings given and confirmations are received to ensure that all parties operating vehicles have been removed from the movement areas, with the exception of safety critical operational vehicles;

d) Assure that all apron and taxiway crossings are under positive control by ATC.

2.9.5.6 It is important that communication of the introduction and cancellation of Low Visibility Procedures is fast and effective, but must include procedures to ensure that physical barriers have been placed and/or removed and that this has been communicated to ATC and airside operations prior to releasing those areas back for aircraft or vehicular traffic use.
Note: Site-specific Low Visibility Procedures should be included in the relevant aerodrome manual and should be reflected in the procedures of all companies that are permitted to operate vehicles in airside areas.

2.9.6 Radio-Telephony (R/T) Equipment and Mobile Telephones

2.9.6.1 When operating on certain parts of the airport it will be necessary to use radiotelephony or mobile telephone communications equipment. This may introduce additional risks whilst driving and vehicle operators must ensure that the use of such equipment does not distract the driver from the primary task of driving the vehicle.

2.9.6.2 Drivers of vehicles requiring to cross or enter active runways and taxiways (except at designated uncontrolled taxiway crossing points) must normally be in two-way communication with Air Traffic Control and must comply with any clearance issued to them.

2.9.6.3 With regard to other vehicles, the aerodrome operator should decide the basis on which R/T equipment is provided and used. In some cases a listening watch may be required of vehicles on certain parts of the movement area. In other cases vehicles may be required only to carry R/T equipment to satisfy the need of the company operator. The procedures for use of R/T equipment must be clearly promulgated by the aerodrome operator.

2.9.6.4 It is recommended that users of R/T equipment who communicate with Air Traffic Control or transmit on any frequency used by aircraft must comply with the requirements of the National Authority.

2.9.6.5 The aerodrome operator should establish a system of allocating R/T call signs to be used by vehicles so that the potential for confusion between vehicles and, where relevant, between vehicles and aircraft, is minimised. This is particularly important at aerodromes where the R/T frequency used by vehicles is the same as that used by aircraft or where the R/T frequency used by vehicles is re-broadcast on the R/T frequency used by aircraft.

2.9.6.6 In the interests of safety it is essential that Air Traffic Control is made aware of all radio facilities being used at the airport, whether or not these facilities are used for communication with Air Traffic Control.

2.9.6.7 Vehicle driver should be trained to know the lighting signal for maintain safe operation during communication failure

2.9.7 Vehicle Accident Reporting Procedures

2.9.7.1 Every aerodrome operator should publish rules for the reporting of accidents involving vehicles operating on the airside.

2.9.7.2 Under the provisions of the National Civil Aviation Regulations, aircraft operators may have responsibilities for the reporting of certain accidents involving damage to aircraft.

2.9.7.3 Under the provisions of the National Civil Aviation Regulations, aerodrome operators and managers, and certain other classes of persons including ground handlers, may be required to report occurrences and defects which could endanger aircraft or their occupants.

2.9.7.4 There is, therefore, a requirement under legislation for the reporting of accidents and incidents where vehicles damage or otherwise cause danger to aircraft, but as legal requirements do not cover all vehicle events it is essential that aerodrome operators provide their own scheme for the reporting of airside vehicle accidents not included in the scope of AAI or ROSI accidents/incidents (typically this process may be established as part of an aerodromes safety management system) The scheme should cover the reporting of accidents between vehicles, vehicles and aircraft, vehicles and equipment or buildings, and vehicles and pedestrians. Records of occurrences should be kept for at least three years. They should be reviewed regularly to establish whether any steps could be taken to eliminate the causes of accidents in the airside area. Chapter 7 of this document discusses reporting in further detail).

2.9.7.5 If a person has been injured, there may be legislative requirements for the injury to be reported to the relevant health and safety enforcing operator. At most airports this could be the local police or the office of the Health and Safety department, although at some airports, it may be the Environmental Health Office of the local Operator or Municipality.

2.9.8 Monitoring of Standards

2.9.8.1 The aerodrome operator should establish procedures for the monitoring and assessment of airside vehicle operating standards.

2.9.8.2 All vehicle/equipment operators and their maintenance providers should have facilities commensurate with the type and size of vehicle and equipment it operates and maintains and should be able to demonstrate compliance with the appropriate airport operator and Department of Transport (DOT) standards, where applicable.

2.9.8.3 **Inspections** - Vehicle operators should ensure that persons carrying out safety inspections are appropriately trained and technically competent on the complexity and type of vehicle being inspected.

Therefore evidence of individual competencies should be made available, if requested by the airport operator or other agency during audit.

2.9.8.4 **Records** - Individual vehicles and equipment should have their own records containing all maintenance records where relevant.

2.9.8.5 **Daily Inspections** - It is important that all vehicle owners and operators ensure their drivers and other personnel are aware of the airport operator's requirements for vehicle maintenance and standards.

2.9.8.6 Routine daily inspections of vehicles and equipment should be the responsibility of vehicle owners and operators. It is therefore the responsibility of vehicle operators to ensure checks are carried out and any defects recorded and corrected. Walk round checks should include the whole vehicle including any combination of trailers or dollies. It is also important that a 'nil', or 'no faults/defects found' entry is included in the recording system.

2.9.8.7 Vehicle defects should be recorded and reported to a competent person who has the authority to ensure that appropriate action is taken to rectify any defects found. As determined by local policies, vehicles or equipment found to be unserviceable may be required to be removed from the airside environment by the operator until maintenance work has been completed to the required vehicle and equipment standards for operating airside.

2.9.8.8 Vehicles and equipment deemed to be in a dangerous condition by having a safety defect may be issued with a 'Prohibition Notice' and the local airside vehicle permit withdrawn, in accordance with local airport operator instructions and policies.

2.9.8.9 Conventional road vehicles that have been modified for airport use should still comply with the standards contained in the Local Authority Regulations, irrespective of whether the vehicle is being used on public roads or not. Operators of non-conventional vehicles should ensure that the appropriate and relevant paperwork is held, covering change of use notifications and the relevant insurance and modification certification.

2.9.8.10 The aerodrome operator should establish procedures for the monitoring and assessment of airside vehicle operating standards. These procedures should include a review of the increase/decrease in the number of valid ADPs and the reasons for the change. An assessment of the impact on overall airside safety should be conducted if the number of vehicles operating in airside areas changes significantly.

2.9.9 Performance Management

2.9.9.1 The aerodrome operator should publish any penalties it has established for non- compliance with the rules and instructions for the use of vehicles on the airside. These may include temporary or permanent exclusion from the airside area of individuals, particular vehicles, or group of vehicle controlled by a specified vehicle operator.

2.10 Model Guidance: Chapter 6 - Training for Safety

2.10.1 Objective

2.10.1.1 Working in the airside environment is inherently hazardous therefore all organisations have a duty to ensure that their employees are competent to work safely within their operating environment and all undertake a safety induction to raise the awareness of the hazards associated with working airside. To ensure this competence each organisation will be required to provide adequate training to each employee that is proportionate and commensurate with their role and responsibilities and to ensure they understand that Safety is all airside users' responsibility.

2.10.1.2 This means:

a) Identifying safety skills and training required for each role (typically identified by way of a task and role analysis);

b) Developing and co-ordinating training programmes in co-operation with employees, airport certificate holders and business partners;

c) Delivering appropriate training in a timely fashion;

d) Regularly reviewing the effectiveness of the programme and providing adequate reinforcement training as necessary;

e) Ensuring the training takes account of the capabilities of the individuals being trained;

f) Maintaining adequate records of the training undertaken;

g) Making all apron users aware of the non-punitive safety culture;

h) Ensuring all staff understand the reporting safety related hazard and incidents (overview of the corporate safety reporting system)

2.10.2 Introduction Objective

2.10.2.1 All employers have a responsibility to provide information, instruction training and supervision to their employees. Having a competent and safe workforce makes good business sense as incidents and injuries damage lives and are a needless expense for an organisation.

2.10.2.2 Organisations need to set clear training policies and objectives that are supported and driven at Board level and by senior management. It is critical that these policies include the monitoring of the effectiveness of any training.

2.10.2.3 In developing training for working in the airside environment organisations should consider:

a) Whether staff undertaking different roles airside require different training, and whether it is adequately provided;

b) What specialist training is required and by whom;

c) Whether there are sufficient resources (financial, human and equipment) available to provide training;

d) Whether there is a structure in place to deliver the relevant safety training;

e) Whether the organisation has the knowledge, competence and skills to design and deliver the training;

f) Assess whether the balance of theoretical and practical training is adequate;

g) Determine what level of supervision is required and who will provide it;

h) Determine what oversight monitoring is in place that will ensure that key airside safety and performance objectives continue to be met and to ensure that there is good co-operation and co-ordination to meet the objectives.

2.10.2.4 The aerodrome operator should lead in determining the compatibility of airside training between all airside service providers in order to foster standardisation and to ensure safety training delivers a safe working environment.

2.10.3 Evaluate/Measure Effectiveness

Safety training should be reviewed at least annually to ensure that training needs are being met and that the training is effective in bringing about desired changes in behaviour and safety awareness. Systems to measure these changes should be in place and methods of measuring achievement need to have been set at the training objectives stage within this module. A system of feedback from employees will enable employers to assess whether the courses are meeting their objectives and changes identified by training evaluation or audit should be fed back into the course design administration.

2.10.4 Categories and Timing of Training

Health and safety training needs to be tailored to the individual and the role, and needs to take account of the whole term of employment.

a) Induction Training - On employment with the organisation, as part of the induction process;

b) Specialist Training - When there are specialist requirements, new systems or tasks are introduced to the person's role;

c) Refresher Training - At periods throughout employment to reinforce the health and safety message;

d) As required to maintain competence;

e) When a person changes job.

2.10.5 Induction Training

Safety induction training should be carried out for every person who is new to an organisation or department (this includes contractors). The induction training should be carried out by a suitably qualified and competent 'trainer'. It should not be assumed that because an individual has worked in airside areas in the past that they will already be familiar with these topics. The following list of training areas should to be considered (this list is not exhaustive):

a) The company health and safety policy;

b) Safety responsibilities;

c) Local emergency procedures;

d) Incident reporting;

e) Main hazards and risks of the job;

f) Welfare arrangements;

g) Key safety procedures;

h) Rules and the names of key safety personnel and safety representatives within the organisation;

i) Airside safety and familiarisation training;

j) Provision and use of personal protective equipment;

k) Emergency procedures (low visibility/inclement weather);

l) Flight safety/ Occurrence Reporting procedures;

m) Environmental related considerations.

2.10.6 Specialist Training

Specific training should be provided where specialist skills are required to work safely, with requirements identified as part of a task-focused training needs analysis, for example: pushback and headset operations.

2.10.7 Refresher Training

Refresher training should be provided where necessary to ensure safety competencies are maintained. The frequency will vary according but not to exceed 24 months to the degree of risk, the use of the skills and the rate at which skills can be forgotten and when any significant changes to procedures are made. Refresher training should be programmed and recorded when completed.

2.10.8 Conclusion

By following the general guidance and advice contained within this chapter, airside operators at all size and complexity of aerodromes should be able to develop a systematic approach to assessing training, delivering training needs and evaluating its effectiveness.

2.11 Model Guidance: Chapter 7 - Safety Performance Management and Measurement

2.11.1 Introduction

2.11.1.1 The term 'Safety Performance Management' is used here to reflect a structured process of management and involves policy and target setting, activity monitoring, measuring and reviewing performance against targets, supervising, rewarding and disciplining.

2.11.1.2 This Chapter provides guidance on safety performance management, within the aerodrome safety management system. It includes the following topics:

a) The fostering and maintenance of safety discipline;

b) Just Culture;

c) Active performance monitoring and management;

d) Investigation of accidents and incidents;

e) Enforcement of regulations;

f) Implementation of remedial action.

2.11.1.3 Any system to manage safety and to measure and monitor safety performance will have a number of common elements. There are many texts which describe both theoretical aspects and practical application of safety performance management and this document seeks to illustrate some of these principles. It must be remembered, however, that only the aerodrome operator and managers of airside operators can determine the most appropriate systems for their organisations and environment.

2.11.2 The Fostering and Maintenance of Safety Discipline

2.11.2.1 One of the prime contributory factors in the establishment and maintenance of effective safety discipline is an open and honest occurrence reporting system. Such a system creates an environment of trust at all levels and facilitates learning from common experiences and contributes to the prevention of accidents. A sound reporting system should make due allowance for the honest genuine mistakes. However, there is no place in the air transport industry for ill-discipline or lack of professionalism.

2.11.2.2 Industry sources considered that one of the major issues on the ramp is the threat to safety posed by aircraft damage that is not reported, but is subsequently 'found'. It is therefore important that stakeholders provide education and awareness training so that all personnel understand the safety significance of reporting all incidents. It follows that the most important task is to establish a non-threatening or a 'just' culture for the genuine mistake which is honestly reported. It is in the general interests of the industry to reduce damage (and thus costs) to aircraft and equipment and it is everyone's duty of care and responsibility to do their utmost to prevent injury to personnel. However, of paramount importance is the need to avoid aircraft departing with unreported and unknown damage. Such incidents can potentially lead to catastrophic accidents. Experience has shown that the major disincentive to reporting accidental ground damage is the fear of dismissal or other punishment.

2.11.2.3 Not only is unreported damage potentially lethal but it also precludes timely investigation and subsequent remedial action aimed at preventing a recurrence; a significant disadvantage when statistics show that accidents have often been presaged by earlier similar incidents. Everyone must be made aware that in any incident in which an aircraft is damaged, the most serious offence is failure to report. It follows that keeping quiet about an accident or incident would be considered as a 'wilful violation' under a Just Culture policy and any subsequent disciplinary action would reflect the seriousness of the failure to report.

2.11.2.4 To foster the comprehensive reporting of accidents and incidents, aerodrome operators should encourage the adoption of effective safety reporting systems. These systems should be brought to the attention of every employee and adopted by all the other organisations that have an airside role. The safety reporting system should be headed by a formal statement, and signed by the company Accountable Manager. What should flow from this policy statement is an instruction to all staff on the subject of the reporting of aircraft ground damage.

2.11.2.5 Safety awareness and an understanding of reporting procedures should be fostered by all staff as part of normal working activity. Both are a function of line management and should not be regarded by either management or employees as separate issues that are the sole responsibility of specialist safety staff. The aerodrome operator should take particular care to see that its own safety management arrangements and staff attitudes are exemplary and that they are seen to be so by other organisations and persons working airside.

2.11.2.6 Although this Chapter sets out a number of recommended practices on enforcement of regulations, fostering and maintenance of safety discipline should also operate on the reward principle. Good standards and operating practices should be recognised when observed and promoted to others. Safety management should not be confined to seeking out low standards, bad operating practices and breaches of regulations, but the overall safety performance system should include procedures for recognising, highlighting and possibly rewarding good performance.

2.11.2.7 One cause of airside accidents is where personnel trained for low skill tasks are required to carry out these tasks in a 'high-tech' environment. Managers and supervisors must ensure that selection and training recognise the full operational safety requirement: that is, selection and training satisfy the needs of the task and the environment within which the task is to be undertaken.

2.11.3 Just Culture

2.11.3.1 The National Authority encourages a 'Just Culture' in the interests of the on-going development of flight safety. This means the National Authority supports the development, within all areas of the aviation community, of a culture in which:

a) Individuals are not punished for actions, omissions or decisions taken by them that are commensurate with their experience and training but which result in a reportable event; but

b) Where gross negligence, wilful violations and destructive acts are not tolerated.

2.11.3.2 Just Culture has evolved from a 'No-Blame' approach and recognizes that there are instances, such as gross negligence, where even though an incident has been reported the circumstances are such that the responsible individual should face disciplinary or punitive action. Such action should, however, be the exception rather than the norm and a transparent process to make such determinations is necessary. The point is that staff are encouraged to report incidents without fear of unfair punitive action.

2.11.4 Active Performance Monitoring and Management

2.11.4.1 Airside safety performance and management should be pro-active, rather than reactive, at all levels of the management structure. Monitoring should be part of the daily routine, not a set piece procedure for use only following an incident or accident. Performance monitoring and management should be an accepted part of the overall responsibilities of all management and supervisory personnel. Although large organisations might have staff dedicated to full-time safety performance monitoring, safety performance monitoring and management is a line management responsibility - it should not be delegated.

2.11.4.2 Very few, if any, airside operations procedures or working practices occur in total isolation. Many airside operations involve co-operation, both formal and informal between two or more departments of an organisation and often between two or more separate organisations. This is a complex matrix that requires cooperation, co-ordination and good understanding and agreement. It is clearly advantageous, and in many cases necessary, for line managers to work closely with their counterparts from other departments and third party organisations. The benefits of co-ordination are obvious: increased rapport, a mutual exchange of safety-related information and the same standards of safety discipline applied across the whole aerodrome operation. The aerodrome operator should act as the focal point in coordinating best practice for all organisations on the aerodrome; for example, by acting as the Chairman of the Airside Safety Committee (see Chapter 2, Appendix 2A). Where appropriate and practicable, managers and supervisors of airside operators should ensure that they maintain a suitable level of visibility on airside working areas. Their role should include observation of, and participation in, all aspects of airside work carried out by their staff and indeed the staff of other organisations where it can be seen that airside safety could be improved.

2.11.4.3 Wherever practical, aerodrome operators should collate safety performance data from all airside operators and co-ordinate an overall safety performance programme. Such a system will identify those organisations that operate best practice and will enable lessons from incidents to be shared by all airside operators. In order to do this it is essential that all operators collect comparable data and the aerodrome operator should define the data to be collected as part of a total system approach.

2.11.4.4 Accident investigation looking into causal factors suggest that as much as 50% of all serious aircraft accidents have resulted from non-compliance with procedures at some point. Clearly it is important that all safety-related activities are described by documented procedures. Such procedures should include defined performance measures and monitoring systems where appropriate.

2.11.4.5 Companies operating on the apron should establish measures to ensure and monitor that safety performance procedures are implemented correctly and are achieving their intended objective. The aerodrome operator should conduct a similar programme of audits to assess the effectiveness of aerodrome-wide procedures. Any deficiencies that are identified in an audit should be considered and appropriate remedial action or measures taken. The audit should be followed up to ensure that these remedial actions and measures are effective. In this way deficiencies in procedures that could lead to an unsafe situation should be remedied before an incident or accident occurs.

2.11.4.6 A Local Proficiency Check (LPC) is a useful self-audit mechanism which also identifies noncompliance of ground handlers and airport operators.

2.11.4.7 A set of local level safety KPI's can provide greater insight into safety and risk management at a local airport level and implement areas and measures for improvement.

2.11.5 Investigation of Accidents and Incidents

2.11.5.1 It should be the primary aim of any investigation following an accident or incident to establish the facts of the matter in order to prevent a recurrence. Managers are reminded that beyond the requirement for internal procedures, some occurrences and accidents fall within statutory reporting requirements. This includes occurrences that take place on the apron. Accident or incident investigation will usually be best conducted by a line manager or supervisor. Such persons will almost certainly be most familiar with the type of operation or working practice during which the accident or incident occurred. In some cases, it may be preferable for the investigation to be carried out by a manager from a different department from that involved in the accident or incident. It is important that managers do not assume that investigations into accidents and incidents conducted under statutory provisions will necessarily meet the requirements of their own internal investigation procedures.

2.11.5.2 'Accidents' and 'Incidents' in the context of this Chapter should not be limited solely to occurrences where physical damage or injury is sustained to equipment, structures or persons. Occurrences exhibiting a possible risk of damage or injury will also merit formal investigation, where managers consider there has been exposure to unacceptable but avoidable risk. Managers should also be aware that where an accident occurs airside it might be necessary to co-ordinate the airside safety investigation with parallel investigations by others.

2.11.6 Enforcement of Regulations

2.11.6.1 It is essential that a 'just-culture' accident and incident reporting policy is not confused with the necessity for sanctions that preserve airside safety against indiscipline. Establishing a 'Just Culture' needs to have formal disciplinary procedures that, at their extreme, might have the force of criminal law under airport bye-laws or legislative provisions. It is this area of safety performance management that requires the greatest management expertise, clear thinking and well-documented procedures. It is imperative that all staff are aware of the Just Culture principles to give them the confidence to report incidents without fear of punitive action, while acknowledging that there is no place for gross negligence, wilful violations or destructive acts. Fundamentally, Just Culture should be understood as being fair.

2.11.6.2 Accidents and incidents will come under the jurisdiction of the National Authority, the Accident Investigation Authority or Local Law Enforcement Authorities and these organisations should be involved during the course of any investigation as required.

2.11.6.3 Each organisation needs to establish processes to support their Just Culture, including what is considered as gross negligence, wilful violation or a destructive act. Examples of situations where punitive or disciplinary action may be appropriate are:

a) Failure to report damage to an aircraft;

b) Smoking airside;

c) Driving on the manoeuvring area without permission;

d) Failure to report a potentially hazardous incident;

e) Driving in front of, or behind, an aircraft with aircraft engines still running and/or

f) anti-collision warning lights on;

g) Parking in areas marked as 'parking unsafe' or 'prohibited';

h) Leaving vehicle unattended with engine running on movement area.

2.11.6.4 All employers at each aerodrome will need to consider their disciplinary structure in order to ensure that it is appropriate and fair. Procedures should provide proper opportunities for individuals to put their side of the case.

2.11.6.5 The aerodrome operator should publish details of any penalties it has established for non-compliance with the rules and instructions whilst working airside including the use of vehicles. These may include temporary or permanent exclusion from the airside area of individuals, particular vehicles, or group of vehicles controlled by a specified vehicle operator.

2.11.6.6 In the interests of natural justice it will be important for any penalty system to include an appeal procedure. However, this should not prejudice the immediate exclusion of a particular individual or vehicle where, in the opinion of the aerodrome operator, this is necessary in the interests of safety.

2.11.6.7 The aerodrome operator is responsible to the National Authority for ensuring that the aerodrome is safe for use by aircraft. The continuance of the aerodrome operating certificate depends on the aerodrome operators (or certificate holder's) ability to secure the continued maintenance of safety for aircraft. The aerodrome operator should make this responsibility for safe operation quite clear to all third parties and seek compliance with appropriate safety management and safety performance standards.

2.11.6.8 Whilst the aerodrome operator is responsible to the National Authority for the safe operation of the aerodrome with respect to aircraft, all organisations and operators at an aerodrome are collectively and individually responsible for safety in its widest sense. It should be noted that nothing said here or within this document as a whole can absolve any person from his responsibility and accountability under the law.

2.11.6.9 Clearly, disciplinary offences against safety regulations may be reported by anyone, but should be directed in the first instance via the alleged offender's supervisor or manager. Subsequent action will depend on what arrangements are in force for disciplinary offences at each particular aerodrome. However, it is the aerodrome operator who carries the responsibility and he may require to know how disciplinary offences against aerodrome safety regulations have been dealt with, in pursuit of his responsibilities. It is a matter for service providers and aerodrome operators to reach agreement about how accidents and incidents are to be reported, recorded and investigated. Participation in the Airside Safety Committee (as described further in **Appendix A)** is a good vehicle for this action.

2.11.6.10 In some circumstances the aerodrome operator may take action against a company or organisation, as opposed to an individual.

2.11.7 Implementation of Remedial Action

The objective of any accident or incident investigation should be to identify the root causes and produce findings which facilitate further action aimed at prevention of recurrences. Such findings should focus on how procedures, practices, or regulations failed to prevent the accident or incident. The report should list recommendations and nominate those responsible for taking corrective action. The whole proceedings should be reviewed at senior management level with the intention of establishing what subsequent actions are required. The loop should then be closed by ensuring that all line managers and safety specialists are aware of the changes so that they can monitor their effectiveness. It is equally important to determine whether the changes identified require any changes to training syllabuses and to action accordingly.

2.11.8 Conclusion

2.11.8.1 Whatever systems are implemented, airside safety performance management essentially consists of two fundamental and key elements:

a) A 'just' culture, based on company policy to ensure that accidents affecting aircraft and airside safety are reported, in order to protect the public and the workforce from preventable injury;

b) A code of discipline to secure a safe airside working environment for everyone.

2.11.8.2 The outcome of effective safety performance management should be seen by everyone to be:

a) Educational and developmental;

b) Encouraging and rewarding;

c) Active rather than reactive;

d) Constant rather than intermittent;

e) Continuing rather than currently fashionable;

f) Part of normal work rather than an isolated activity;

g) A means of reducing or containing costs rather than costing money itself;

h) Everybody's concern rather than that of specialists, or worse, nobody's concern;

i) Punitive only as a last resort.

Appendix A
Airside/Apron Safety Committee

A.1 General

1. Airports and aerodromes need effective forums in order to communicate with all airside operators; the aim of the Airside/Apron Safety Committee (ASC) is to promote and maintain airside safety standards and it is the foremost forum for the discussion and resolution of apron and ramp safety issues. The ASC provides the partnership between the airport operator's safety managers and other airside users to communicate and resolve matters concerning airside safety and operations.

2. It is recommended that aerodrome certificate holders or airport operators establish an ASC or an equivalent. The committee should be headed by the aerodrome manager, or senior airport operations manager, safety

manager, or equivalent. At large airports, membership should consist of many different organisations including flight operators, ground services companies, and aircraft handling organisations, ATC and representatives from the emergency services. In order to maintain membership at a manageable level, joint operator groups, such as a ramp, baggage, or aircraft fuelling, may consider nominating selected members to represent group interests.

3. At smaller airports or aerodromes, the ASC may be less complex and comprise membership from multi-disciplined stakeholders, commensurate with the particular type of hazard presented in the airside environment and the safety issues represented.

4. Meetings should be scheduled on a regular basis, with notes and actions from meetings communicated and promulgated to the wider airside community in a timely manner following meetings, with agreed actions recorded and tracked for closure.

5. The Airside/Apron Safety Committee should:

   a) Ensure that all airside personnel are aware of the potential safety hazards connected with their duties (safety awareness);

   b) Ensure that lessons arising from safety occurrence investigations and other safety activities are disseminated to accountable safety managers within all organisations operating airside;

   c) Ensure that all stakeholders are actively encouraged to engage and propose solutions to identified hazards and changes in order to improve safety where they appear needed, or in response to safety incidents.

A.2 Terms of Reference

6 The Committee's Terms of Reference should include:

   a) Acting as the focus for shared ownership of and responsibilities for airside safety issues;

   b) Developing policies for safe airside operations;

   c) Considering actions to resolve airside safety problems;

   d) Promoting airside safety discipline;

   e) Reviewing apron and Health and Safety incidents, in order to share analysis and lessons learned. The committee may consider other aspects of operational safety such as the following list (not exhaustive or prioritised):

   f) Apron congestion issues and advise on best solutions;

      i. Airside cleanliness issues;

      ii. Review reports and statistics on accidents, incidents and emergencies, airside discipline issues and discuss trends and solutions;

      iii. Identification and reduction of shared risks;

      iv. Apron equipment issues;

      v. Airside traffic issues;

      vi. Standard operating procedures for airside activities;

      vii. New and updated airside safety instructions;

      viii. Personal protective clothing/equipment issues;

      ix. Environmental safety matters such as noise, blast and fumes;

x. Methods to develop and promote apron safety awareness initiatives, such as poster campaigns and safety presentations/exhibitions;

xi. Sand clearance issues;

xii. Receive reports on significant outages and breakdowns concerning airside fixed facilities;

xiii. Receive engineers' briefings and reports on ongoing or imminent airside works and projects and provide safety advice;

xiv. Proposed changes/developments to the airside environment, aircraft ground handling operations and/or standard operating procedures;

xv. Results of aircraft turnround audits.

Note: The existence of an Airside Safety Committee must not substitute for safety management arrangements made by individual organisations represented on the flight safety, ground safety or local runway safety committees.

Appendix B

CAA certification checklist apron management assessment

Name of Aerodrome/Aerodrome:	Inspection date:	Name of Operator:
Managing Agency of Facilities:	Inspector(s) name (s)	Reference: Regulation

	Activity and objective	Reg. ref.	Status S/US/ O/ N/A	Comments
1.	Aerodrome Manual			
2.	Does the manual contain particulars of the procedures for aircraft parking control, if established?			
3.	Does it include the arrangements between air traffic control and apron management?			
4.	And the arrangements for allocating aircraft parking positions?			
5.	And the arrangements for initiating engine start and ensuring clearances for aircraft bushback?			
6.	And an inventory and description of the activation and deactivation of any visual docking guidance system used at the aerodrome?			
7.	And details of the marshalling service?			
8.	And the leader van service or follow-me service?			
9.	And the names, telephone numbers and roles of the persons responsible for planning and implementing aircraft parking control?			
10.	Record Keeping			
11.	List of documents checked.			
12.	Is the operator maintaining records in accordance with the aerodrome manual?			
13.	Facilities			
14.	Are suitable staff available to control aircraft parking?			
15.	Are suitable staff and facilities available to design parking layouts and marking?			
16.	Are staff available to provide follow me vehicle service if required?			
17.	Procedures			
18.	Is the staff aware of safety requirements relating to clearances and blast?			
19.	Are the organisational responsibilities and control arrangements in accordance with the manual?			
20.	Are parking positions allocated in accordance with the manual?			
21.	Are engine starts and push backs initiated in accordance with the manual?			
22.	Are any conditions or exemptions complied with?			
23.	Product Check			
24.	Are the visual docking systems in accordance with the manual?			
25.	Are the aircraft parking markers and markings in accordance with the manual?			
26.	Feedback			
27.	Are aircraft parking related incidents noted, reported and followed up?			

Appendix C

CAA surveillance checklist apron management assessment

Name of Aerodrome/Aerodrome:		Inspection date:		
Name of Operator:		Managing Agency of Facilities:		
Inspector(s) name (s)				
Reference: Regulation ……				
S/N	ITEM	Reg. ref.	Status S/US/ON/A	Comments
	AERODROME OPERATIONS MANUAL			
1.	Has the aerodrome operator identified individual/s who are responsible for apron management and apron safety?			
2.	Has the aerodrome operator distributed parts of the Aerodrome Operations Manual to those who require it to conduct their duties/ operate on airside?			
3.	If Yes, is the aerodrome operations manual distribution list available for review?			
	APRON SAFETY MANAGEMENT			
4.	Are risk assessment and safety audits conducted on the apron?			
5.	If Yes, who is the person/s responsible for ensuring that risk assessment s and safety audits are conducted?			
6.	Are the risk assessments/ analysis and internal audits conducted by competent individuals?			
7.	Has the Aerodrome Operator developed criterion to identify and assess risks identified on apron areas? (Risk Matrix)			
8.	Are risk assessments and safety audits conducted on apron operations?			
9.	Has the Aerodrome Operator developed a procedure to ensure the consistent application of risk assessments on aerodrome apron operations?			
10.	Is the frequency of risk assessments and preceding management review detailed?			
11.	Are there risk assessments and hazard identification reports available for inspection?			
12.	Has the Aerodrome Operator developed a safety occurrence and investigation procedure for events?			
13.	Are there accident and incident investigation reports available for inspection			
14.	Has the Aerodrome Operator established a Committee/Forum where Apron Safety issues are discussed?			
15.	Are the minutes available for review?			
	AIRCRAFT SAFETY			
16.	Are all aprons clean and clear of foreign object debris (FOD)?			
17.	Are there any FOD bins available on the parking bays and other strategic positions?			
18.	Are FOD bins emptied regularly?			
19.	Is all apron equipment parked in designated staging areas?			
20.	Is the marshaller on the aircraft stand prior to the arrival of the aircraft? (One sample per apron)			
21.	Do all marshallers comply with all standard operating procedures prescribed by the aerodrome operator?			
22.	Are the marshalling signals used compliant with CAA Requirements?			

23.	Is all marshalling staff adequately trained? (Sample: Verify marshaller details with marshalling training records)			
24.	Interview: Is the marshaller familiar with the aircraft marshalling standard operating procedures?			
25.	Do apron staff approach the aircraft prior to been given the go-ahead from the aircraft engineer?			
26.	Are there any unsafe acts/ conditions during the loading and unloading of the aircraft?			
27.	Do all apron equipment and vehicles adhere to the speed limit permitted when on the ramp?			
28.	Are all standard operating procedures adhered to during the servicing of the aircraft?			
29.	PARKING OF, SECURING AIRCRAFT ON THE APRON			
30.	Are there safety lines painted to define the areas intended for use by ground vehicles and other servicing equipment, to provide safe separation from aircraft?			
31.	Does the aircraft stand provide the minimum clearance requirements as prescribed in ECAR 139?			
32.	Does the aerodrome have an apron management service at the aerodrome?			
33.	Is the movement of aircraft on apron areas conducted in a safe manner?			
34.	Do all pilots adhere to all parking and departing instructions issued by the Apron Management Service/ATC?			
35.	Is the aircraft properly chocked once stationary?			
36.	Are the chocks used, suitable for the size of aircraft?			
37.	Is provision made for smaller aircraft to be properly moored?			
38.	Does the aerodrome make use of air-bridges?			
39.	If yes, are the air-bridge operators suitably trained?			
40.	Do the airbridge operators comply with the aerodrome operators' standard operating procedures when using the airbridges?			
41.	Does the aerodrome make use of motorized apron equipment?			
42.	Are the apron equipment in a serviceable and roadworthy condition?			
43.	Are the steps used suitable for the type of aircraft?			
44.	Interview: An apron equipment operator on the content of the standard operating procedures governing the use of such equipment.			
45.	Record the following information (1 Sample to be taken from each apron): Aircraft registration; ETA of aircraft Ground handling company; Unsafe acts or conditions noted during the handling of the aircraft.			
	MOVEMENT OF VEHICLES			
46.	Is vehicular movement regulated			
47.	Has the aerodrome operator developed rules and procedures to regulate the movement of vehicles and equipment on the movement area?			
48.	Has the aerodrome operator implemented measures to ensure that all drivers are familiar with and complies with, the rules and procedures for the operation of ground vehicles on service roads and aerodrome stands?			
49.	Do all drivers adhere to the minimum speed and standard operating procedures when on the apron/s and service roads?			
50.	Interview: (One Sample per apron) Verify if the driver has all necessary authorisation to operate a vehicle on airside and if he/she is knowledgeable on the standard operating procedures governing vehicular movement on the aerodrome?			

51.	With reference to 5: Has these drivers been trained to operate vehicles on the movement area ?			
	APRON INSPECTIONS			
52.	Has the aerodrome operator developed an aerodrome inspection programme, incorporating information and procedures for apron inspections?			
53.	Are all apron areas inspected at least once daily and are the findings recorded on a daily basis?			
54.	Do competent aerodrome personnel conduct these inspections?			
55.	Does the apron inspection checklist used, Inspection date the specific operational safety needs of the aerodrome?			
56.	Do all employees complete the apron inspection checklist in accordance with the apron inspection procedures?			
57.	Are these reports available for inspection?			
58.	Are these inspection reports verified by aerodrome anagement?			
59.	Is the apron sufficiently illuminated when dark?			
60.	Are airside staff allowed to smoke on airside?			
	REFUELLING OF AIRCRAFT			
61.	Has the aerodrome prescribed standard operating procedures with regard to aircraft refuelling?			
62.	Is refuelling of aircraft done in accordance with the prescribed standard operating procedures?			
63.	Does the aerodrome operator ensure that refuelling is conducted within the prescribed safety parameters?			
64.	Does the Aerodrome Operator ensure that all refuelling vehicles are roadworthy and that the refuelling equipment is compliant with the safety specifications?			
65.	Does aircraft refuelling take place whilst passengers are boarding or disembarking from the aircraft			
66.	If Yes, has the Aerodrome Operator prescribed procedures to mitigate the risks associated with this practice?			
67.	Are these procedures complied with at all times?			
68.	Are fuel/ oil spillages reported, appropriately treated and cleaned immediately?			
69.	Are fuel spillages recorded?			
70.	To prevent staff and drivers going under aircraft wings, are safety cones placed around wingtips, vent areas and engines?			
71.	Are these areas kept clear whilst refuelling is taking place?			
72.	Interview: Are the staff charged with ensuring airside safety aware and knowledgeable about the prescribed refuelling procedure?			
73.	Interview: Are the refuelling staff aware and knowledgeable about the prescribed refuelling procedure?			
	SAFETY TRAINING			
74.	Is appropriate training being given to personnel who are charged with the responsibilities of ensuring safety on the apron?			
75.	Is such training being presented by competent personnel			
76.	Is the training presented at an accredited training establishment?			
77.	Are all persons working on the apron inducted in terms of the aerodrome standard operating procedures?			

78.	Are training records being kept indicating the individuals who attended the training, the typeof training, when the training was attended and if the training was successfully completed?			
INSPECTOR REMARK: RECOMMENDATION: NAME OF INSPECTOR:_SIGN:_____DATE:_____				

APPENDIX 4A

B0 – ACDM: Improved Airport Operations through Airport-CDM

Description and purpose

To implement collaborative applications that will allow the sharing of surface operations data among the different stakeholders on the airport. This will improve surface traffic management reducing delays on movement and manoeuvring areas and enhance safety, efficiency and situational awareness.

Main performance impact:

KPA- 01 – Access and Equity	KPA-02 – Capacity	KPA-04 – Efficiency	KPA-05 – Environment	KPA-10 – Safety
N	Y	Y	Y	N

Applicability consideration:

Local for equipped/capable fleets and already established airport surface infrastructure.

B0 – ACDM: Improved Airport Operations through Airport-CDM			
Elements	***Applicability***	***Performance Indicators/Supporting Metrics***	***Targets***
A-CDM	OBBI, HECA, OIII, OKBK, OOMS, OTBD, OTHH, OEJN, OERK, OMDB, OMAA, ~~OMDW~~	Indicator: % of applicable international aerodromes having implemented improved airport operations through airport-CDM Supporting metric: Number of applicable international aerodromes having implemented improved airport operations through airport-CDM	40% by Dec. 2017

APPENDIX 4B

TABLE B0-ACDM

EXPLANATION OF THE TABLE

Column

1 Name of the State

2 Name of City/Aerodrome and Location Indicator

3 Status of implementation of Apron Management, where:
Y – Yes, implemented
N – No, not implemented

4 Status of implementation of ATM-Aerodrome coordination, where:
Y – Yes, implemented
N – No, not implemented

5 Terminal & runway capacity is declared, where:
Y – Yes, declared
N – No, not declared

6 Action plan — short description of the State's Action Plan with regard to the implementation of B0-ACDM.

7 Remarks

State	City/ Aerodrome Location Indicator	Apron Management	ATM-Aerodrome Coordination	Terminal &runway capacity declared	Action Plan	Remarks
1	*2*	*3*	*4*	*5*	*6*	*7*
BAHRAIN	Bahrain/Bahrain Intl (OBBI)	N	N	N	2018	
EGYPT	Cairo/Cairo Intl (HECA)	N	N	N	2018-2019	
IRAN	Tehran/Mehrabad Intl (OIII)	N	N	N		
KUWAIT	Kuwait/Kuwait Intl (OKBK)	N	N	N		
OMAN	Muscat/Muscat Intl (OOMS)	N	N	N		
QATAR	Doha/Doha Intl (OTBD)	N	N	N		
QATAR	Doha/Hamad Intl (OTHH)	N	N	N		
SAUDI ARABIA	JEDDAH/King Abdulaziz Intl (OEJN)	N	N	N		
SAUDI ARABIA	RIYADH/King Khalid Intl (OERK)	N	N	N		
UAE	Abu Dhabi/Abu Dhabi Intl (OMAA)	Y	Y	Y	2017	Final Operational test Q4 2017 Full implementation Q1 2018
UAE	Dubai/Dubai Intl (OMDB)	Y	Y	Y	2017	
~~UAE~~	~~DUBAI/Al Maktoum Intl (OMDW)~~	~~N~~	~~N~~	~~N~~	~~No~~	~~No operational requirement~~
Total Percentage		**18%**	**18%**			

APPENDIX 4C

MID Region Airport Collaborative Decision Making (MID A-CDM) Survey Questionnaire

Name of the State/Administration:

Approach to implementation

1. Is the A-CDM implementation a national program/project or a local airport by airport project? *(Please select the applicable box)*

It is a national program where A-CDM is being implemented at several airports with one entity managing the overall program to facilitate common procedures and approach to the implementations	
It is an "airport-by-airport" approach where each project is managed at "local" level	
It is a combination of a national program and separate airport projects manager at "local" level	
There is not yet an implementation plan for A-CDM	

Please add free text comments if needed:

2. If A-CDM has been/is going to be implemented, please indicate at which airports and by what year:

Airport	Year

Add additional lines as needed

For EACH airport mentioned above, please provide separate responses to QUESTIONS 3 to 22:

Status of A-CDM implementation

3. In which of the following phases is the A-CDM implementation?
(Please select the box that is the most suitable option)

No planning, i.e. nothing in relation to A-CDM has started yet	
Initial planning, i.e. collecting information about guidance material etc. to set the scope of the projects	
Planning well underway, i.e. scope set, engaged with stakeholders etc.	
Ready to launch A-CDM implementation project	
A-CDM implemented, i.e. procedures are in place and used in the "day-to-day" operations (Please indicate number of years for A-CDM used in day-to-day operations.	

A-CDM Project Scope

4. Which one of the A-CDM conceptual elements are being implemented as part of the A-CDM project? (*Please select the applicable box(es))*

Information sharing	
Milestone Management	
Variable Taxi Times	
Collaborative Management of Flight Updates	
Pre Departure Sequencing	
A-CDM in adverse conditions	
Integration with Air Traffic Flow Management (ATFM)	

Please add free text comments if needed:

5. How is Information sharing implemented as par to the solution/planned A-CDM solution? (*Please select the applicable box(es))*

Via Information Sharing platform collecting data in real-time from various systems.	
Via manual interaction and information exchange	
A combination of the two alternatives above	

Please add free text comments if needed:

6. What Milestones (based on the Eurocontrol model) are captured/planned to be captured for the Milestone Management? *(Please select the applicable box(es) and please indicate if the implementation/planned implementation uses any other names for the milestones)*

Eurocontrol Milestones	Applied	Alternative name
Milestone 1 - ATC Flight Plan Activated		
Milestone 2 - CTOT Allocation/EOBT – 2 Hrs		
Milestone 3 - Take off from Outstation		
Milestone 4 - Local Radar Update/FIR Entry		
Milestone 5 - Final Approach		
Milestone 6 - Landed		
Milestone 7 - In Block		
Milestone 8 - Aircraft at Gate		
Milestone 9 - TOBT Entered		
Milestone 10 - TSAT Issued		
Milestone 11 - Boarding Starts		
Milestone 12 - Aircraft Ready		
Milestone 13 - Start-up Request		
Milestone 14 - Start-up Approved		
Milestone 15 - Off Block		
Milestone 16 - Take Off		

Please add free text comments if needed:

7. Are you planning to apply the concept of Target Off Block Times? *(Please select the applicable box)*

No	
Yes, and this will be the responsibility of the Airlines and/or appointed Ground Handlers to manage and update the Target Off Block Times (TOBT) in order to ensure that TOBT is accurate and reliable.	

   a. If yes, will the project provide a solution that facilitates predictive TOBT calculations? *(Please select the applicable box)*

No	
Yes	

8. What methodology is applied/going to be applied for calculating Variable Taxi Time? *(Please select the applicable box)*

"Table look up" utilizing fixed taxi time from gates to runways.	
Dynamic Variable Taxi Time using self-learning algorithms based on real-time and statistical surveillance data	

9. How is Target Start-Up Approval Time (TSAT) being calculated as part of Pre-Departure Sequencing? *(Please select the applicable box)*

Manual TSAT calculations	
Automatic TSAT calculations utilizing a Pre Departure Sequence or full Departure Management system/capability	

   a. If TSAT Is calculated automatically, at what key milestones are the TSAT calculated/re-calculated? *(Please select the applicable box(es))*

Milestone 1 - ATC Flight Plan Activated	
Milestone 2 - CTOT Allocation/EOBT – 2 Hrs	
Milestone 3 - Take off from Outstation	
Milestone 4 - Local Radar Update/FIR Entry	
Milestone 5 - Final Approach	
Milestone 6 - Landed	
Milestone 7 - In Block	
Milestone 8 - Aircraft at Gate	
Milestone 9 - TOBT Entered	
Milestone 10 - TSAT Issued	
Milestone 11 - Boarding Starts	

10. How TSAT information is shared to Airlines operators/Ground Handling Agencies? *(Please select the applicable box(es))*

Via A-CDM portal/web interface/application	
Via mobile application	
Via Automatic Parking Aid displays at gate	
Data link	
Radio communication	

11. What are the key parameters for data exchange between ACDM and ATFM? *(Please specify in free text in the text box)*

12. To establish the A-CDM project, has any guidance material been used to facilitate the scope and objectives? *(Please select the applicable box)*

Yes	
No	

a. If yes, please indicate what guidance material has been used. *(Please select the applicable box(es))*

ICAO Doc 9971	
Eurocontrol A-CDM Manual	
CANSO A-CDM Guidance Material	
FAA Surface CDM material	
IATA Guidance material	
Specific airport "operational guidelines" materials	
Other material like Eurocae or ETSI standards for A-CDM (*Please specify)*	

Please add free text comments if needed:

Local Concept of Operations

13. Has a "Local Concept of Operations" document for the A-CDM implementation been established? *(Please select the applicable box)*

Yes	
No	

a. If yes, please indicate the scope of the document. *(Please select the applicable box(es))*

It sets out the objectives that A-CDM is aiming to achieve	
It provides a common vocabulary with all definitions for A-CDM	
It provides information about information sharing and the sources for the information collected	
It provides information about the milestones used in the A-CDM process	
It defines each participating stakeholder's role and responsibilities as part of the A-CDM process	
It provides how A-CDM shall operate during irregular operations	
It provides descriptions of the process steps for various regular and irregular operations	
It includes how to measure the success of A-CDM once implemented, i.e. Key Performance Indicators (KPIs)	

Please add free text comments if needed:

Stakeholder Engagement

14. Which stakeholders are involved in the A-CDM implementation? *(Please select the applicable box(es))*

Airport operator	
Airline operators	
Ground handlers	
Air Navigation Service Provider	
Network Operations/ATFM unit	
Others (*Please specify)*	

15. Has a Memorandum of Understanding (MOU) been established between the stakeholders? *(Please select the applicable box)*

Yes	
No	

Please add free text comments if needed:

Project Implementation

16. Has a project group been established with all stakeholders involved? *(Please select the applicable box)*

Yes	
No	

Please add free text comments if needed:

17. Is there a shared leadership or is the project management led by one organization? (*Please select the applicable box)*

Shared leadership	
Leadership is appointed from one organization	

a. Please explain why one of the options is applied:

18. Is the project group meeting held on a regular basis or ad-hoc? (*Please select the applicable box)*

Regular	
Ad-hoc	

a. Please explain why one of the options is applied:

19. What are the objectives identified in the project that A-CDM is aiming to achieve? *(Please select the applicable box(es))*

Increase predictability	
Increase on-time performance	
Improve resource utilization	
Reduce taxi times	
Increase airport efficiency	
Reduce environmental nuisance	
Optimise the use of available capacity	
Improved safety	
Other *(please indicate what other objectives are identified in box below)*	

Please add free text comments if needed:

20. Has the project identified a more detailed Key Performance Framework with Key Performance Indicators to facilitate the measurements of the A-CDM implementation? *(Please select the applicable box)*

Yes	
No	

a. If yes, would the project team be willing to share this work with the ICAO Regional officer for Aerodromes and Ground Aids (AGA) to aid in its future work such as the establishment of more detailed A-CDM guidelines? *(Please select the applicable box)*

Yes	
No	

Please add free text comments if needed:

Training

21. Has the project established training in any of the following areas for the implementation of A-CDM? *(Please select the applicable box(es))*

Initial training for stakeholders to "what is A-CDM"	
Advanced training for stakeholders to "what is A-CDM"	
Training on how to operate under A-CDM procedures for all stakeholders	
Specialized/tailored training for each user in relation to "what do I need to do when A-CDM is operational at the airport"?	

Please add free text comments if needed:

Challenges

22. Please rank what hold most true in relation to your A-CDM implementation. (Please use 1-5 where 1 indicates "no, do not agree at all" and 5 is "yes, agree completely").

A-CDM as a concept is too complicated and vague	
Developed guidelines are not enough to understand how A-CDM shall be implemented successfully	
It is challenging to understand what an A-CDM implementation is, i.e. what has to be achieved to say "yes, we have A-CDM at our airport"	
The challenge is to understand what system(s) is(are) and information are needed to implement A-CDM	
It is challenging to get all stakeholders engaged and committed to the A-CDM project	
It is challenging to manage the A-CDM project	
It is challenging to understand what value A-CDM will bring	
It is very complicated to establish how to measure the success of A-CDM	

Please add free text comments if needed:

APPENDIX 4D

Recommended Steps for the effective implementation of ACDM

STEP:	EXPLANATION OF THE STEPS
1	ACDM Familiarization of All Partners: *Note 1- As Airport CDM includes a whole set of new procedures and processes, a training phase to understand these new features will be needed for all partners.*
2	Setting the Organization Structure *Note 2- Setting the Organization Structure at the airport level which to be responsible of the ACDM implementation and guide the project decision making process.*
3	Conduct ACDM GAP Analysis *Note 3- GAP Analysis related to ACDM Implementation with the involvement of all concerned partners may be conducted to achieve a clear vision of what is available and what is missing within the airport partners' technical infrastructure.*
4	Conduct Cost Benefit Analysis (CBA) *Note 4- Cost Benefit Analysis (CBA) may be conducted to contribute to a managerial decision on whether Airport CDM will be implemented at the airport.*
5	ACDM MoU Signature *Note 5- At airport level a Memorandum of Understanding (MoU) between the airport partners defines the ownership, the responsibilities, the rules for exchange and the confidentialities of data between the different parties. In particular, it specifies for each data in the Airport CDM Platform who is the owner, how it is managed and updated and who can read it and modify it. The rules for connections between systems to feed the Airport CDM Platform are also described in this MoU.* *Note 6- Since the Memorandum of Understanding sets the framework of the Airport CDM Project, it should be signed by all the airport partners as soon as they have decided to implement Airport CDM and they have agreed on the general objectives and responsibilities of each participant.* *Note 7- Note: Partners are defined as Aircraft Operators, Air Traffic Services, Airport operations Services, Ground Handlers, service providers and any other partners with a contribution to make to, and a benefit to derive from, Airport Collaborative Decision Making.*
6	Establishment of ACDM project plan *Note 8- ACDM project plan should include, mainly, Concepts Elements, Training, Technical Validation and Concept Validation.*
7	ACDM Elements Implementation *Note 9- **Information Sharing** is essential since it forms the foundation for all the other subsequent elements.* *Note 10- **The Milestones Approach (Turn- Round Process)** aims to achieve common situational awareness by tracking the progress of a flight from the initial planning to the take off.*

Note 11- ***Variable Taxi Time*** *is the key to predictability of accurate take-off in block times especially at complex airports.*

Note 12- ***Collaborative Management of Flight Updates*** *enhances the quality of arrival and departure information exchanges between the Network Operations and the CDM airports*

Note 13- ***Collaborative Pre-departure Sequence*** *establishes an off-block sequence taking into account operators preferences and operational constraints.*

Note 14- ***ACDM in Adverse Conditions*** *achieves collaborative management of a ACDM during periods of predicted or unpredicted reductions of capacity.*

8 Establish ACDM risks and mitigation Project

Note 15- ACDM risks and mitigation Project includes risks which are unique to Airport CDM and others which will be known from other projects within the Airport CDM context.

9 ACDM KPIs and performance measurement

Note 16- Objectives should be set and agreed by all partners, together with an agreed process to measure the achievement of the objectives (agreement on performance indicators). It is also vitally important that these agreements cover all the partners, collectively and individually.

APPENDIX 4E

B0-SURF: Safety and Efficiency of Surface Operations (A-SMGCS Level 1-2)

Description and purpose

Basic A-SMGCS provides surveillance and alerting of movements of both aircraft and vehicles on the aerodrome thus improving runway/aerodrome safety. ADS-B information is used when available (ADS-B APT).

Main performance impact:

KPA- 01 – Access and Equity	KPA-02 – Capacity	KPA-04 – Efficiency	KPA-05 – Environment	KPA-10 – Safety
Y	Y	Y	Y	Y

Applicability consideration:

A-SMGCS is applicable to any aerodrome and all classes of aircraft/vehicles. Implementation is to be based on requirements stemming from individual aerodrome operational and cost-benefit assessments. ADS-B APT, when applied is an element of A-SMGCS, is designed to be applied at aerodromes with medium traffic complexity, having up to two active runways at a time and the runway width of minimum 45 m.

B0-SURF: Safety and Efficiency of Surface Operations (A-SMGCS Level 1-2)			
Elements	***Applicability***	**Performance Indicators/Supporting Metrics**	**Targets**
A-SMGCS Level 1*	OBBI, HECA, OIII, OKBK, OOMS, OTBD, OTHH, OEDF, OEJN, OERK, OMDB, OMAA, OMDW	Indicator: % of applicable international aerodromes having implemented A-SMGCS Level 1 Supporting Metric: Number of applicable international aerodromes having implemented A-SMGCS Level 1	70% by Dec. 2017
A-SMGCS Level 2*	OBBI, HECA, OIII, OKBK, OOMS, OTBD, OTHH, OEJN, OERK, OMDB, OMAA, OMDW	Indicator: % of applicable international aerodromes having implemented A-SMGCS Level 2 Supporting Metric: Number of applicable international aerodromes having implemented A-SMGCS Level 2	50% by Dec. 2017

**Reference: Eurocontrol Document – "Definition of A-SMGCS Implementation Levels, Edition 1.2, 2010".*

APPENDIX 4F

TABLE B0-SURF (A-SMGCS Level 1-2)

EXPLANATION OF THE TABLE

Column

1 Name of the State

2 Name of City/Aerodrome and Location Indicator where A-SMGCS is required

3 Status of implementation of A-SMGCS Level 1, where:
- Y – Yes, implemented
- N – No, not implemented

4 Status of implementation of A-SMGCS Level 2, where:
- Y – Yes, implemented
- N – No, not implemented

5 Action plan — short description of the State's Action Plan with regard to the implementation of A-SMGCS Level 1-2, especially for items with "N".

6 Remarks - additional information (e.g. case of difference between level 1 and level 2 applicability)

State	City/ Aerodrome Location Indicator	Level 1	Level 2	Action Plan	Remarks
1	*2*	*3*	*4*	*5*	*6*
BAHRAIN	Bahrain/Bahrain Intl (OBBI)	N	N	A-SMGCS Level 1, 2 Projects is under execution phase. Expected completion on Dec 2018	
EGYPT	Cairo/Cairo Intl (HECA)	Y	Y		
IRAN	Tehran/Mehrabad Intl (OIII)	N	N		
KUWAIT	Kuwait/Kuwait Intl (OKBK)	N	N		
OMAN	Muscat/Muscat Intl (OOMS)	N	N		
QATAR	Doha/Doha Intl (OTBD)	Y	Y		
QATAR	Doha/Hamad Intl (OTHH)	Y	Y		
SAUDI ARABIA	Dammam/King Fahad Intl (OEJN)	N	N		
SAUDI ARABIA	JEDDAH/King Abdulaziz Intl (OEJN)	N	N		
SAUDI ARABIA	RIYADH/King Khalid Intl (OERK)	N	N		
UAE	Abu Dhabi/Abu Dhabi Intl (OMAA)	Y	Y	Level 4 -2017	
UAE	Dubai/Dubai Intl (OMDB)	Y	Y	Level 4 – 2016 (implemented)	
UAE	DUBAI/Al Maktoum Intl (OMDW)	Y	Y	Level 4 - 2018	
Total Percentage		**46%**	**46%**		

TABLE B0-ACDM

EXPLANATION OF THE TABLE

Column

1 Name of the State

2 Name of City/Aerodrome and Location Indicator

3 Status of implementation of Apron Management, where:
Y – Yes, implemented
N – No, not implemented

4 Status of implementation of ATM-Aerodrome coordination, where:
Y – Yes, implemented
N – No, not implemented

5 Terminal & runway capacity is declared, where:
Y – Yes, declared
N – No, not declared

6 Action plan — short description of the State's Action Plan with regard to the implementation of B0-ACDM.

7 Remarks

State	City/ Aerodrome Location Indicator	Apron Management	ATM-Aerodrome Coordination	Terminal &runway capacity declared	Action Plan	Remarks
1	*2*	*3*	*4*	*5*	*6*	*7*
BAHRAIN	Bahrain/Bahrain Intl (OBBI)	N	N	N	2018	
EGYPT	Cairo/Cairo Intl (HECA)	N	N	N	2018-2019	
IRAN	Tehran/Mehrabad Intl (OIII)	N	N	N		
KUWAIT	Kuwait/Kuwait Intl (OKBK)	N	N	N		
OMAN	Muscat/Muscat Intl (OOMS)	N	N	N		
QATAR	Doha/Doha Intl (OTBD)	N	N	N		
QATAR	Doha/Hamad Intl (OTHH)	N	N	N		
SAUDI ARABIA	JEDDAH/King Abdulaziz Intl (OEJN)	N	N	N		
SAUDI ARABIA	RIYADH/King Khalid Intl (OERK)	N	N	N		
UAE	Abu Dhabi/Abu Dhabi Intl (OMAA)	Y	Y	Y	2017	Final Operational test Q4 2017 Full implementation Q1 2018
UAE	Dubai/Dubai Intl (OMDB)	Y	Y	Y	2017	
~~UAE~~	~~DUBAI/Al Maktoum Intl (OMDW)~~	~~N~~	~~N~~	~~N~~	~~No~~	~~No operational requirement~~
Total Percentage						

APPENDIX 5A

Deficiencies in the AOP Field

EGYPT

Item No	Identification		Deficiencies				Corrective Action			
	Requirement	Facilities/ Services	Description	Date First Reported	Remarks/ Rationale for Non-elimination		Description	Executing Body	Date of Completion	Priority for Action
~~1~~	~~MID eANP VOL II Table AOP II-1~~	~~Alexandria Int`l Airport~~	~~Runway is short and current distance is 7221 FT with runway all up weight maximum 68000kgs~~	~~Jul, 2004~~	-	~~F O~~	~~Upgrade for RWY 04/22 is done,study is carried out with conclusion of MTOW 72000 Kg commensurate the demand aircraft fleet mix serve at the airport taking into consideration the current Rwy characteristics (Length,PCN)~~	~~Egypt~~	~~Jul, 2018~~	~~A~~
2	ANNEX 14 VOL I: Para. 1.4	Luxor and Borg El Arab Intl. Airports	Implementation of Certification of Aerodromes used for international operations	Nov, 2006	- - Certification of: - LUXER/Luxor Intl Airport (HELX) will be in Dec 2017 - ALEXANDRIA/ Borg El-Arab Intl Airport (HEBA) will be in the first half of 2018	F H	State submitted a letter dated 22/07/2015 stating that all primary international aerodromes will be certified by the end of November 2018.	Egypt	~~Nov, 2018~~ Jun, 2018	A

(1) Rationale for non-elimination: "F"= Financial "H"= Human Resources "S"= State (Military/political) "O"= Other unknown causes

Deficiencies in the AOP Field

IRAN

Item No	Identification		Deficiencies				Corrective Action			
	Requirement	Facilities/ Services	Description	Date First Reported	Remarks/ Rationale for Non-elimination		Description	Executing Body	Date of Completion	Priority for Action
1	ANNEX 14 VOL I: Para. 1.4	~~Imam Khomaini, Mehrabad, Mashhad, Yazd and Tabriz Intl. Airports~~ - MASHHAD/Shahid Hashemi Nejad Intl (OIMM), SHIRAZ/Shiraz Intl (OISS), TABRIZ/Tabriz Intl (OITT), TEHRAN/Imam Khomaini Intl (OIIE), BANDAR ABBAS/Bandar Abbas Intl (OIKB)	Implementation of Certification of Aerodromes used for international operations	Nov, 2006	- Certification Status for: - TEHRAN/ IKIA Intl (OIIE) - BANDAR Abbas /Bandar Abbas Intl (OIKB) are waiting final action for certification very soon	F H	Corrective Action Plan has not been formally provided by the State	Iran	Dec, 2018	A

(1) Rationale for non-elimination: "F"= Financial "H"= Human Resources "S"= State (Military/political) "O"= Other unknown causes

Deficiencies in the AOP Field

IRAQ

Item No	Identification		Deficiencies				Corrective Action			
	Requirement	Facilities/ Services	Description	Date First Reported	Remarks/ Rationale for Non-elimination		Description	Executing Body	Date of Completion	Priority for Action
1	ANNEX 14 VOL I: Para. 1.4	~~Baghdad/ Basrah/ Erbil /Sulaymaniyah / Al Najaf Intl. Airports~~ Al Najaf/Al Najaf Intl (ORNI), BASRAH/Basrah Intl (ORMM), MOUSL/Mousl Intl (ORBM), SULYMANIYAH/Sulaymaniyah Intl (ORSU)	Implementation of Certification of Aerodromes used for international operations	Nov, 2006	-	F H O	Corrective Action Plan has not been formally provided by the State	Iraq	Dec, 2018	A

[(1)] Rationale for non-elimination: "F"= Financial "H"= Human Resources "S"= State (Military/political) "O"= Other unknown causes

Deficiencies in the AOP Field

JORDAN

Item No	Identification		Deficiencies				Corrective Action			
	Requirement	Facilities/ Services	Description	Date First Reported	Remarks/ Rationale for Non-elimination		Description	Executing Body	Date of Completion	Priority for Action
1	MID eANP VOL II Table AOP II-1	Queen Alia Airport Runway 08L/26R	Runway is not operational and closed since long time	Dec, 2014	construction handing over Runway 26R I DBL is operational since 14/09/2017 as an instrument runway for departures only; arrival profiles and approach procedures CAT II are published and will be effective on 7/12/2017. The runway operates in a trial period for 180 calendar days starting from	F	Corrective Action Plan has not been formally provided by the State	Jordan	Dec, 2018	B
2	ANNEX 14 VOL I: Para. 1.4	Marka Intl Airport AMMAN/Marka Intl Airport	Implementation of Certification of Aerodromes used for international operations	May, 2015	- State sent a letter to ICAO MID Office dated 21 Nov.2017 Designated Marka Airport as a General Aviation Airport,and requested its removal of form MID eANP AOP Table	F H	Corrective Action Plan has not been formally provided by the State -	Jordan	Dec, 2017 Mar, 2018	A

(1) Rationale for non-elimination: "F"= Financial "H"= Human Resources "S"= State (Military/political) "O"= Other unknown causes

Deficiencies in the AOP Field

LEBANON

Item No	Identification		Deficiencies				Corrective Action			
	Requirement	Facilities/ Services	Description	Date First Reported	Remarks/ Rationale for Non-elimination		Description	Executing Body	Date of Completion	Priority for Action
1	ANNEX 14 VOL I: Para. 1.4	~~Hariri. Beirut Intl. Airport~~ BEIRUT/ Rafic Hariri Intl (OLBA)	Implementation of Certification of Aerodromes used for international operations	Nov, 2006	-	F H	Corrective Action Plan has not been formally provided by the State	Lebanon	Dec, 2018	A

[(1)] Rationale for non-elimination: "F"= Financial "H"= Human Resources "S"= State (Military/political) "O"= Other unknown causes

Deficiencies in the AOP Field

Libya

Item No	Identification		Deficiencies				Corrective Action			
	Requirement	Facilities/ Services	Description	Date First Reported	Remarks/ Rationale for Non-elimination		Description	Executing Body	Date of Completion	Priority for Action
1	ANNEX 14 VOL I: Para. 1.4	~~Benina, Sebha, and Tripoli Intl Airports~~ BENGHAZI/Benina (HLLB), SEBHA/Sebha (HLLS), TRIPOLI/Tripoli Intl (HLLT)	Implementation of Certification of Aerodromes used for international operations	May, 2015	-	F H S	Corrective Action Plan has not been formally provided by the State	Libya	Dec, 2018	A

(1) Rationale for non-elimination: "F"= Financial "H"= Human Resources "S"= State (Military/political) "O"= Other unknown causes

Deficiencies in the AOP Field

Sudan

Item No	Identification		Deficiencies				Corrective Action			
	Requirement	Facilities/ Services	Description	Date First Reported	Remarks/ Rationale for Non-elimination		Description	Executing Body	Date of Completion	Priority for Action
1	ANNEX 14 VOL I: Para. 1.4	~~Nyala and El Obeid Intl. Airports~~ - Nyala/Nyala Airports	Implementation of Certification of Aerodromes used for international operations	May, 2015	- -Certification of NYALA/Nyala (HSNN) Will be in January 2018	F H	~~Corrective Action Plan has not been formally provided by the State~~ -	Sudan	~~Dec, 2018~~ Jan, 2018	A

(1) Rationale for non-elimination: "F"= Financial "H"= Human Resources "S"= State (Military/political) "O"= Other unknown causes

Deficiencies in the AOP Field

SYRIA

Item No	Identification		Deficiencies				Corrective Action			
	Requirement	Facilities/ Services	Description	Date First Reported	Remarks/ Rationale for Non-elimination		Description	Executing Body	Date of Completion	Priority for Action
1	MID eANP VOL II Table AOP II-1	Damascus int`l Airport	Apron lighting inadequate	Sep, 2003	-	F H	Corrective Action Plan has not been formally provided by the State	Syria	Dec, 2018	A
2	MID eANP VOL II Table AOP II-1	Damascus int`l Airport	Runway surface rough and damaged. Runway markings unsatisfactory	Sep, 2003	-	F H	Corrective Action Plan has not been formally provided by the State	Syria	Dec, 2018	A
3	ANNEX 14 VOL I: Para. 1.4	~~Damascus, Aleppo, Bassel Al Assad Int`l. Airports~~ ALEPPO/Aleppo Intl (OSAP), DAMASCUS/ Damascus Intl (OSDI), LATTAKIA /Bassel AL-Assad Intl (OSLK)	Implementation of Certification of Aerodromes used for international operations	Nov, 2006	-	F H	Corrective Action Plan has not been formally provided by the State	Syria	Dec, 2018	A

[(1)] Rationale for non-elimination: "F"= Financial "H"= Human Resources "S"= State (Military/political) "O"= Other unknown causes

Deficiencies in the AOP Field

YEMEN

Item No	Identification		Deficiencies				Corrective Action			
	Requirement	Facilities/ Services	Description	Date First Reported	Remarks/ Rationale for Non-elimination		Description	Executing Body	Date of Completion	Priority for Action
1	ANNEX 14 VOL I: Para. 1.4	~~Sana`a, Aden, Hodeidah, Mukalla, Taiz Intl. Airports~~ ADEN/Aden Intl (OYAA), HODEIDAH/ Hodeidah Intl (OYHD), MUKALLA/Riyan Intl (OYRN), SANA`A/Sana`a Intl (OYSN), TAIZ/ Taiz Intl (OYTZ)	Implementation of Certification of Aerodromes used for international operations	Nov, 2006	-	F H	Corrective Action Plan has not been formally provided by the State	Yemen	Dec, 2018	A

[(1)] Rationale for non-elimination: "F"= Financial "H"= Human Resources "S"= State (Military/political) "O"= Other unknown causes

Note:* Priority for action to remedy a deficiency is based on the following safety assessments:

'U' priority = Urgent requirements having a direct impact on safety and requiring immediate corrective actions.

Urgent requirement consisting of any physical, configuration, material, performance, personnel or procedures specification, the application of which is urgently required for air navigation safety.

'A' priority = Top priority requirements necessary for air navigation safety.

Top priority requirement consisting of any physical, configuration, material, performance, personnel or procedures specification, the application of which is considered necessary for air navigation safety.

'B' priority = Intermediate requirements necessary for air navigation regularity and efficiency.

Intermediate priority requirement consisting of any physical, configuration, material, performance, personnel or procedures specification, the application of which is considered necessary for air navigation regularity and efficiency.

Definition:

A deficiency is a situation where a facility, service or procedure does not comply with a regional air navigation plan approved by the Council, or with related ICAO Standards and Recommended Practices, and which situation has a negative impact on the safety, regularity and/or efficiency of international civil aviation.

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(1) Rationale for non-elimination: "F"= Financial "H"= Human Resources "S"= State (Military/political) "O"= Other unknown causes

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