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Study

Safety Recommendations of General Interest for Public Air Transport Overview 1995-2005

BEA

Bureau d'Enquêtes et d'Analyses
pour la sécurité de l'aviation civile

MINISTERE DE L'ECOLOGIE, DE L'ENERGIE, DU DEVELOPPEMENT DURABLE ET DE L'AMENAGEMENT DU TERRITOIRE

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Glossary

ADP	Paris Airports Authority
CVR	Cockpit Voice Recorder
DAST	French strategic and technical affairs directorate
DCS	French safety inspection directorate
DGAC	French civil aviation directorate
DNA	French air traffic management directorate
EASA	European Aviation Safety Agency
ECAC	European Civil Aviation Conference
FAA	Federal Aviation Administration (USA)
FDR	Flight Data Recorder
FLIRECP	Flight Recorder Panel (ICAO)
ICAO	International Civil Aviation Organisation
JAA	Joint Aviation Authorities
JAR	Joint Airworthiness Requirements
SAFA	Safety Assessment of Foreign Airlines
USOAP	Universal Safety Audit Oversight Programme

FOREWORD

Relations between investigation bodies and oversight authorities

The roles of the DAST and the DCS within the French civil aviation authority (DGAC) are, respectively, to prepare technical regulations and to check on application of the safety and security regulations. This involves ensuring that aircraft are correctly designed, manufactured, operated and maintained, that air operators are properly organized, that crews, controllers and mechanics are properly educated and trained, that aerodromes are safe to use and that air traffic control services meet the required safety standards.

In France, the BEA is the official organization responsible for technical investigations (as defined by ICAO) into civil aviation accidents and incidents. The sole objective of these investigations is to improve safety. To do this, it must identify the circumstances of the accident or incident, determine the causes thereof and where necessary make recommendations aimed at preventing similar accidents.

Though the investigative process is, and must remain, independent of the areas of regulation and oversight, the BEA and the DGAC work towards the common objective of civil aviation safety. Thus a good working relationship between the two organisations is essential, while in no way jeopardising the independence of the safety investigation.

Within the context of its mission, the BEA informs the DGAC, manufacturers and operators of the progress of its investigations. The formal procedure that allows it to point out safety problems that, according to the BEA, require corrective action, is based on safety recommendations.

Recommendations can be issued at any stage as the investigation progresses. They are generally included in the investigation report (in chapter 4 according to the international model). The DGAC has procedures in place to evaluate the recommendations and take the necessary action. During evaluation, it considers the means, the methods and the possible consequences associated with the implementation of the recommendations, in consultation where necessary with other regulatory authorities such as the EASA, the JAA or ICAO.

The EASA was established in September 2003, with a mandate that currently covers aspects of airworthiness related to the design and production of aircraft. Working relations comparable to those that exist with the DGAC are being established between the BEA and the European agency.

INTRODUCTION

This study deals with safety recommendations issued by the BEA between 1995 and 2005, with general interest in the context of public transport. These recommendations are not of a specific nature, that is to say they are not linked to a specific operator, a specific type of aircraft or one aerodrome. They also have a long term effect for aviation safety.

Note: the forty recommendations issued after the accident that occurred on 20 January 1992 at Mont Sainte-Odile preceded the time period covered by the study. It should be noted that those recommendations contributed significantly to a profound reorganisation of the French regulatory system for handling incidents. France established a system for systematic flight analysis through the order of 12 May 1997 (based on the JAR OPS 1), anticipating the more recent requirements by ICAO.

The study covers:

- an overview of how safety recommendations issued by the BEA are currently made and on the legal context;
- a classification of the main recommendations in tabular form, with an inventory of the answers supplied;
- analysis of the recommendations related to two recurrent themes:
  - readout of recorders for aviation safety
  - oversight of air safety by States.

The study concludes with recommendations to ICAO on two initiatives that would be desirable in order to improve international aviation safety.

1 - WHAT IS A SAFETY RECOMMENDATION?

It is important to draw lessons from accidents and incidents that may help to prevent future accidents. In addition to publishing reports aimed at heightening awareness among those involved in the aviation world, issuing appropriate safety recommendations[1], during and/or at the end of an investigation, makes it possible to propose actions than can, according to the investigative body, prevent future accidents with similar causes or reduce the gravity of their consequences. A safety recommendation is drawn up on the basis of the facts established by investigators.

During an investigation, safety problems that have not directly contributed to the accident's occurrence may also be identified. These related failings are of course mentioned in the report and can also be the subject of safety recommendations.

A safety recommendation describes the safety problem identified during an investigation and offers directions in which to work that are assessed to be useful for safety. For the BEA, they are therefore focused more on dealing with the problem identified than on the suggested solution. A recommendation leaves it to the recipient to determine the means to be employed to reach the safety objective. This is especially the case where studies and additional tests seem necessary to achieve the desired result.

To effectively limit the regulator's or operator's room for manoeuvre by indicating corrective actions that are too detailed would be the same as specifically directing the orientation of aeronautical activity. This is contrary to the mission of safety investigation bodies and with their future objectivity.

[1] International definition of a safety recommendation: a proposal of the accident investigation authority of the State conducting the investigation, based on information derived from the investigation, made with the intention of preventing accidents or incidents. (ICAO, Annex 13).

2 - LEGAL CONTEXT FOR SAFETY RECOMMENDATIONS

The principal relevant legislation is included in Book VII of the French Civil Aviation Code, based on Law n° 99-243 of 29 March 1999 relating to technical investigations into accidents and incidents in civil aviation and its implementing regulation n° 2001-1043 of 8 November 2001. Book VII confirms the safety objective and the independence of the safety investigation, known as a technical investigation, details and confirms the powers of investigators and completes the applicable provisions, in particular in terms of communication and publication of information.

Provisions of the Civil Aviation Code relating to safety recommendations

(Law n° 99-243 of 29 March 1999)

> **Article L 711-1**. **I**- The technical investigation undertaken as the result of a civil aviation accident or incident shall have, as its sole objective, the collection and analysis of useful information, the determination of the circumstances and the causes or probable causes of the accident or incident, and if necessary, the issuing of safety recommendations, with the intention of preventing future accidents and incidents and, where applicable, without prejudice to judicial inquiries.

> **Article L 731-2**. - During the technical investigation, the permanent organisation may issue safety recommendations if it believes that their implementation within a short period of time may prevent an accident or serious incident.

> **Article L 731-3**. - At the conclusion of the technical investigation, the permanent organisation shall make public a report in a form which is appropriate to the type and seriousness of the event. This report shall not name any individual. It documents only such information resulting from the investigation as is necessary to determine the circumstances and causes of the accident or incident and to understand the safety recommendations.

(Decree n° 2001-1043 of 8 November 2001)

> **Article R.731-2**. Those to whom safety recommendations are addressed, as mentioned in part I of article L 711-1, shall inform the BEA, within a time period of ninety days after reception, of the actions they intend to take and, where appropriate, of the time necessary for their completion.

These provisions are consistent with international (ICAO - Annex 13) and European (Directive 94/56/THIS) regulations.

Directive 94/56/CE specifies in article 10 that "A safety recommendation shall in no case create a presumption of blame or liability for an accident or incident.

This is why safety recommendations issued by the BEA are now usually preceded by the following foreword:

Note: In accordance with article 10 of Directive 94/56/CE setting out the fundamental principles governing investigations into accidents and incidents in civil aviation, a safety recommendation is intended neither to apportion blame nor to assess individual or collective responsibility in an accident or an incident. Article R.731-2 of the Civil Aviation code specifies that those to whom safety recommendations are addressed, as mentioned in part I of article L 711-1, shall inform the BEA, within a time period of ninety days after reception, of the actions they intend to take and, where appropriate, of the time necessary for their completion.

The fact that a recommendation is received favourably means that those who apply it recognize that it helps to further aviation safety. This does not, however, necessarily establish the causes of accident or incident or, even less, the responsibilities that may result.

Furthermore, an investigation into an accident may cover a much wider area than just the combination of events and factors that explain, or may explain, the accident. This type of investigation generates recommendations that are thus not necessarily linked to the factors that triggered the accident.

3 - OVERVIEW OF RECOMMENDATIONS ISSUED

Ninety safety recommendations concerning public transport with more generally applicable scope have been issued by the BEA over the last ten years (see accompanying table).

These recommendations represent only a part of the safety recommendations issued by the BEA. The overall total is seven hundred and three, corresponding to one hundred and eighty-four occurrences.

3.1 Recipients and safety themes

Over the years, BEA recommendations of general interest have been addressed to all those involved in the world of aviation at the French, European (EASA, JAA) and world level (ICAO, FAA).

In general, they concern the civil aviation authorities but can also be addressed directly to operators or manufacturers.

Numerous technical areas have been covered: design, training, operations, meteorology, etc. The safety work identified by the BEA is thus varied and extensive. These recommendations with generally applicable scope essentially endeavour to reinforce the aviation system overall rather than on a case by case basis.

Note: this illustrates the distinction between active failures and systemic failures. Active failures can be linked to errors in actions committed by front line actors. Technical investigations describe and analyse them. To do this, they also search for systemic failures (deeper causes) that may have contributed to their occurrence and which are generally found at the organisational level. This is why recommendations focus on structural problems.

Areas linked to aircraft (design, operations) are those most often addressed by BEA recommendations. It is also in this area that identification of incidents and information feedback are best organized. The tradition of systematic feedback is strong and is determined by a large number of regulations.

In the area of air traffic control, the structures ensuring safety and quality insurance are similar to those in place in the context of the design and operation of aircraft.

However, the BEA still encounters certain difficulties in establishing dialogue with airport authorities. This can be explained by the fact that internal feedback processes have only been established recently and are still developing. Feedback system structures usually provide the BEA's privileged interlocutors during formulation of safety recommendations.

The ongoing relationship with the DGAC helps to reinforce this tradition of dialogue based around the exploitation of safety recommendations.

3.2 Responses received

Three types of response are possible:

- a favourable response (accepted recommendation) indicates that the recommendation has been taken into account by the recipient. The latter undertakes to improve the safety system in accordance with the recommendation.

- a partially favourable response (partially accepted recommendation) indicates that the recipient accepts the principle of the recommendation but considers that the means to be employed are incompatible with the recommendation as formulated. For example, the recommendation may be provisionally put to one side when the recipient considers that additional studies or tests are necessary in order to make it more relevant.
- an unfavourable response (rejected recommendation) indicates that the recommendation has been explicitly rejected[2] or that the response does not correspond to the content of the recommendation. In this case, the BEA can supply further clarification. This can sometimes lead to a different response by the recipient and subsequent acceptance of the recommendation.

There are also cases where no response is given.

The DGAC systematically responds to the BEA's recommendations, even when it is not the direct recipient (see following table and the examples described in chapter 5).

In addition to allowing the BEA to complete the process initiated at the outset of the investigation, the responses are also useful for improving the relevance of the BEA's actions.

As an indication, over 75% of the recommendations identified in this study received a favourable response, even if the BEA would have liked this to be more ambitious.

When the recommendations relate to areas linked with aircraft airworthiness and/or where specific correspondence has been issued, the BEA generally receives a response. In other cases, the recommendations addressed to organisations outside of the DGAC frequently remain unanswered (see last column of the following table). This is likely because they are not explicitly mentioned in the letters that accompany reports or safety studies.

[2] A recommendation to which a response has been given that further studies are required is considered as rejected if these studies are not undertaken.

4 - SUMMARY TABLE

Recommendations of General Interest for Public Air Transport Safety (1995-2005)

Occurrence	Type of recommendation	Number	Recipient	Response	
Summary (several events)	Automated flight systems (human factors)	1	DGAC	Yes	-
	Authorities oversight of air transport (oversight)	1	DGAC	Yes	-
Paris CDG - F-GNIA	Areas sensitive to fire (design- certification)	1	DGAC	Yes	-
Study	Wake vortex	1	DGAC	Yes	-
Johannesburg/ Paris - F-GITF	In-flight turbulence and movement in the cabin	2	DGAC / JAA / operators	Yes	No
	First aid kits	1	JAA	Yes	No
	Confirmed failure of onboard equipment	1	DGAC	Yes	-
	Technical assistance (radar coverage)	2	States (France) / ICAO	Yes	Yes
	Dynamic tests on interior outfitting	1	FAA	-	Yes
	Meteorological message	1	ICAO	Yes	Yes
North Atlantic - F-GNEM	In-flight turbulence and movement in the cabin	2	DGAC / JAA / operators	Yes	No
	Annex 3 – International meteorological services	1	ICAO	-	Yes
Orly - F-GRMC	Working periods (fatigue)	1	DGAC	Yes	No
	Management of alarms in the cockpit	2	Airworthiness authorities	Yes	No
	Flight recorder readout	1	Aircraft manufacturers	Yes	No
	Controller's radar images	3	DNA / SCTA (DGAC)	Yes	-
	In-flight checks – significant changes (oversight)	1	DGAC	Yes	-
Pristina - F-OHFV	Management and test of cockpit alarms (GPWS)	2	Airworthiness authorities	Yes	No
	Increased oversight of operators / significant changes (oversight)	1	Airworthiness authorities	Yes	No
	Standards applicable to emergency locator beacons	1	ICAO	Yes	No

Pointe-à-Pitre - N607GC	Representation of obstacles on charts	2	ICAO / GGAC	Yes	No
Paris CDG F-GHED/G-SSWN	Simultaneous use of two parts of the same runway	2	DGAC / ADP	Yes	-
	Taxonomy	3	DGAC / ADP	Yes	-
	Sequential line-up procedure	1	DGAC / ADP	Yes	-
	English language	1	DNA (DGAC)	Yes	-
	ATC operations manual	1	DNA (DGAC)	Yes	-
	Controller training (TRM)	1	DGAC / DNA	Yes	-
Saint-Barthélemy - F-OGES	Presence of flight recorders	1	DGAC / JAA	Yes	No
	Strict monitoring of pilots' aviation activity	1	DGAC / operators	Yes	No
Gonesse F-BTSC	Airplane tyres	1	DGAC / airworthiness authorities	Yes	No
	Risk of fuel leak fire	1	DGAC / airworthiness authorities	Yes	No
	Prevention of FOD on aerodromes	2	ICAO / DGAC	Yes	Yes
	Recorders (video + cockpit exchanges)	2	ICAO	Yes	Yes
	Devices to visualize hidden parts	1	DGAC / airworthiness authorities	Yes	No
	Flight simulators (acceleration)	1	DGAC / airworthiness authorities	Yes	No
	Potentially dangerous materials	1	ICAO / airworthiness authorities	Yes	Yes
FIR Tahiti - VH-OJL /VH-OEB	South Pacific Datalink (VIVO-SIGMA)	1	DNA (DGAC)	Unknown	-
New-York - N14053	Pilot training (rudder)	3	DGAC / manufacturers / operators	Yes	No
Paris CDG - CN-RMN	Awareness of the use of implicit information	1	DGAC / operators	Yes	No
	Markings on taxiways (aerodrome)	1	DGAC / ADP	Yes	-
Paris/Lorient - F-GHQH	Pilot training (fuel systems)	2	DGAC / operators	Yes	No
Pic de Bure - F-GJGU	Notion of designated region (survival aspects)	1	DGAC	Yes	No

Taiwan - B77208	Pilot training (identification of icing conditions)	2	DGAC / manufacturer / operators	Yes	No
Cotonou - 3X-GDO	Awareness of aviation safety (oversight)	2	ICAO (Council)	Yes	Yes
	Scheduled and charter flights (oversight)	1	ICAO (Council)	Yes	Yes
	Operator notion (oversight)	1	ICAO (Council)	Yes	Yes
	Technical assistance	1	States (France)	Yes	No
	Weight and balance devices (design - certification)	2	Authorities (FAA, EASA)	-	No
Tahiti - N132AA	Approach strategy (meteorological conditions)	1	Operators	Yes	No
	Crew documentation	1	Operators	Yes	No
	Runway side lighting (aerodrome)	1	DGAC / aerodromes	Yes	No
Brest - F-GRJS	Use of radar (surveillance)	1	DGAC	Yes	-
	Training and practice / evacuation equipment	2	DGAC	Yes	-
	Training and approval of CRM instructors	1	DGAC / foreign authorities	Yes	No
	Piloting and navigation systems	1	EASA	Yes	No
Airprox F-GPMF/F-GHQA	Training on TCAS procedures	3	DGAC	Yes	-
	TCAS system (design - certification)	4	EASA	-	No
FDR Study	Operation of flight recorders	4	ICAO /EASA / DGAC	n/a	n/a

Note: The fact that there is a negative answer in the "Other Organisations" column indicates that the BEA did not receive a written response. This does not necessarily imply that the recommendations were not implemented.

5 - ANALYSIS OF TWO RECURRENT THEMES

In the table above, it appears that recommendations on flight recorders and on oversight of air transport have been formulated on various occasions by the BEA. These are two examples of the permanent ongoing work for aviation safety.

5.1 Installation and readout of protected recorders

Flight recorder readouts often bring to light various problems (operator not in possession of documents; incomplete, erroneous or out-of-date documents) during parameter readout. These problems sometimes significantly delay the work of analysis.

Obtaining complete and precise data in the shortest time following an accident is often critical for the technical investigation. The data from the flight data recorders can rapidly provide a direction for the investigation to identify the causes so that the appropriate measures can be taken to prevent a similar accident recurring.

Over the past few years, the BEA has therefore formulated, on several occasions, recommendations concerning the fitting and readout of protected recorders, as illustrated by the following three examples[3]

- Investigation into the serious incident on 23 November 1997 on approach to Orly (94) to the McDonnell Douglas MD83 registered F-GRMC operated by AOM Minerve S.A.

  During readout of the QAR data, which was identical to that on the FDR, it appeared that the "Glideslope" and "Terrain" parameters did not correspond to the parameters which were really recorded, that is to say to the "Glideslope" and "Warning" lights in the cockpit. In the absence of simulations, this might have distorted the meaning of part of the analysis of the incident.

  Consequently, the BEA recommends:

  - **that airplane manufacturers ensure that the denomination of parameters on flight recorder decoding grids corresponds to the parameters really recorded.**

  None of the recording systems available made it possible to know how the crew had affected, by its actions, the vertical mode of the airplane.

  Consequently, the BEA, on the basis of recommendation 4.3 of the Mont Sainte Odile report, recommends:

  - **that the recording of images from the cockpit instrument panel on protected recorders be required, the images being synchronized with those of other mandatory recordings.**

[3] The reports on these investigations and on those quoted in other parts of this study can be found on the BEA website: www.bea.aero.

The DGAC undertook to further the objective of these recommendations. The recommendations did not mention other recipients explicitly, which may explain the absence of response on their part.

- Investigation into the accident on the 25 July 2000 at Gonesse (95) to the Concorde registered F-BTSC operated by Air France.

> The technical investigation again showed the current difficulty in identifying and analysing certain crew actions, certain selector noises and visual alarms. On several occasions, the BEA or its fellow agencies abroad have recommended the installation of video recorders inside cockpits. This point was examined in September 1999 at the ICAO during the "Investigation and Prevention of Accidents" divisional meeting (AIG 99) and the meeting formulated recommendation 1.2/4 "Video recordings in the cockpit", requesting that proposals be sent to the flight recorder expert group (FLIREC).
>
> Consequently, the BEA recommends that:
>
> - **ICAO fixes a precise timetable for the FLIRECP group to establish proposals on the conditions for the installation of video recorders on board aircraft performing public transport flights.**

The BEA received a favourable response from ICAO. The FLIRECP group was scheduled to meet in April 2006.

- Investigation into the accident on 24 March 2001 at Saint-Barthélemy (971) to the DHC-6-300 registered F-OGES operated by Caraïbes Air Transport.

> The DHC-6 registered F-OGES that crashed on 24 March 2001 at Saint-Barthélemy was not equipped with a flight recorder, which significantly delayed the determination of the causes of the accident.
>
> It is regrettable that the absence of flight recorders on the aircraft made it impossible to make a rapid determination of the conditions of the last minutes of the flight. More than ten years after the publication of the decree of 5 November 1987, the exceptions allowed for older aircraft no longer appear to be justified.
>
> Consequently, the BEA recommends that:
>
> - **the DGAC and the JAA make mandatory the installation of at least one flight recorder on board public transport aircraft authorized to carry more than nine passengers and whose maximum certified take-off weight is less than or equal to 5,700 kg, whatever the date of certification may be.**

This recommendation, which is contained in the interim report, was then reformulated in the final report so that these provisions were extended to airplanes of the same type undertaking transport of cargo and proposed that extensions be studied to include helicopters operated for public transport. It was mentioned again in the ad-hoc BEA safety study (see following) on flight data recorders.

In response, the DGAC indicated that the JAA had proposed a new wording of the relevant paragraph in the JAR OPS 1 *"to extend the mandatory installation of a CVR for airplanes below 5.7 tonnes that can carry more than nine passengers, regardless of the date of issue of the Individual Certificate of Airworthiness or the type of propulsion system"*.

Safety study on FDR data frame documents

The most frequent problems in reading out recorders were identified, grouped together and analysed recently in an ad-hoc BEA safety study[4]. It contained recommendations addressed to the aviation community, including the following example.

[4] Readout of flight data recorders, technical and regulatory aspects: http://www.bea.aero/etudes/etudefdr/etudefdr.html

> The availability of data frame layout documents, which have to be obtained prior to any read-out, is one of the main problems facing FDR analysis. ICAO Annex 6, Part I, Attachment D stipulates that operators have to keep such documents up to date.
>
> The French regulation of 12 May 1997 requires that operators retain data frame layout documents. However, these documents are often missing or incomplete, and seldom filed with the regional services of the French Civil Aviation authorities.
>
> Consequently, the BEA recommends that:
>
> ❍ **ICAO ensure, through its audit procedures, that Contracting States ensure that their operators can rapidly provide comprehensive and up-to-date data frame layout documents.**

Protected recorders (images, FDR, CVR) are a recurrent theme for potential improvements in safety in the long term, which implies international recognition of this fact.

5.2 Oversight of Air Transport

Recommendation of 9 May 1995

Recent events that the BEA has had to investigate, as the State of Occurrence or the State of Manufacture, showed that the operating conditions of some airlines that did not guarantee an acceptable level of safety.

Some airlines serve French airports or over-fly French territory in accordance with the DGAC's recognition of the authorisation given by foreign authorities. Mutual recognition between the authorities of different countries depends on adherence to and correct application of the Annexes to the Chicago Convention, in particular Annex 6 (Operation of Aircraft) and Annex 8 (Airworthiness of Aircraft). It is however patently clear that some States are unable to meet the obligations that result from the aforementioned. In addition, there is no provision for mutual inspections by the various authorities on the application of these texts.

Consequently, the BEA recommends:

- **that the DGAC, on the basis of its experience as State of Manufacture, play a leading role in the international arena with the aim of reinforcing the effectiveness of oversight of air transport performed by the authorities of various States, within the context of current actions undertaken by ICAO and ECAC.**

This recommendation has contributed to establishing French strategy on this matter. It specifically allowed the DGAC to take a leading role in the launch of the ICAO Universal Safety Oversight Audit Programme (USOAP -1999)[5] and in the ECAC programme for inspection of airplanes on stopover (SAFA)[6]. Thus, for several years, France has been the coordinator of this European programme.

Note: The accident on 6 February 1996 at Puerto Plata (Dominican Republic) to the Boeing 757-200 registered TC-GEN was the shock that made it possible for the SAFA programme to be adopted by ECAC. This accident caused 189 fatalities, and occurred to an airplane belonging to the Turkish airline Birgenair that had been chartered by the Dominican airline Alas Nacionales to transport German tourists.

[5] In 1999, ICAO created the Universal Safety Oversight Audit Programme (USOAP) to help States assess the effectiveness of their safety oversight systems, as well as the implementation of ICAO Standards and Recommended Practices (SARP's), associated procedures, guidance material and safety-related practices. Summary reports of audited States were given to all other States for them to judge for themselves the level of safety of any Member State and to take the action they felt necessary. In 2005, USOAP was expanded using an overall systems approach that will help States develop stronger internal processes to respond to safety threats. (Source ICAO, extract from press release of 26 August 2005 reference PIO 10/05).

[6] The SAFA programme made it possible to constitute a common database based on inspections on foreign aircraft with anomalies (including those originating in another ECAC state). This enabled operators to be blacklisted where inspections found anomalies that endangered safety and also helped the authorities in decision-making on opening routes or for charters.

More recently, the SAFA programme was recognised by European Parliament and Council directive 2004/36/THIS, on 21 April 2004, relating to the safety of aircraft from third countries using Community airports.

Recommendations linked to increased oversight of operators in case of significant changes

Between 1995 and 2004, the BEA issued two recommendations aimed at reinforcing oversight of operators:

- Investigation into the serious incident on the 23 November 1997 on approach to Orly (94) to the McDonnell Douglas MD83 registered F-GRMC operated by AOM Minerve S.A. (French operator).

> Three in-flight inspections were carried out in 1997, with only one being on an MD83. This rate was clearly inadequate, particularly when taking into account the rapid increase in the airline's activity.
>
> Consequently, the BEA recommends:
>
> ❍ **that the DGAC significantly increase the number of in-flight inspections, particularly in case of a major increase in an airline's activity.**

This recommendation was put into effect.

- Investigation into the accident on 12 November 1999 north of Pristina (Kosovo) to the ATR 42-300 registered F-OHFV operated by SI FLY (Italian operator).

> One of the basic tenets of air transport safety is the oversight exercised by the civil aviation authorities over operators. In this context, the investigation showed the importance of reinforced oversight of start-up operators or, more generally, those undergoing significant change.
>
> Consequently, the BEA recommends that:
>
> ❍ **the civil aviation authorities exercise reinforced surveillance of companies with a recently acquired air transport certificate or where there is significant change in an operator's structure or activity.**

The BEA did not receive a response to this recommendation, except from the DGAC. This was perhaps because it was formulated in too general a manner, and thus did not seem to be addressed to any civil aviation authority in particular.

Recommendations published in the report on the accident on 25 December 2003 at Cotonou.

During take-off, the Boeing 727-223 registered 3X-GDO performing flight GIH 141, which was overloaded in an anarchic fashion, failed to achieve normal climb. It struck a building located on the extended runway centreline, crashed onto the beach and ended up in the ocean.

The investigation was delegated to the BEA by Benin. In the report, the following recommendations were issued.

The investigation showed that weakness in regulatory structures and in the means for oversight of safety in certain States made it impossible to guarantee an appropriate level of safety for passengers and people on the ground, including on other States' territory. These weaknesses are the result of several factors, including the priority often given to economic considerations and the belief that safety largely depends on the decisions taken in real time by the front line actors, in particular the Captain. This situation tends to call into question the international organization of air transport, based as it is on confidence and the recognition by each State of the approvals and certificates issued by other States. This leads to multiple checks and direct inspections, with all of the negative consequences that this has on the direct and indirect costs of air transport, and poses the risk of the appearance of a two-speed world safety system.

The BEA notes the initiatives taken by the ICAO on the occasion of the 35th session of the Assembly (September-October 2004), in particular the findings and proposals in WP 63[7]. The investigation shows the relevance and urgency of the measures proposed.

Consequently, the BEA recommends that:

- **the ICAO Council vigorously follow up the actions to be taken as a result of the resolutions that the Assembly adopts in the area of safety by affirming its role as the lead actor and conductor where safety is concerned and by endeavouring to ensure, where necessary, that States be made aware of their responsibilities in this area;**

- **the ICAO Council examine all of the provisions relating to safety oversight that are contained in the Chicago Convention and its various Annexes, so as to identify any updates required, in particular in relation to the role of the State of Operator and to the deletion of the distinctions made between scheduled flights and charter flights;**

- **the ICAO Council endeavour to clarify the notion of operator, given the various forms of aircraft leasing and agreements between carriers, in order to avoid the dispersal of responsibilities;**

- **the ICAO Council, noting the inevitable complexity in regulations and documentation relating to safety oversight, study the development of a guide, intended for those responsible at a national level for safety matters, that informs them in a structured manner of their responsibilities relating to safety and of the provisions for which they are responsible for ensuring compliance.**

[7] Working paper 63, extracts available in the appendix. This document, presented by the ICAO secretariat, dealt with weaknesses in oversight by some States and proposed a strategy to assist these States to meet their international obligations.

ICAO's response to these recommendations was received on 5 July 2005. It should be noted that ICAO used the BEA report during an international conference on aviation safety in June 2005 in Cologne (*The Europe-US International Aviation Safety Conference 7-9 June 2005)*[8]. Mention was made of the conclusions of the Cotonou report and abuses (use of flags of convenience) in some geographical areas.

In addition, the DGAC informed the BEA of actions taken by France within ICAO, and in particular within the Council:

"France, as a member of the ICAO Council, is ready to support in Council the above recommendations, in order that they be studied.

Following the last Assembly of the Organisation, France is acting vigorously for their effective application. The ICAO Council has just adopted a procedure for application of article 54j of the Chicago Convention, making it possible for States to make sufficient efforts to ensure compliance in relation to safety oversight.

Finally, following France's reminder during the last Assembly, a study was presented to the ICAO Council that had been undertaken by the ICAO air transport committee. This concerned the incidence of practices or commercial arrangements and the specifications that should be added to the standards and recommended practices in order to clarify situations that engaged the responsibility of several States. The Council decided to send information to all of the States giving some examples of situations and the applicable rules. In addition, the Air Traffic Commission will examine in depth the question of the application of article 83 of the Chicago Convention as well as that of relevant amendments to be made to Annex 6 to the Convention."

[8] Improving Aviation Safety – The need for a multilateral approach. http://www.easa.eu.int/conference2005/presentations/day2/Institutional_Changes/icao_presentation.pdf

CONCLUSIONS AND RECOMMENDATIONS

The procedures for following up recommendations established by the DGAC allow the BEA to obtain a systematic response to the recommendations that it addresses to the French administration. Moreover, the DGAC relays to its partners (EASA, FAA, JAA, and ICAO) the recommendations that are not directly addressed to it. These exchanges on the follow-up to recommendations contribute to reinforcing safety relations between the BEA and the DGAC.

The provisions of article R.731-2 of the order 2001-1043 of 8 November 2001 mean that the BEA receives responses to all recommendations directly addressed the DGAC within three months. Other countries, such as the United States, Australia and the United Kingdom have put in place similar mechanisms that systematically associate responses to recommendations on a national level. On the other hand, there can be no obligation to respond when the recommendation is addressed to a foreign country or an international institution.

So that recommendations from investigation bodies are better taken into account around the world, the BEA recommends that:

- **ICAO makes it mandatory, in the same way as for investigation reports, to respond to recommendations.**

Today, two tools for potential improvement of civil aviation safety appear to provide significant progress: safety audits (USOAP) and safety recommendations. The latter appear to be a significant additional source of progress for aviation safety.

It is regrettable that their consideration is generally limited to the State or States that are directly involved, which weakens their international scope, whereas they could generate some real safety workshops, with a general impact on safety. To do this, it seems necessary that these recommendations are centralised, consolidated and followed up in a universal manner.

Consequently, the BEA recommends that:

- **ICAO set up a structure dedicated to analysing and consolidating safety recommendations issued by the various investigation organisations with permanent impact on aviation safety, in order to identify and initiate actions to be taken at the international level.**

Further, in the light of this study, the BEA is reviewing, in consultation with its European counterparts, its procedures for formulating and following up its safety recommendations.

APPENDIX

Chapter 2.3.3 of Report 3x-o031225 (on the accident on 25 December 2003 at Cotonou Cadjehoun aerodrome (Benin) to the Boeing 727-223 registered 3X-GDO, operated by the Union des Transports Africains.

The preceding analysis shows that, beyond the fundamental role of the States for safety oversight of their operators, a re-definition of the role of other States appears to be desirable. Such a re-definition can only be conceived of within an international context, under the auspices of the ICAO. Reference was made to this in the report to the 35th session of the ICAO Assembly and in working paper 63. The entire investigation and the analysis of the facts carried out by the BEA show the relevance of WP 63 and the importance of the voluntary application of its recommendations by the international community.

The following extracts are illustrative:

…

The audits have also revealed organization-related problems, arising mainly from a lack of commitment by certain Governments to adequately support their civil aviation authorities. Where such problems exist, the consequences include incorrect and insufficient safety oversight, and subsequent safety deficiencies.

…

The Convention on International Civil Aviation and its Annexes provide the legal recognition and operational framework for Contracting States to build a civil aviation safety system based on mutual trust and recognition. For example, Article 33 of the Convention requires Contracting States to recognize as valid certificates of airworthiness and personnel licenses issued by another Contracting State, provided that the requirements under which such documents were issued are equal to or above the minimum Standards established under the Convention. This implies, prior to any recognition, that States be satisfied with other States' level of adherence to ICAO provisions and safety oversight provided. This can either be performed directly through bilateral contacts or by analyzing the ICAO safety oversight audit results for the States concerned. These results are available to all Contracting States in the form of audit summary reports. These reports provide information to identify those States having difficulties in maintaining their safety oversight capability and performance. Contracting States have a responsibility to assist in the global safety oversight effort by increasing vigilance and taking appropriate action.

…

However, it has become evident that additional safety-related information, e.g. ramp checks, non-ICAO audit programs, incident and accident reports would also be useful to States. On the basis of such information, as well as that provided through the ICAO audit reports, civil aviation authorities may identify safety deficiencies and take appropriate measures affecting specific foreign air operators, e.g. placing additional conditions on these operators when they access their airspace.

…

States are responsible for taking measures, including the imposition of additional conditions to ensure that safety deficiencies are addressed. Transparency is a key element to enable flight safety to be maintained worldwide. Information related to safety deficiencies and subsequent additional conditions imposed on operators should be made available to all Contracting States.

…

The Chicago Convention which, with its annexes, regulates international civil aviation is based on trust and mutual recognition between States. Each State must establish its own means for safety oversight. The ICAO, through its evaluations, checks their conformity with the rules dictated by the Chicago Convention. It therefore seems necessary, in order to avoid the development of non-law areas, that all violation of these rules, especially the absence of corrective actions, should be easily identifiable and available for the States. A resolution to this effect was adopted by the 35th session of the Assembly. This increased transparency should allow all States to better respect the basic rules on safety oversight.

To facilitate the application of the provisions that are desirable in terms of safety oversight, the following thoughts are offered up: a clear elucidation of the role of the State of the Operator at the highest level of international regulations, that is to say in the Convention itself, would be desirable so as to complete the steps taken when article 83 b was adopted. Equally, a clarification of the requirements for non-scheduled flights would be desirable. In fact, as has been seen, these two points are clear in practice but the existence of apparently contradictory provisions complicates a rapid understanding of what air transport safety implies. Finally, those who are at the top of political or administrative hierarchies may not, paradoxically, possess clear structured information about what is expected of their administration, though any initial impetus should naturally come from them. A written guide with this aim in mind should facilitate their task.

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