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ABSTRACTS

(1) LIABILITY OF THE AIRPORT FOR THE BIRD STRIKE DAMAGE

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All around the world, there are a significant number of legal proceedings referring material and non-material damages caused by bird or other animal's strikes. Namely, international court sentences become a highly effective means of application of corresponding preventive methods in the segment of air traffic persons and property protection. Therefore, it is necessary to spread more and more the awareness of possible legal consequences that might emerge in case when, in course of definite proceedings, it is undoubtedly stated that bird and other animals strike safety measures failed to be applied, or that the control of these measures application failed to be conducted. It is also known that interested parties would rather settle an out of court agreement than start long-lasting and expensive legal proceedings. In the Republic of Croatia, the first sentence concerning this matter was pronounced in Pula County Court, on 18th April 2000. Croatia Insurance Co., as the Insurer, sued Pula Airport for damage that had occurred at Pula Airport, on 13th September 1996, as a result of the suction of gulls into the left engine of a Croatia Airlines aircraft B-737, registration 9A-CTB. The aircraft had been in a take-off phase, but it managed to stop on the runway without any consequential damages or human casualties. In this survey, we shall reconsider the domestic legal proceedings in which, after the incident, the damage compensation claim was directed to Pula Airport. Being the first and the only case of the kind, it represents a sort of precedent. In that, the Insurer claims the reimbursement of damage compensation that he paid to the air carrier was because a bird had flown into the aircraft engine on take-off.

(2) MULTI-ENGINE BIRD STRIKES TO TURBINE POWERED AIRCRAFT

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The aviation safety hazard posed by the possibility of multi-engine strikes to turbofan and turbojet powered air carrier aircraft has been the subject of much recent debate and study. An Aviation Rule Advisory Committee (ARAC) convened by the FAA studied the threat posed by large (weight > 1.15 kg.) flocking birds. Early in the process there were questions raised as to the validity of the database used by the ARAC group. The ARAC group recently released their recommendations for ingestion standards of large flocking birds. For engines with an inlet throat area <2.5 m^2 – no large bird ingestion test. For engines with an inlet throat area >2.5 <3.50 m^2 – one 1.85 kg bird. For engines with an inlet throat area >3.5 <3.9 m^2 – one 2.10 kg bird. For engines with an inlet throat area <3.9 m^2 – one 2.5 kg bird. Analysis of bird/turbofan and

turbojet engine strike data (*N* = 5,800; 1990 — 2003) from the FAA National Wildlife Strike Database found 293 instances of multi-engine bird strikes and 74 cases of multi-engine damage. There were 5 reports of all 4 engines on 4-engine aircraft being struck and 4 reports of all 3 engines on 3-engine aircraft being struck. There were 223 (17 corporate aircraft, 206 air carrier aircraft) reports of strikes involving both engines on 2-engine aircraft. Of these, 63 (12 corporate aircraft and 51 air carrier aircraft) strikes damaged both engines. These data indicate that the threat of multi-engine strikes and danger posed by flocking birds is more serious than the ARAC's recommendations would indicate. I recommend that the FAA reject the ARAC group's recommendations in favor of more stringent requirements.

(3) A DISCUSSION OF BIRD STRIKE DESIGN ISSUES FOR ENGINES WITH OBSCURED FANS

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In general, the design of rotating structures to withstand bird strike and the associated testing is a difficult process; not least because of the variable nature of bird internal structures and the random manner in which birds present themselves at the inlet to the engine. What increases the difficulty of this process is a case such as a single-engine military aircraft where the fan face may not be visible from the entry to the aircraft intake. In this case, the bird will have significant interaction with the internal structure of the intake during its passage from intake lip to fan. This paper explores the possible interactions that take place in such an installation prior to the bird reaching the fan and makes use of test and analytical evidence to make observations about the effect of such interactions on the bird structure. The implications of these interactions on the behaviour of the fan during the bird ingestion are then explored; again using test and analytical evidence.

(4) APPLYING SCIENCE TO RESOLVING LAND USE ISSUES: PREDICTING THE BIRDSTRIKE RISK FROM WETLANDS NEAR AIRPORTS

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The International Civil Aviation Organization's new standard for airport bird control requires that: The appropriate authority shall take action to eliminate or to prevent the establishment of garbage disposal dumps or any such other source attracting bird activity on, or in the vicinity of, an aerodrome unless an appropriate aeronautical study indicates that they are unlikely to create conditions conducive to a bird hazard problem. In the UK, there is a requirement for any new development within 8 miles of an airport to be evaluated in terms of flight safety and for the airport to be given the opportunity to object. Such objections often result in appeals, public inquiries and other legal proceedings. Both sides seek to show that the risk is either unacceptable (in the case of the airport) or negligible (in the case of the applicant). Both sides rely heavily on the opinion of expert witnesses, but there is little good scientific evidence to support the arguments of either side. Wetlands clearly constitute a bird attraction, but the numbers and species attracted, and hence the likely risk, are frequently disputed. This presentation reports on a study, funded by the UK minerals industry, designed to determine how to accurately predict the