Ministerie van Verkeer en Waterstaat

Directoraat-Generaal Rijksluchtvaartdienst

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Enclosure(s)
3

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Your reference
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Subject
Reaction of the Minister of Transport to the recommendations of the Netherlands Aviation Safety Board in relation to the El-Al accident.

Dear Mr.

Herewith I send you a copy of the reaction of the Minister of Transport to the recommendations of the Netherlands Aviation Safety Board in relation to the El-Al accident. An informal translation of the main part of the report has been added.
Hopefully this will be the last official correspondence in relation to this accident.

With kind regards,

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Viewpoint of the Minister of Transport, Public Works and Water Management on the recommendations of the Netherlands Aviation Safety Board in its report on the El-Al accident.

General.

The recommendations of the Netherlands Aviation Safety Board are endorsed by the Minister of Transport, Public Works and Water Management. In the progress report of 24 June 1994 the most important conclusions on each of the recommendations have already been presented. As far as relevant the content of the progress report will be included in this final report.

Most activities with respect to the recommendations took place shortly after issue of the Board's report and were already activated a long time before. In the progress report of 24 June 1994 this was already mentioned.

An essential problem in handling the recommendations - which I fully endorse - is that almost all of these reach far beyond the competence of the Minister of Transport, Public Works and Water Management. Prescribing rules to foreign countries or globally imposing procedures upon world aviation is impossible. Principally by means of persuasion and by means of communication it will be attempted to persuade other parties to adopt the recommendations, what already has happened. In general, the response can be characterised as positive to very positive.

In this process the following activities have been developed.

After appearance of the Board's report on the El Al accident on 24 February 1994 on short term identical letters have been sent to KLM, Schiphol Airport, Netherlands' Air Traffic Control, the Dutch Airline Pilots Association, the Association of Air Traffic Controllers and the Coast Guard, requesting a reaction to the recommendations of the Board.
All organisations mentioned above have fulfilled this request. The answering letters contained useful suggestions and showed readiness to further cooperation to improve existing situations, where necessary.

In the beginning of May 1994 a visit was paid to the US Federal Aviation Authority (FAA), the National Transportation Safety Board (NTSB) and the Flight Safety Foundation (FSF) in Washington D.C. and to the Boeing factory in Seattle. Two extensive briefings were given on June, 10, 1994 to the International Civil Aviation Organisation (ICAO) and the International Air Traffic Association (IATA) in Montreal.

The most important letters and documents that arose from these activities are attached to this report as appendices. If relevant, the information in these appendices has been communicated also to other parties concerned.

As appears from the documents, by this approach a number of processes have

been activated that will be continued after the completion of this final report. Not only modifications on Boeing 747 aircraft will be considered but also the development of rule making in ICAO and worldwide promotion of newly acquired operational insight by Flight Safety Foundation and IATA.

Specific reactions.

In this subpart a reaction is given to each of the recommendations of the Board. For more detailed information reference is made to the appendices.

1. **Improve the design of the B 747 pylon, including the attachments of engine and wing. All Service Bulletins and Airworthiness Directives should be terminated with the coming of the new design.**

It can be said that almost without any restrictions Boeing complies with this recommendation. The design of the pylon has been changed so vigorously, that all so called Service Bulletins, that had any relation to safety, and Airworthiness Directives are withdrawn herewith. Not only the pylon is thoroughly improved, also the part of the wing where the pylon is attached has drastically been modified. This is a very extensive programme. It concerns circa one thousand 747-aircraft. The total amount is estimated at about two billion guilders and the aircraft must be grounded for several weeks to accomplish the modifications. The airline companies attempt to carry this out as much as possible in coincidence with the regular extensive maintenance. In itself there are no objections against this procedure. However, also on instigation of Boeing, it has been required that all ancient B 747's should be modified within three years. For more recent aircraft this modification procedure can be extended to seven years. Until the modification a tighter control regime is imposed. For further details see appendix 15.

2. **The improved pylon design should be subjected to a complete fatigue and "fail safe" test.**

Although Boeing initially resisted the execution of a complete fatigue and "fail safe" test, the manufacturer decided nevertheless recently in favour of it. A total of 72.000 flights will be simulated. After that one of the two most essential fuse pins will be removed, after which another 2400 flights will be simulated. Next a so called tear down inspection will take place to find out if somewhere hidden cracks may have originated. On first sight this seems to be a very satisfying programme. This is also the opinion of the United States Civil Aviation Authority, the FAA. It is expected that the tests will start in March 1995 and will be completed in October 1995.

3. **A large scale programme for in flight measurements of fatigue loads for wing as well as tail mounted engines should be executed to acquire a more realistic load spectre for evaluation of actual metallic fatigue.**

Boeing executes this recommendation by doing very extensive measurements

on its new aircraft, the B 777. It will take some time before the results of these measurements are available. Yet Boeing has indicated that if something unexpected on this subject might occur, these matters will be further analysed and will be considered whether this has consequences for existing aircraft. The Minister of Transport, Public Works and Water Management regards this to be an acceptable approach. It is expected that this programme can be completed in November 1995.

4. **The actual methods for testing the aircraft construction, such as non-destructive inspection techniques and the specific airworthiness requirements for the Boeing 747 pylon should be revised.**

It is expected that in the beginning of next year all so called fuse pins are replaced by highly improved versions of this pin.
The urgency of non-destructive inspections is then diminished. Meanwhile the instructions and procedures for these inspections have been improved considerably and both FAA and the Netherlands' Directorate General of Civil Aviation, the RLD, are convinced that the actual operation of these aircraft can be qualified as safe. This opinion is endorsed by the Minister of Transport, Public Works and Water Management.

5. **If an aircraft design concept has been used as a basis for Certification of another design, then any problem that might occur with one design should also be verified on safety merits with the other design.**

As is stipulated under recommendation 3 Boeing will develop very extensive extra activities on the B 777, to make sure that with this latest aircraft no problems will arise on this subject. The basic assumption under this recommendation is sustained by the US FAA as well as the European JAA (Joint Aviation Authorities) and will subsequently be completed further in occurring occasions. Meanwhile Boeing has some experience with the so called Airplane Safety Awareness Process (ASAP) that has been established to shape the ideas exposed in the recommendations. Of the designs identified a potential risk of 20 % appeared to occur on other aircraft types.
The so called Service Related Problem (SRP) process has been established to eliminate each of these potential risks.

6. **Evaluate and, if necessary, improve flight crew training and capability on factors related to the control of the airplane when flown in asymmetric conditions, e.g with one or more engines inoperative: together with:**
- **advantages and drawbacks of turn direction;**
- **limitation of bank;**
- **use of thrust to preserve controllability.**

This recommendation is sustained by the airline pilots and Netherlands' Air Traffic Control. The Ministry of Transport, Public Works and Water Management still has discussions with the Flight Safety Foundation in Washington D.C. about announcing worldwide through this organisation the lessons that can be drawn

from this accident. The Flight Safety Foundation presents itself in a very positive manner and is eager to pay attention to these affairs in publications and on symposia. For further details see appendix 14.

7. **Evaluate and, if necessary, improve training and capability of flight for crews in "cockpit resource management" to prepare them to plural loss of systems, conflicting check list procedures and other incidents that go beyond unusual situations.**

A considerable amount of "cockpit resource management" is already included in the training programmes of Dutch airline companies. Also in other countries view increases that this is a matter of importance. So this recommendation meets much approval. See appendix 14.

8. **Enlarge the information on emergencies during flight in the applicable instructions with advice to make pilots and air traffic controllers aware of the necessity to exchange information during emergencies. Emphasise the use of standard phraseology.**

Also this recommendation is sustained by pilots and air traffic controllers with all their heart. On both sides one is prepared to consider this further and to give it further implementation. Worth mentioning is the initiative by which Dutch air line pilots and air traffic controllers discussed these matters in articles and work shops. At the end of 1993 a course has been initiated to improve communication between pilots and air traffic controllers in comparable situations. Pilots as well as controllers participate in this course. The Netherlands' Air Traffic Control organisation will repeat these courses periodically. For more details see appendix 2 and 10.

9. **Study and if necessary develop general instructions for emergency procedures and phraseology to be used between air traffic control service, fire brigade, airport authorities and other authorities such as coast guard.**

Based on the Rand action programme, the Netherlands' Air Traffic Control meanwhile takes part in the alarm organisation of the airport. Development of instructions on emergency procedures and phraseology takes place within this organisation.

10. **Extend the education of pilots and air traffic controllers with the wisdom that in handling emergency situations not only the safety of aircraft and passengers must be taken into account but also the risk of third parties, especially residential areas.**

Both from pilots and air traffic controllers this recommendation gave rise to many comments. The final decision has not been taken yet. Expressed was the consideration of risks that has to be made. Especially in case of an aircraft carrying hundreds of passengers. It will not be simple to take up an universal valuable position. Therefore the circumstances in the different cases are too

diverse. Yet it will be attempted to come to a better balance between criteria for cases that are comparable to this accident by discussions with all involved. As this is not a typical Dutch problem the Ministry of Transport, Public Works and Water Management has put considerable effort in getting this subject on the international agenda. ICAO, IATA, Flight Safety Foundation and IFALPA try each with their own possibilities to think this subject through and where possible to shape it.
An important contribution in this are the "Guidelines for situations which are beyond the scope of the non-normal procedures" set by Boeing on handling an aircraft no longer considered airworthy. Taken into account Boeing's position it may be expected that these guidelines will play an important role in the international aeronautical community.
The intensive dialogue between pilots and air traffic controllers about handling an aircraft in distress is a very good matter that also can tribute to a further optimalisation of the prescribed procedures and especially makes is possible to carry out the ever necessary improvisations with the greatest possible professionalism.

11. Review design approaches of fire warning systems to prevent false alarms in case of break away of engines.

However, the demand to come to better design in this matter is not questioned, nobody knows how to realise this. Boeing correctly indicates that actions to be taken in case of engine fire or engine loss do not differ substantially. For the time being first priority is to prevent break away of engines.
For details see appendix 9.

12. Review the design of aircraft control with the purpose to prevent control surfaces, which could diminish the way in which the loss of these control surfaces can be controlled.

This recommendation is not easy to implement. KLM pleads in favour of improving controllability in emergencies by providing mechanisms that keep control surfaces in their position with a so called "override", which permits use of the control surfaces in special situations. At this moment it is not foreseen how far this is technically feasible and might have also negative consequences on safety.
In appendix 9 Boeing has extensively analysed this. In flight tests as well as in analyses it has been demonstrated that the actual design guarantees sufficient controllability under the most varying circumstances.

13. Fire resistance of DFDR and CVR should be enlarged.

Several manufacturers work on cockpit voice recorders and flight data recorders that are remarkably better than the present equipment. These so called solid state recorders prove to be far better fire resistant and also more able to resist to extreme forces than present equipment. The most recent three B 747-440 aircraft of KLM are already equipped with these recorders. The same applies for

the new KLM B 767 aircraft.
ICAO has adopted the compulsory prescription of better recorders in its programme. See appendix 11.

14. Study the advantages of installation of camera's with which external parts of the aircraft can be looked over from the cockpit.

Tests El-Al planned to carry out with external camera's have been delayed. Boeing too is studying possible advantages of external camera's, especially during taxiing. The FAA considers it to be improbable that these external camera's ever will be prescribed, but is positive towards further investigations on the usefulness of these cameras. Except for the comparatively high costs, application of external camera's show a good deal of operational drawbacks. Especially diversion of attention from primary flight tasks is seen by experts as an essential problem. The subject will be paid more attention.