



DGP-WG/18-IP/8
1/10/18

**DANGEROUS GOODS PANEL (DGP)
WORKING GROUP OF THE WHOLE (DGP-WG/18)**

Montréal, 1 to 5 October 2018

**Agenda Item 8: Coordination with other panels
8.2: Airworthiness Panel (AIRP)**

PRESENTATION ON AIRWORTHINESS PANEL (AIRP) ACTIVITIES

(Presented by the Secretary of the Airworthiness Panel (AIRP))



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Update on the Airworthiness Panel (AIRP) Activities

Maimuna Taal - Ndure

MTaal@icao.int

Secretary to the AIRP

DGP-WG/18 Panel Coordination
Montréal, 1 – 5 Oct 2018





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Cargo Compartment Fire Suppression Provisions

JOB-CARD AIRP011



AIRP Job Cards with DGP in a supporting role

“Cargo compartment fire suppression provisions” -

- Cargo compartment fire suppression provision in Annex 8, need review due to inconsistencies with current practice.
 - The SARP required effects of an explosive or incendiary device or DG to be taken into account in the design of cargo compartment fire suppression system.
 - Other design code considerations (FAR 25.795 or CS 25.795)
 - Explicitly considering the threat is difficult due to number of variables involved.
 - Baseline information needed on cargo compartment fire suppression capability is not readily available.

Job-card AIRP.011.01

Title	Cargo compartment fire suppression provisions	Reference:	AIRP.011.01
Source	AIRP3 Report, Air Navigation Commission (200-13, 201-5, 6 and 8)		
Problem Statement	Risks posed by the transport of cargo by air may not be sufficiently mitigated because: <ol style="list-style-type: none"> a) Annex 18 and the Technical Instructions base risk mitigation at the package level without taking the aircraft's cargo compartment fire suppression capabilities fully into account. These risk mitigations may be incomplete they may be challenging to do because information on cargo compartment fire suppression capabilities is not readily available; and b) a number of variables needed to quantify the risk of an occurrence involving Dangerous Goods (DG) are unknown, making it impossible to fully comply with the Annex 8 requirement for DG to be taken into account when designing cargo compartment fire suppression systems. 		
Specific Details (including impact statements)	Annex 8, Part IIIA § 4.1.6.g) and Part IIIB § 4.2.g) requires the effects of an explosive or incendiary device or DG to be taken into account in the design of cargo compartment fire suppression systems in large aeroplanes. Current design codes, such as FAR § 25.795 or CS 25.795, clearly address the threat from a well-defined explosive or incendiary device but do not explicitly consider the threat from DG as cargo. Explicitly considering the threat is difficult to do because the outcome of an occurrence involving DG is dependent on a number of variables including the types and quantities of DG involved, cargo compartment load factors, cargo compartment load configuration and aeroplane types. Many of these variables are unknown during the aircraft design phase, making it impossible to quantify a fixed threat. Adding to this concern is the fact that Annex 18 and its associated <i>Technical Instructions for the Safe Transport of DG by Air</i> base risk mitigation at the package level and do not explicitly take the aircraft's cargo compartment fire suppression capabilities fully into account. The limitations of the cargo compartment fire suppression systems have not been characterized for the threat from shipments containing DG. Additionally, the baseline information of aircraft needed for operators to determine the limitation of specific cargo compartment fire suppression capabilities is not readily available. The DG provisions do distinguish between passenger and freighter aircraft whereby some additional restrictions are applied to the former, but they do not differentiate between different cargo compartment types and associated cargo compartment protection capabilities. These capabilities include fire suppression systems as well as fire containment features. Mitigating at the package level was considered effective when the DG provisions were originally developed some forty years ago because of the ability of aircraft protection features to control the possible effects from an occurrence involving the quantities and types of DG being transported. At that time, DG made up a very small percentage of cargo and were often chemical substances with established criteria for effectively identifying hazards. Today the quantity of DG has significantly increased, with a large number of DG being articles such as lithium batteries whereby criteria for effectively identifying the hazards they pose have yet to be established. This has introduced new threats to flight safety which may not be sufficiently mitigated. Experience from accident and incident investigations has shown that the hazards posed by an individual package of DG may not be the only contributing factor. The cumulative effect of DG and general cargo may also be a contributing factor. <p>The involvement of other dangerous material could easily lead to an exponential increase in risk commensurate with the cumulative energy, mass, and volume of the material involved which could potentially overwhelm what would normally be an effective aeroplane protection function. The current DG provisions do not adequately account for the diversity in airworthiness certification standards and operations limitations. A multidisciplinary approach involving airworthiness, flight operations and DG experts is needed to identify limitations between minimum performance design standards, operations and risks posed by DG. Criteria need to be established, taking these limitations into account, for determining whether DG can be transported safely by air. This may result in amendments to some or all of the associated Annexes.</p>		
Expected Benefit	Clarification about the large aeroplanes design capability related to cargo compartment fire protection provisions in Annex 8 under PART IIIA and IIIB will lead to a significant improvement in safety by ensuring adequate information as relevant to aeroplanes' airworthiness design standards (Annex 8) being made available and taken into account in Annex 18. The resulting complementary information will facilitate the development by operators of the risk assessment for the carriage of DG by air. An additional benefit, such as providing accurate data in the overall regulatory scheme in Annex 18, to facilitate the proper packaging of DG, is expected.		
Reference Documents	Annex 8 Doc 9760 – Airworthiness Manual, Annex 18, Doc 9284 – Technical Instructions For The Safe Transport of DG by Air, FAR/CS 25.795 and related advisory material, Job cards - DGP 003.01, FLT/OPSP 043.01.		Attachments



Job-Card AIRP011

- **The task:**
 - Clarify large aeroplanes design capability related to cargo compartment fire protection provisions
- Part of a holistic approach to mitigate the risks posed by the transport of cargo by air
- Special concern about lithium batteries in personal electronic devices (PEDs)
- **Coordination with:**
 - Dangerous Goods Panel
 - Flight Operations Panel
- **Cargo Safety Subgroup (CSSG)**
 - Multidisciplinary Cargo Safety Group (CSG), June & July 2017
- **Flight operations, dangerous goods, airworthiness, aerodromes, safety management, security, facilitation**



Job-Card AIRP011

- **Guidance material**
 - CSSG is developing comprehensive guidance material for the operator's safety risk assessment, including information to be provided for the cargo fire protection features.
 - WG/4 will coordinate and assist in the development of this guidance.



Job-Card AIRP011

- **Deliverables Q4 2018:**
 - Annex 8 → review & possibly amend SARPs on cargo fire suppression provisions
 - Annex 6 → review & possibly propose provision for the manufacturer to specify the cargo compartment fire suppression capabilities, so the operators can determine the limitation of specific aircraft fire suppression systems
- **Deliverable Q4 2019:**
 - Develop guidance material to explain, if necessary, the design of the current cargo compartment fire suppression functions



Control of electromagnetic radiation risks posed by the carriage of battery-powered devices in baggage, cargo and mail that are active when inside the aircraft cargo compartment

JOB-CARD AIRP012



AIRP Job Cards with DGP in a supporting role

Carriage of active battery powered devices inside aircraft cargo compartment.

- Control of electromagnetic radiation risks posed by the carriage of battery-powered devices in baggage, cargo and mail that are active when inside the aircraft cargo compartment

- The carriage and use of portable electronic devices (PED) already addressed by - (Cir. 340, AN/198).
- Significant increase on the use of PED
- Sources of potential EMI with aircraft systems.
- Recognizing the EMI risk posed to aircraft systems during operations and in particular during critical phases of flight, the AIRP was tasked via the job card AIRP 012.01.

Job-card AIRP.012.01

Title		Control of electromagnetic radiation risks posed by the carriage of battery-powered devices in baggage, cargo and mail that are active when inside the aircraft cargo compartment	Reference	ARP 012.01		
Source		Secretariat, DGP 25, ANC 2015				
Problem Statement		Many items carried in aircraft cargo compartments, including unit load devices, cargo, mail and passenger baggage now contain, or are fitted with battery-powered devices that are operational (active) throughout the transport chain, including when inside the aircraft during flight. These devices, when active, emit electromagnetic radiation that could have the potential to affect the aircraft systems thereby compromising flight safety.				
Specific Details (including impact statements)		Battery-powered devices are increasingly being used by consignors of air cargo for use in items such as tracking devices and temperature data loggers which are placed in the aircraft cargo and which remain active throughout the entire transport journey, including when inside the aircraft during flight. The use of some of these devices, such as temperature data loggers is a regulatory requirement for some commodities, such as pharmaceuticals, and therefore the shipper is obligated to have these devices in their air cargo to comply with applicable regulations. The air operators and/or equipment manufacturers are also using battery-powered devices that are attached to aircraft unit load devices (ULDs) or use ULDs that are fitted with battery-powered devices such as refrigeration/heating units. There is also a move to the use of so-called permanent baggage tags or other devices in passenger baggage fitted with batteries, which remain active when inside the aircraft. The concern with the specific devices and the accumulation of these devices in the cargo compartment are the electromagnetic radiation that may be emitted by the devices when active and the potential effect on aircraft systems. To address this potential risk, it is believed that the ARP should develop specific SARPs and/or guidance material.				
Expected Benefit		Safe transport aboard aircraft of cargo, mail and passenger baggage that contains active battery-powered devices				
Reference Documents		ICAO Cir. 340 AN/198, Guidelines for the Expanded Use of Portable Electronic Devices FAA Advisory Circular AC 91 21-1C, Use of Portable Electronic Devices Aboard Aircraft EASA AMC and GM to CAT.GEN.MPA.140, Portable Electronic Devices			Attachments	
Primary Expert Group		AIRP				
WPE No.	Document affected	Description of Amendment proposal or Action	Supporting Expert Group	Expected dates:		
	Action	Determine the need for Standards / Guidance to control the risk of transporting battery-powered devices in baggage, cargo and mail that are active when inside the aircraft cargo compartment.		Expert Group	Effective	Applicability
	Annex 6 and/or 8	Develop provisions if required to control the risk of transporting battery-powered devices in baggage, cargo and mail that are active when inside the aircraft cargo compartment	DGP FLTOPSP, SMP	Q4/2017	2019	2020
	Associated Manual/Doc/Circular	Develop guidance material if required to control the risk of transporting battery-powered devices in baggage, cargo and mail that are active when inside the aircraft cargo compartment	DGP FLTOPSP, SMP	Q4/2017	2019	
Initial Issue Date: xx Nov 2016			Date approved by ANC:		Session/Meeting:	



Job-Card AIRP012

Way forward:

- Agreed that the scope of the Job Card is limited to the risk of potential electromagnetic interference with the aircraft systems.
- Agreed that the risk of battery fire falls within the scope of the Dangerous Goods Panel (DGP).
- First action will be to assess whether the electromagnetic radiation emitted by these devices is significant enough to cause any hazards to the operation of the aircraft. However, more expertise is needed (Secretariat to facilitate access to such expertise).
- Agreed that this will cause a delay in the deliverables.
- Multidisciplinary approach : AIRP, FLTOPSP, SMP



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The DGP-WG/18 is invited to:

Take note of the Updates from the Airworthiness Panel Work Programme.

continue to collaborate with the AIRP as necessary.



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