

Gutentag Benjamin,

I again thought about your question...

Heeft de RLD ELAL voor het onderhoud bekritiseerd?

I think the answer is best as follows:

1) the RLD has no official role in the accident investigation. The investigation was led by the independent Dutch aviation safety board, called 'The Raad voor de Luchtvaart'

2) yes, there was some form of criticism on the maintenance, below I will explain.

Some airlines are very pro-active in their maintenance. I think that we can say that Lufthansa and KLM and many others are very pro-active and have a tendency to engineer every service bulleting from the Type certificate Holder (Boeing). They may perform more preventive maintenance than legally is necessary.

There are service bulletins that have a economical background (not mandatory from a legal perspective), or are optional (not legally mandatory) for the operator, some service bulletins are recommended (advised by the TC-Holder) and some service bulletins are MANDATORY (you have to comply because there is a safety issue)

Mandatory SB's by the Type Certificate Holder are also made mandatory by Airworthiness Directives of the primary certification authority (the FAA in this case) and everyone has to comply with a mandatory SB that is covered with an airworthiness directive. Other Nations respecting the conventions of the ICAO will normally adopt FAA Airworthiness directives in their system, so that everyone in the world complies with the necessary actions to ensure the global safety of the fleet.

Looking at the fuse pins of ELAL 1862 you can see that ELAL was not always so proactive in their maintenance as Lufthansa and KLM, but they performed all service bulletins that were legally mandatory (the minimum).

ELAL kept flying with old style fuse pins and kept inspecting them on a frequent basis as allowed by Boeing and the FAA instead of replacing them with the newer generation fuse pins...the second generation or even the third generation fuse pins that would have terminated the inspection regimes.

Airlines like KLM and Lufthansa would probably already have phased out the old style fuse pins for a better new version (they had already phased out depleted uranium balance weights for instance).

So, from a criticism point you could say that KLM and Lufthansa probably had a 'somewhat higher' standard of maintenance.....but ELAL complied with all legal requirements.

Of course....economics here, and the following questions are relevant:

1)...why did Boeing allow frequent inspection of old style fuse pins while there were many service issues reported of broken pins and fatigue...???

2) why did Boeing not mandate replacement of old style fuse pins sooner????

3) why did Boeing not earlier review the critical design of the 747 engine suspension systems in depth with so many incidents reported??

4) why did Boeing (and FAA) wait to conclude that an engine separation on a 4-engine aircraft could be catastrophic (see China Airlines dec 1991 that crashed and see Boeing 707 31 march 1992 in Istres)???

5) why was the design not sufficiently fatigue tested during the certification of the Boeing 747??? (economy?)

6) why did the FAA accept the certification evidence from the Boeing B707 in their B747 initial certification? (economy?)

So, yes.....there were a lot of things addressed that you could question: but the ELAL maintenance was very basic, legally correct, but less pro-active.

Hope it helps.

If you have questions: please do not hesitate to ask....!!!!!!

regards, Henk

Verzonden vanuit Outlook

I do have the full analysis of the maintenance of ELAL 1862 at home:

The aircraft and engine maintenance was OK. Engine 3 had 261 cycles since last overhaul and was relatively new on wing and was installed on 18-06-1992, so roughly 3.5 months... There was nothing in the maintenance files, nothing in the accident factual finding reports and nothing in the teardown inspection and nothing in the DFDR that revealed any indication an engine problem or premature engine failure (no EPR, N1, N2 or EGT issues). The stalls that were heard by people on the ground were a logical consequence of the engine separation: the intakes stalled and this caused the loud bangs (stalls).

According to the Master Minimum Equipment List and deferred deficiency lists there were no essential items that negatively influenced the airworthiness of the aircraft, but there was a long list (26 pages) of non-essential for airworthiness items that were

deferred for a long time and had to be addressed at the next shop visit or aircraft overhaul

There was a more critical item in relation to maintenance, discussed between the Dutch Investigation Board, Boeing and ELAL (including NTSB and FAA): Boeing was of the opinion that ELAL had missed a crack in an engine 3 fuse pin at the last ultrasonic inspection. ELAL argued that the crack growth rate would have been excessive....and that the crack would not have been detectable. Till the end of the investigation this controversy between ELAL and Boeing continued to exist. From metallurgic review counting the striations it was not possible to be 100% sure whether Boeing or ELAL was correct. The accident board concluded that: if a critical system was so vulnerable and so depending on a very frequent inspection method to ensure its airworthiness, it did not offer the required level of safety and was not designed sufficiently safe

Hope this helps, regards, Henk