BIRD STRIKE COMMITTEE EUROPE

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OPERATIONAL METHODS FOR BIRDSTRIKE PREVENTION

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Summary

Following this summary, the paper contains some operational decisions pilots will make in case of high bird concentrations. The possibility to avoid collisions with birds by pure avoiding manoeuvres is virtually nil. A number of operational methods however will help to reduce the severity in case of a bird strike or even prevent it. The most effective prevention however lies in the biological management on airports.

Key Words: Hazard Management, Avoidance, Statistics, Civil Aviation, Control Methods, Noise

The vulnerability of aircraft to birdstrikes is different for combat-aircraft, helicopters and big transports. Different mission profiles, speeds and size of airplanes are factors. Due to these differences possible operational methods will vary to counteract massive birdstrike hazards.

It might be advisable to cancel low-level high-speed military activity in some areas at certain times. Transports however follow a completely different flight-profile. Specific operational strategies have to be developed. Following proposals would be exclusively for large transports to counteract birdstrike risks.

The flight profile of an airliner consists of a rapid climb after take-off to a comparatively high cruising altitude that should be maintained as long as possible followed by a long and shallow descent to the destination airport. For economic reasons jet powered airplanes climb to high cruising altitudes even on shorts flights. The airspeed at take-off and landing is around 150 knots depending on airplane type and gross weight. Climb- and descent- speeds vary between 250 knots and 380 knots. Cruising speeds usually are maintained between 76% and 86% of the speed of sound. Below 10,000 feet (3,000 metres) generally 250 knots indicated airspeed are maintained.

The operational profile of big transports clearly indicates the greatest risk of birdstrikes being during very short periods of operation provided most birds will be found below 3,000 feet (1,000 metres). Take-off and subsequent climb to 3,000 feet take between two and four minutes depending on take-off weight. Approach and landing out of 3,000 feet take some five minutes.

Statistics are represented in these figures: 91% of all birdstrikes are below 3,000 feet - 30% during take-off up to 500 feet, 12% during climb, 29% while approaching above 200 feet and 27% during landing manoeuvre below 200 feet and on the runway. Damage to airplanes is reported in 17% of all birdstrikes.

There is absolutely no possibility for a pilot to initiate manoeuvres that help to avoid collisions with birds during take-off and landing roll on the runway except take-off abort. For this reason birdstrike prevention on airports and in their direct vicinity is of major importance.

To enable pilots to make operational decisions in due time birdstrike warnings and birdstrike forecasts around airports are very important. According to the statistics the number of birdstrikes during take-off is approximately equally as high as during landing. However the damaging effect during take-off usually is greater. The reasons are higher speeds. Engines on high power are more vulnerable to any disturbance.

A take-off abort is one of the most critical manoeuvres in the operation of a jet transport. This applies especially to a heavy airplanes at high take-off speed. The system with a very high kinetic energy has to be brought to a complete stop within the boundaries of the remaining runway. Negative effects could be the loss of parts of the wheel brake system or reduced braking coefficients due to a runway contamination by standing water, rubber deposits, ice, snow or slush. Being aware of these problems any take-off attempt into a known flock of birds is prohibited. A take-off must be delayed until the animals have been scared away or have cleared the take-off and departure area and create no more danger.

From experience we know that a sudden change of runways especially in the winter time creates additional danger. Cleared runways usually are warmer than the snow covered surrounding land. If one of these runways has not been used for a longer period of time birds prefer to sit on them. If operation is resumed on one of these runways, the birdstrike risk for the first airplane to operate on it could be extremely high. The same applies to an airplane being the first to use a runway in the early morning hours or the one to operate on a remote airport that is rarely being used.

Birds sitting on a runway direct themselves into the wind. They are unable to see an approaching airplane from behind that takes off into the wind. They only can be warned by the increasing noise level of the airplane.

A great disadvantage in this particular aspect is the much lower noise level of modern airplanes. Birds could hear the old Boeing 707 some twenty seconds before impact while this value was decreased to only ten seconds with the B747. It is even lower with airplanes of the latest generation.

If a pilot receives a warning of bird concentrations in the departure area he might try to gain altitude as quickly as possible after lift-off. This could be achieved by a modified take-off and climb procedure which in turn could mean a higher noise level on the ground. Therefore, it only should be used for safety reasons.