SKREVET AF:
ARI VAALA men udelt anonymt! O.H.
50149387/42960043

Copenhagen Jan 4, 1992

Dear friend and collegue,

FEN NEBERG 31642040

Please accept this as a letter to you from me as private person, who quite accidentally is flying the same aircraft as you do in SCANAIR.

The reason for the following is a meeting I attended today at the Globetrotter Hotel. The meeting was initiated by a fellow captain on the SAS MD-80, namely Oluf Husted and called by Fleet Chief SAS MD80. I won't bother you with the remainder of the attendance list since it is unimportant for the contents of this letter.

Oluf had worked untiring, day and night for the last 7 days in order to convince our peers in SAS to change our Engine Anti-ice Procedure as they are now outlined in our AOM Flight Procedures, Ground operations.

You are right of course, Olufs work was done somewhat with a glance in the rear view mirror, although what follows does not necessarily have any bearing on the mishap of December 27, 1991 at Arlanda.

Oluf is today grounded, appearing as IL in the schedule.

OK, I hope that you are still with me : Oluf had called the morning before (very early) and asked: "How do you, my friend, use the engine anti-ice, especially with regard to engine run-up, to clear it for any ice build-up?"

Now, that's a very nasty question at 7 o'clock, when you have just left your bed of 37 degrees C. I muttered something about engine run ups at about 10 min intervals for 10-15 seconds and up to 70%. I did not get much further before I realized that I did not have a clear cut answer and swiftly and rudely I was interrupted by a: "Domaren säger att svaret är fel!"

What I definitely had got wrong was that you shall ALWAYS do it, irrespective of taxi time, if the conditions are below the ones mentioned in the AOM. For some consolation I was not the only one having worked under this misconception - it turned out at the meeting.

Oluf had checked these procedures for all other airlines using the same engine that he could find - and now comes the nasty part:

- Those other airlines (until further, Transwede and Sterling are investigated, the latter using the same engine in their Boeings) use a considerably higher temperature below which an engine run-up is made, either to static take-off power or to as high a power setting as practical (read: obtainable, without sliding off the asphalt.)

- The engines of these airlines are operated according to the Flight Crew Operating Manual issued by the McDonnel-Douglas Corporation. In other words: the severe icing definition of below plus 2 degrees C in our AOM is a definition worked out between SAS, McDonnel-Douglas and the engine manufacturer Pratt & Whitney and the change of procedures, for whatever reason only SAS knows, was initially requested by SAS.

- The others use either plus 6, 8 or 10 degrees dependent on the speci fic engine installation.

- This, dear collegue, means that "the others" ARE DOING AN ENGINE RUN UP, WHENEVER THEY HAVE HAD THE ENGINE ANTI-ICE SYSTEM SWITCHED TO ON and then to AS HIGH A POWER LEVEL AS PRACTICAL and that take-off is FORBIDDEN if you cannot do the run up.

As you have gathered, I hope, everything hinges on the definition of "severe icing" and on the understanding of the following: "the HIGHER the TEMPERATURE the MORE SEVERE the ICING right up to the temperature where water ceases to exists as ice in the engine"

Plese read that last paragraph again! It is actually meant to shock you a little unless, of course, you already had this theorem firmly imbedded in your mind.

ARNE HILSSON CHEF FOR ANAIR

I can qoute one meeting member, to the best of my recollection, who said (in my translation): " I have about thirty years of flying experience and I refuse to believe that my pilots can be convinced that you run a greater risk of icing one morning in the month of June at 5 degrees than you do a winter's morning at minus 2 degrees (at the same relative humidity,(my rem.))"

If the "thirty years" meant that he himself was also a non-believer I do not know - but since I only have about 23 years of flying experience in SAS, let me try you out:

Take a unit of air, say one cubic meter at a temperature of zero degrees C.

Put into that body of air as much water vapour it will hold until condensation occurs - then you measure the amount of water in grams held in the air. Now, heat the air say about 10 degrees and you will of course notice that the condensation disappears. In other words, the AIR CAN HOLD MORE WATER, now. An approximation is that the water held DOUBLES for every 10 degrees C (maintaining 100% RH).

Next, a quote from the McD-D Flight Crew Operating Manual used by "the others":

- "The higher the temperature, the higher the cloud water content and the more severe will be the icing conditions. At temperatures below minus 20 degrees C, icing conditions encountered should be less severe. However, heavy icing has on occasion been reported at temperatures as low as minus 60 degrees C."

This paragraph is valid ON GROUND as well as AIRBORNE and it is, as outlined above, a LAW of NATURE. Even then it was not accepted to be true by all the members of the meeting and what is more serious, it was not accepted by the people who write our regulations.

A SECOND LAW of NATURE is actually described in our own SCANAIR FOM, 3.3.2. page 1, paragraph 3.2, and it is the same law of nature that carries you and me aloft along with all our happy passengers:

- Engine icing:

- - - Engine inlet duct icing can occur without the formation of ice on the external aircraft surfaces. When jet aircraft fly at velocities below approximately 250KIAS and at high thrust setting as in a climb, the intake air is drawn into the engines rather than being rammed in. This suction reduces static pressure, causing incoming air to expand in the inlet. Under these conditions, air at an ambient temperature above freezing may be reduced to subfreezing temperatures as it enters the engine. Free moisture in the air may become supercooled and could cause engine icing while no external surface icing would be evident. The maximum temperature drop occurs at high RPM on the ground and decreases with decreasing engine RPM and increasing airspeed."

A quite correct explanation of what happens at the engine air intake!

Do you also belong to the group refuting the fact that warmer air causes more severe icing? Then consider this:

Take two sponges, one approximately double the size of the other. The small sponge illustrates a body of air at 0 degrees C, the larger one air at 6, 8 or 10 degrees (depending on your definition of an icing condition). Now you soak both sponges until just saturated.

Now, over your kitchen work table squeeze the water out of both sponges in two neat puddles, one puddle double the size of the other.

The Fleet Offices of both SAS and SCANAIR will have you and me believe that the water from the smaller puddle can give you severe icing when ingested and frozen inside the engine air intake, WHEREAS THE GREATER PUDDLE CAN NOT!

Now, do you believe in miracles? Because only miracles are not governed by laws of nature.

Further, if you do not believe in miracles do you then believe that a different set of laws apply to engines marked "TRANSWEDE" and "STERLING" as compared to those marked with a "SCANAIR/SAS"?

If you do not, do you then think that we should have the same procedures for revving up the engine in icing conditions?

If you do think that, you could consider doing the same as I am going to do, every time, starting with DK331 the 5th of January 1992, with a side glance to, in my case, the danish "Lov om Luftfart":

Anytime the meteorological conditions dictate the engine anti-ice system to be used, I will perform an engine run-up to as high a level as practical, preferably at least 70 percent N1 for 15seconds, before take-off - alternatively static run-up at the take-off position.

If for ANY reason this is not possible, I will not take off. Period.

And this is practically verbatim what is stated in the SCANAIR FOM 3.2.2 - BUT NOT IN OUR AOM! Unfortunately SCANAIR claimed to contemplate a change of writing in the direction of the AOM. This incongruency is the reason for this letter. THANKS!

Further, I am going to write an INFO remark, whenever engine anti-ice has been used during the approach and landing, stating also the time UTC when shutting down. This to preclude a subsequent start/take-off with ice build-up remaing in the engine interiors. You could then, starting out on the next leg, switch on the engine anti-ice system and do a run-up eventhough you do not have icing conditions your-self, allowing for the time elapsed since my INFO remark.

+ OR!

This may sound very, very fanatic a this time, but please consider the fact that we are often operating at 72.5 tonnes of weight in icing conditions with a "souped-up" engine that is sensitive to compressor stalls brought about by ice FOD. And those, as we know by now, are no childs play.

Finally I would like to state that this letter is based on factual information received at the said meeting and the assumptions made and described are made solely by me and have no other goal than that of a higher level of flight safety.

Yours truly, and a firm believer!