

## AERODROME BIRDSTRIKE STATISTICS - HOW USEFUL CAN THEY BE?

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### ABSTRACT

Tim Milsom reported to BSCE at Helsinki in 1990 (Working Paper 30), on how birdstrike statistics can be used to monitor the hazard and evaluate the risk at an individual aerodrome. He reported on how the established total birdstrikes per 10,000 movements was a weak monitoring statistic, although widely used throughout the world, as it did not reveal any underlying trends which have now been shown to be significant. Since 1990, two further years of data have been added to the data base and a final report prepared which is soon to be published by Central Science Laboratory. *(It was hoped to have the book available for this meeting but we are experiencing major printing problems which we hope will shortly be resolved).* I will briefly summarise the major points here.

As I was preparing this report to BSCE, I realised that the second title I had proposed for my own Working Group; "Bird remains identification - who uses the results?" was directly related to the topic discussed here, so I have combined the two in this paper for the Statistics WG.

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## BIRDSTRIKE STATISTICS

There has always been a problem at the aerodrome level of how to translate birdstrike statistics and especially, of how knowledge of the annual number of birdstrikes per 10,000 movements will help to prevent the next birdstrike. At the ground level, bird control staff who are the usual source of reports have a natural tendency to think that the more birdstrikes they report the more management will be given the impression that they are not efficient at their job. Management have been known to think in this way if the rate increases in a particular year. However, it can also have a different view in these difficult economic times of "we have had so few birdstrikes this year and no damage, why do we need the bird control measures?" I do not think that either of these views can be resolved by the single use of a rate per 10,000 movements. In our report, Tim Milsom and I have shown that sufficient information can be gained from an individual birdstrike to make the accurate reporting and collation of aerodrome birdstrikes a dynamic management tool at the aerodrome level and, because bird control effort can be equated to strike risk, a national measure for the regulatory authority of risk and management at individual aerodromes.

Too much effort appears to have been placed on total numbers of birdstrikes in the past and, whether a single Swallow *Hirundo rustica* (19g) is involved or a flock of Brown Pelicans *Pelecanus occidentalis* (3500g), a birdstrike is a birdstrike! Obviously I have taken ridiculous extremes in the above example but not all birds present the same risk of damage. It emphasises the philosophy that we have been developing that it is not the number of aerodrome birdstrikes which is the crucial factor but what species are hit, how many birds are involved and could any action have been effective in removing them from the aerodrome.

What species are hit involves identification of bird remains which, for aerodrome strikes, range from whole birds to a few feathers. The former should be easily identified by bird control staff and the latter will be the subject of the second part of this paper. However, it is necessary for the species to be identified wherever possible and, recorded on the reporting form. Importantly, for bird control staff, some species are controllable by current scaring and habitat modification methods while others are not. A high proportion of the latter in the total birdstrike sample would indicate that the major problem species, for which the control measures have been developed, are being controlled.

The number of birds struck or, seen prior to impact, also is a measure of bird control effectiveness, especially if the species are controllable. If a strike involved a flock of Lapwings *Vanellus vanellus* for example, this would indicate a shortcoming in control even if only temporary, whereas, the same size flock of Linnets *Acanthis cannabina* would not.

Perhaps the most important factor is whether any action would have been successful in removing the birds from the aerodrome. If managements only use total birdstrike number or rate per 10,000 movements as their monitoring measure they will not be aware of any breakdowns in scaring effort or, improvements for that matter. The important birdstrike species for the UK have been classed as the *priority group* in the report and these respond well to bird control measures that are available to aerodromes. They are also in the size range that is more likely to cause damage in a birdstrike. It follows, therefore, that the first aim of bird control is to remove these species from aerodromes. Any birdstrike with flocks of these species indicates immediately that the control measures should be reviewed.

From the few paragraphs above it is apparent that the birdstrike data Member States have been collecting for many years is a greater pool of information which should be examined. If the data is analysed well and shown to be of much greater potential than was first thought as we have done in our analysis, there will be greater co-operation from bird control staff, air crew may not complain so often at having to fill in yet another form for the numbers game, therefore, any reporting biases will reduce. Also, management will be able to monitor their efforts day to day rather than have to wait for and base decisions on information produced annually in arrears.

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## BIRD REMAINS IDENTIFICATION

Correct identification of species is necessary on aerodromes as part of the birdstrike monitoring process as discussed above. However, this information is also required by other agencies including; biologists, who need to know what problem species need to be studied and, engineers and designers, require an accurate weight to calculate impact forces etc. which can only be given if the species is identified.

The identification of birdstrike remains should be undertaken at every aerodrome and in many countries, specialist units are available to assist whenever the remains are too difficult for the layman. These units are often the only means to identification of the small amounts of bird material left on an aircraft following a high speed *en route* birdstrike. Often it is from the latter, especially in military aviation, that the greatest damage costs are accrued.

Most workers in these specialist units use the light microscope as either the sole or initial means of identification using techniques and keys which are founded on work from the beginning of this century.

Increasingly, the scanning electron microscope (SEM) has been used, for example by Roxie Laybourne in the USA and Tim Brom in the Netherlands. Various claims have been made over which of the techniques provides the greatest accuracy which I will not debate here. However, the operating costs using a SEM are very much greater than with a light microscope. More recently, biochemical techniques have been developed for example, protein electrophoresis as used by Henri Ouellet in Canada.

As current Vice-chairman of the Bird Remains Identification WG, I am becoming increasingly concerned, possibly only my own perception, that all the developments in this work are driven by the biologist rather than the aviator. For example, apart from electrophoresis, a few strands of white gull *Larus spp.* feather are only identified as gull and given a weight range in the UK of 275 - 1660g. To the engineer attempting to correlate the impact speed and damage, these figures are useless but, over the years support for research and development within this field has reduced. The question that is being asked is are the customers satisfied with the levels of identification they receive from the specialists because active research and development within this field is very limited. There is none in the UK where remains identification is a servicing function and, I suspect from previous BSCE meetings, that this is becoming the case elsewhere.

The sad loss of Tim Brom as Chairman has removed one active player in this field. I understand Karen Perremans has now completed her research on feather surface structures and I do not know what is happening in Australia since Peter Davison's unit was disestablished. The apparent lack of current research and development on bird remains identification reduces the merits of a separate WG from the statistics WG which is why I have combined by papers and I recommend that the Bird Remains Identification WG is closed.

The question I should like to put to the meeting, either now in the Statistics WG or the final Plenary, is what do the recipients want from bird remains identification? Is the level of service they now receive and the accuracy of identification sufficient? Are simulations etc, so good now that real data from actual strikes have reduced in importance? Have flight safety and engineering organisations accepted for example, that if a gull is struck and only identified as a gull, then a weight range is the best they are going to get?

Under current financial constraints new developments will have to be paid for by the aviation industry as a whole. Over the years as each country has become increasingly involved in birdstrike prevention, each has established an identification centre that has created its own reference collections and effectively duplicated the work of the others. Research in the 1990s is expensive and it would be illogical for states to duplicate again or compete with each other for further developments. If the identification service is of value to more than just the aerodrome staff, closer international collaboration should be encouraged by BSCE so that a common standard is reached.