



# Report

Participant

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Hr.Fischer; Hr.J.F.v.d.Spek.

From	Number
Visit Washington/Seattle	94-039
Recorded by	Telephone
ir.H.N.Wolleswinkel	02503-63215
Date of meeting	Enclosure(s)
May 2 t/m 5, 1994	
Place of meeting	From/until
Washington/Seattle	--
Subject	
Recommendations El-Al accident.	

## 1. Introduction

In order to stimulate the attention for the recommendations issued by the Netherlands Aviation Safety Board in relation to the EL AL accident a visit was paid to the Flight Safety Foundation the NTSB and the FAA in Washington on May 2 and 3 and to Boeing and the FAA in Seattle on May 4 and 5. This report reflects the main results of those visits.

## 2. The Flight Safety Foundation

An in dept discussion was held with Jack Anders and Bob Vandel. Stuart Matthews unfortunately was unable to show-up. His trip from London had been delayed for one day.

The Flight Safety Foundation is very active on controlled flight into terrain activities. They have produced a video for commuter type operators. This free of charge video takes about 25 minutes and will be available within 3 weeks from now. The FSF is cooperating very closely with the Boeing Company. The FSF had adapted the material, provided by Boeing, for the small operators. The main message is: don't troubleshoot, react immediately if there is a ground-prox warning. Jack Anders had prepared a lengthy memorandum on the recommendations of the EL AL accident. This document for the time being has to be considered as confidential. The FSF is very eager to work on those recommendations.



Being a non-profit organisation and not subsidized, the FSF has to be paid for its activities. Basically the FSF can be useful in performing studies of operational problems and collecting and analyzing data from incidents and accidents that are relevant for the problems under consideration.

In the second place the FSF can play an important role in educating the aviation community about the results of safety investigations. This can be done in global conferences, workshops, booklets, leaflets etc. This can be of great value in handling the recommendations 4.6 up to including 4.10. The proposals made by the FSF have to be studied further and to be discussed with the Aircraft Manufacturing Industry and the Airline Industry before final decisions can be taken.

With regard to recommendations 4.14 external cameras, it was suggested to investigate whether or not these cameras can be used also for inspecting wing and tail for icing conditions.

### 3. NTSB

The El Al recommendations were discussed with Mr Berry Sweetler. He is Director of Recommendations at the NTSB.

Apart from the so-called green sheets that were issued during the early stage of the accident investigation, so far the NTSB has not taken any additional steps to adopt the Dutch recommendations. Unfortunately Bob Benzoni, who participated in the accident investigation, was not at the office. He will be asked which recommendations can be endorsed by the NTSB. His proposals will be submitted to the Safety Board, who has to decide on this. In case of a positive decision these recommendations will enter into the American system and will lead to letters to the FAA on which the FAA has to respond.

The NTSB has issued a report to the FAA about the survivability of Flight Data Recorders and Cockpit Voice Recorders. This extended study is available on request.

After a brief discussion of the SF-340 accident in Amsterdam, the NTSB mentioned that also in the United States safety of commuter operators, is considered to be a real problem. Those commuter aircraft usually are flown by rather unexperienced pilots while those aircraft in themselves are not so easy to operate. The accident rate is relatively high.

### 4. FAA

In a discussion with Tony Broderick and Tom Mc Sweeney, the recommendations 4.1 up to and including 4.5 were briefly reviewed. The FAA has not yet formally approved the Boeing modifications. It is still an open question how far the FAA will mandate all modifications. The FAA's opinion is that Boeing has gone further than the FAA would have asked for. The FAA is also not endorsing a full scale fatigue test on the redesigned 747 pylon but agreed that on future new aircraft a full scale fatigue test is necessary.



They mentioned that on the 777 an extensive survey of loads and stresses is carried out to get a better insight, both in the loading condition and the actual stresses in the structure. They stressed that pylons are considered mainly a Boeing problem and therefore the FAA asked Boeing to have a fundamental look at their pylon design. The FAA is fully confident that the existing structure is safe until being modified with the present system of inspections. With regard to outside cameras the FAA basically has a positive attitude but they wonder whether they will ever require it. A new element is that security people are opposing such devices. They are afraid that when an aircraft is being hijacked, standing on the ground, the hijackers might make use of those external cameras to watch what is going on outside the aircraft.

The opportunity was taken to have a discussion with Dick Arnold on the latest developments with regard to GPS and MLS. The FAA has requested another 40 million dollars for GPS research. He was quite optimistic that ultimately GPS will have CAT III capabilities. One of the major advantages of GPS is that in case of differential GPS, the ground station is very easy to install, compared with MLS and ILS devices. The satellite part of the system also does not seem to be a major problem. It is clear now that GPS equipment can be easily installed on satellites that are launched primarily for other purposes and this is relatively cheap.

The FAA is now experimenting with a combination of GPS and TCAS for en route navigation. If the aircraft know their position exactly and have other aircraft identified on TCAS they can fly very close to each other and make an optimum use the available airspace.

Notwithstanding the positive news about GPS, there are still fundamental question marks, and therefore the work on MLS has not been terminated definitely.

The final answer is not yet there. Dick Arnold was convinced that ILS will be with us far beyond 1998. He strongly believes that the ILS will be further protected and will continue to be operated until the next century. A combination of GPS and ILS for CAT III is a real option for the next decade.

##### 5. Visit to Boeing

As usual the visit was well prepared. Boeing provided hand outs on the structural program that is being carried out on the 747 pylon. This hand out is available on request. This report will strict it self to some of the highlights.

In essence, recommendation 4.1 will be carried out completely. Boeing is working closely together with the aging aircraft group, in which also the airlines are represented. New fuse pins are available for all 747 aircraft and the existing ones will be replaced early 1995. The production of modification kits is on schedule. The redesigned pylon will be introduced on the 747-400 in december 1994. All aircraft, manufactured before that date have to be modified within 7 years.



It is not unlikely that quite a few of the older 747's, will not be modified. The total cost of the modification together with other programs is so high that it is no longer worthwhile to spend that money.

Boeing has decided to carry out a full scale fatigue test on the modified pylon. This was new also for the FAA. They have set up a program for simulating 72,000 flights. After that they will simulate 2,400 flights without one of the main spar fuse pins. After that they will carry out a tear down inspection. This test will start at the end of 1994.

Boeing is planning a very substantial amount of extra testing on the 777 to make sure that on that aircraft the same problems as on the 747 will not show up. Boeing will make the results of those test available.

Boeing has prepared a chapter in the 747 Flight Crew Training Manual, under the heading "General information on guidelines for situations, which are beyond the scope of the non normal procedures". At first view this seems to be very useful information. This document is available on request.

Barry Eberhardt just returned from Israel. He was briefed that the El Al program on external cameras has been delayed. The program is however, still alive. Boeing is also looking into this subject for the 777.

It was understood that in one or two years solid state Flight Data Recorders and Cockpit Voice Recorders will be available. The present thinking is to combine these two recorders in one chip and have two recorders available in different places in the aircraft. These chips are really robust and can withstand much higher impact forces than the present recorders and they are also better fire resistant. At the Lauda accident with the 767, these chip recorders did prove to be of great value.

Boeing agreed to respond formally on the recommendations before the first of June 1994.

All in all it can be concluded that the progress made so far is quite satisfactory.

#### 6. A visit to FAA, Seattle

The statements made by Boeing the previous day were checked, with the FAA. They did agree with the information that has been provided by Boeing. The FAA has been asked to comment on the Boeing letter that will be send around the first of June. They are willing to do so. The FAA will witness the fatigue test on the modified pylon. Their philosophy is that this structure should meet the latest requirements which means that it has to be damage tolerant.

The FAA had a key interest in the SAAB 340 accident. They were very eager in being updated on the details and receiving the final report. They agreed that there is a potential safety problem for all turbo prop aircraft when one engine is running at idle power.



A warning or an educational program might seem appropriate. The FAA is very active in relation to bogus parts. They call it suspected unapproved parts. Two documents and a brochure were received on this subject. Those documents are available on request. The general feeling was that the FAA is gaining ground in its fight against those unapproved parts, but they underlined that the battle is not over. If there is any information from our side, they are very interested to get it as soon as possible.

Concluding remarks

As far as the technical aspects of the El Al accidents are concerned, the situation is satisfactory. The modification programs are well on their way and will be carried out as planned. The operational recommendations are more difficult to carry out. There are quite a large number of parties involved and further work is needed. Based on the information collected during this trip and the comments from the various parties in the Netherlands a more concrete program has to be developed. Hopefully this can be done before the visit to ICAO, which is planned on June 10.