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Airport Bird Threat in North America from Large Flocking Birds (geese) (as Viewed by an Engine Manufacturer)-- Part 2

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surfaces at various locations such as the radome nose, wing leading edges and flaps.

- A birdstrike investigation and shop disassembly of the numbers 1 and 2 engines was conducted. It was concluded from ultra-violet light evidence and an analytical map of blade damage measurements that 4 geese were ingested into the No. 1 engine and 2 geese entered the No. 2 engine.

Based on thrust measurements during previous engine tests with fan blade bulge deflections of the type noted, it was determined by measured blockage factors that both engines had suffered significant loss of thrust.

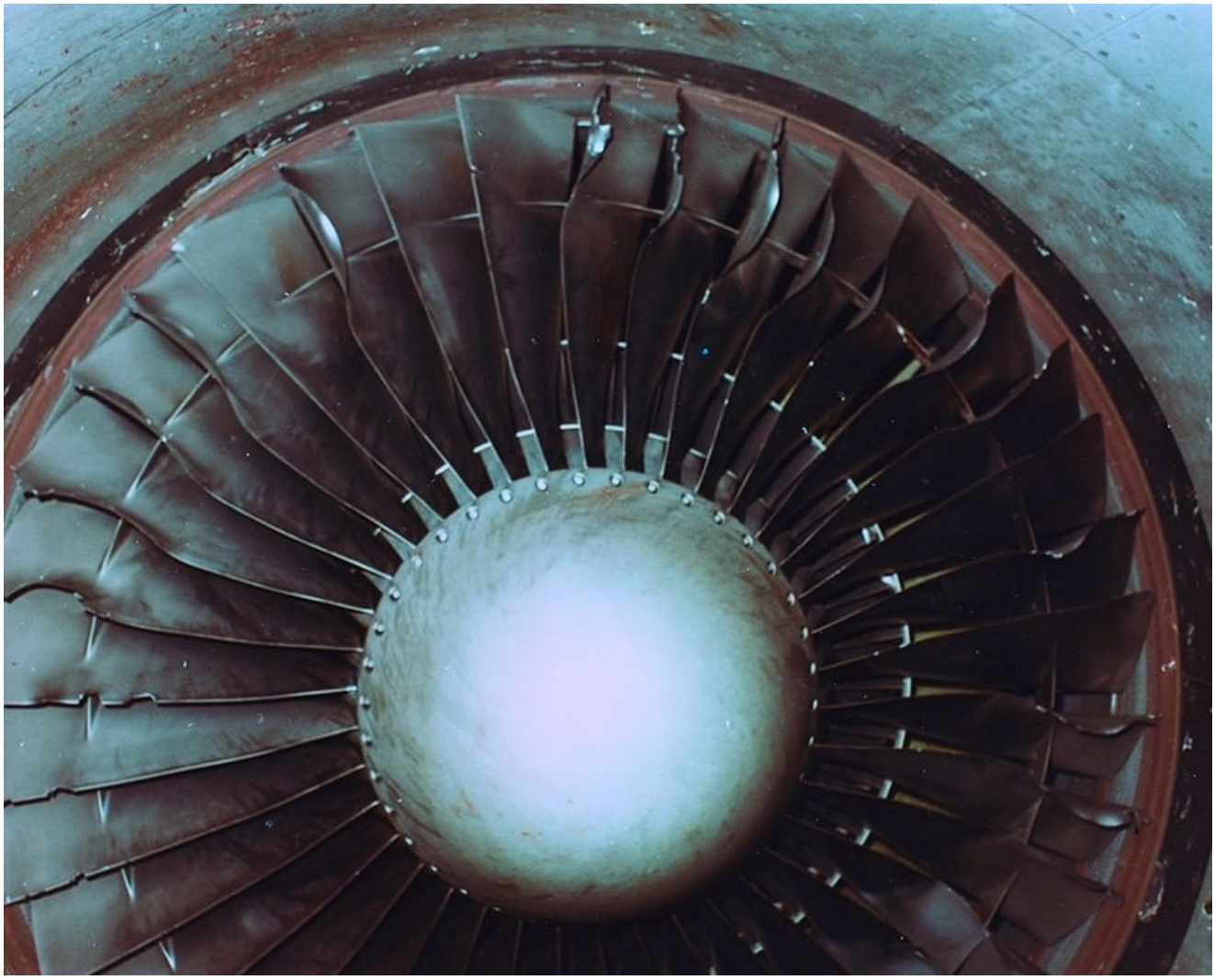

Figure 5 Results Of Multiple Geese Ingested Into A Turbofan Engine (Position 1, E4B Event)

BIRD INGESTION STATISTICS

Although the perceived threat from the growing geese population in North America has been increasing in recent years (and needs to be addressed), progress appears to have been made in reducing the damaging bird strikes through improved awareness and more effective airport bird hazard control programs worldwide.

The following statistics attempt to quantify this progress for selected geographic regions. Reasons for the improvements and lessons learned, if known, are mentioned.

Damaging Bird Ingestions

Experience has shown that virtually all bird ingestions that result in damage to an engine (thirty percent of all ingestions) are reported to manufacturers. There are many more bird ingestions with no damage and these are not reported consistently. Focusing on these “damaging” bird encounters provides a consistent method of establishing a “relative bird threat”.

Relative bird threat as used here is defined as the ratio of the “damaging” bird ingestion rate for a given region (or country) to the rate of “damaging” bird ingestions in North America between 1972 - 1980. This baseline time period was chosen because it represents the introductory years of wide body aircraft operations; also, awareness of the threat and major focus of airport bird hazard control programs were initiated about 1980 in many countries, such as India and Canada.

Relative bird threat as defined provides a consistent method to compare the bird threat at various locations and to show chronological trends. For this paper, bird ingestions during revenue service on the CF6 family of engines were studied for four time periods from 1972 through 1995 as shown in Figure 6 and 7.

Bird Threat Worldwide

Figure 6 shows the statistics for the relative bird threat and trends for selected geographic regions. The results show that consistent improvements have been made since 1980 in North America, the Pacific Rim States, Europe, Asia and the Nordic States, notably Sweden. However, little improvement has been noted in the African regions.

Progress in the Scandinavian countries since 1980, as shown in Figure 6, reflects the bird control initiatives by the airport managers at Copenhagen. There had been two prominent flocking-bird ingestion events involving gulls at Copenhagen in 1976 and 1983 which resulted in major fan engine damage. Since then, significant improvement has been observed there.

The reduced bird threat in Asia has been attributed primarily to efforts initiated in India. The benefits in India since 1980 reflect the dedication of the government and the excellent ongoing work being conducted by their field scientists to reduce the presence of kites, scavenger vultures, and white-backed vultures near airports.

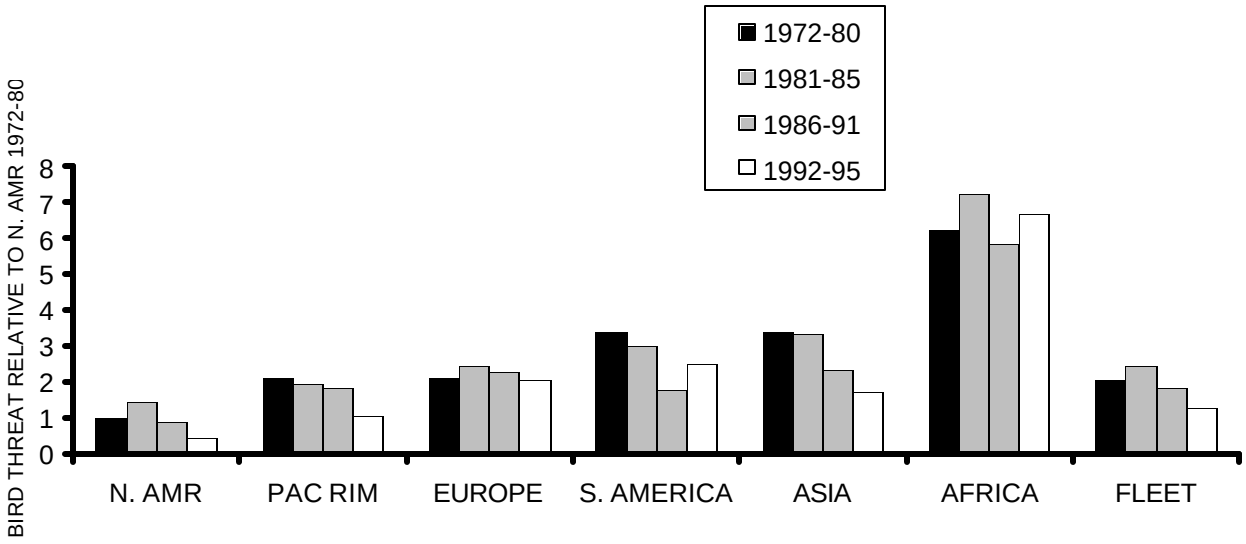

Figure 6 Worldwide Bird Threat and Trends by Geographic Region

Bird Threat in North America

Progress in North America, as shown by country in Figure 7, was attributed in part to efforts in Canada since 1980. This was a direct result of the dedication of Transport Canada, the airport managers in Canada, and airport bird patrol teams. The active bird-control patrols using their whistles and poppers and the use of trained predator birds at some locations have been effective. The high traffic at selected airports in the United States has a tendency to keep birds flushed from the active airport runways and may, along with active bird hazard control programs, be contributing factors to the relatively low damaging rates in North America.

The high traffic rates in North America result in large numbers of damaging birdstrikes each year. Hence, airport operators need to further improve their airport bird hazard controls to further mitigate the threat posed by birds - especially the growing flocks of geese.

Status

These statistics represent the damaging bird ingestions at those airports which accommodate wide-body transports powered by CF6 engines. An independent analysis of damaging bird ingestions to CFM56 engines on B737, A320 and A340 aircraft, which included many of the smaller regional airports, showed similar trends.

The results of these statistics of damaging birdstrikes show that where aggressive bird control efforts were undertaken, measurable reductions of damaging rates have been achieved. In other words, the methodology exists and damaging birds can be controlled when the commitment is made.