TAKING HABITAT MANAGEMENT ONE STEP FURTHER

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Abstract

An integrated approach to bird strike prevention generally consists of habitat management, supplemented with active bird control. Habitat management is generally defined as the reduction of the numbers of problem species by removing the attracting conditions without creating new attraction for other species. Typically, habitat management is aimed at reducing (access to) food, water, rest and shelter in the runway environment.

To get full advantage of bird strike prevention by habitat management it should not be restricted to grass or water management but ideally also includes adaptations to hard infrastructure. Unfortunately this invariably means modification of already existing structures, often resulting in sub-optimum situations at unnecessary high costs. Sometimes it is even impossible to realise. In many cases better results at lower costs are possible when designers are aware of the possible bird attraction of the structures they design. This paper deals with cases where involvement of bird strike prevention specialists in an early stage of the procurement procedures could have, or indeed has, resulted in the incorporation of a “bird unfriendly design”. A plea is made to include the effects on birds in the specifications of infrastructure that is to be procured. Thereby forcing manufacturers to integrated designs when it comes to structures that have to be situated in the runway environment.

Key words: habitat management, infrastructure, worms, runway lights, antennae, procurement procedures

1. Introduction

Already in 1966 Vic Solman, in the Field Note nr. 39, titled “The ecological control of bird hazards to aircraft” underlined the importance of what later became known as habitat management. The Field Note mentions the fact that more than 50 airports had been studied in detail in order to learn about the bird species present and the reason why they were on the airport. In addition, studies were made to determine ways of making airports unattractive to these birds. The – what he called – simple matters like removal of garbage dumps and open water, the banning of agricultural leasing of grounds on the airport and dedicated grass management, all were mentioned already then. The combination of habitat management and bird dispersal activities, that was recommended in the sixties still is the basis of on-airfield bird strike prevention.

Typically, habitat management is aimed at reducing the availability of -or access to- food, water, rest and shelter in the runway environment. A rather under-exposed part of habitat management is the adaptation of hard infrastructure to prevent birds using it for perching and/or nesting. This generally is confined to retrofitting porcupine wire to Air Traffic Control and Meteo structures in the runway environment but could be taken one step further if bird strike prevention aspects are included in the specifications of these devices. In this paper a successful example will be treated in detail. Then some examples are given in which integration of bird strike prevention in an early stage of the procurement may have lead to a better design. The paper finalises with a discussion on the question why, after 50 years of bird strike prevention, manufacturers are still not producing bird-unfriendly antenna’s landing lights, visibility sensors, etceteras, a number of conclusions are formulated.

2. Taking the bird strike hazard in mind when renovating the runway

In 2001 large-scale runway renovation was planned for RNLAF Twenthe airbase. It proved possible to incorporate the opinion of the bird control unit in the eventual design. This meant that the runway was to be provided with a worm-proof drainage gutter and runway lights fitted in concrete verges. The result was so good that it is now regarded as the RNLAF standard. Runway renovations due at Volkel airbase and Leeuwarden airbase will be executed in the same way.

2.1 A worm-proof runway gutter

Following heavy rains, large numbers of worms or slugs sometimes move out of the soil adjacent to the runway looking for a dry place. Those moving on the tarmac of the runway form an easy prey for birds. Especially on more fertile soils enormous numbers of worms sometimes do attract large numbers of birds. Gulls are known to cause problems thanks to this phenomenon, as already mentioned by BIRD in 1965. LEWIS, in 1967 and 1970, mentions that under these wet conditions worms can be crawling on the tarmac in such high numbers that “they have to be swept off the pavement to avoid skidding of aircraft”. Opposed to the reactive approach in which the runway is swept when worms are abundant BLOKPOEL (1976) suggests three possible preventive approaches to this problem: 1) killing the worms by a lumbricide, 2) applying a worm repellent and 3) installing a worm-proof gutter along the runway. As to the use of lumbricides there is no satisfyable agent available that is generally accepted for large scale use on airfields (WINMILL, 1969; SMITH, 1976; TOMLIN & SPENCER, 1976; ALLAN & WATSON, 1990; ALLAN & CORDREY, 1992). The same applies to a worm repellent, leaving a worm-proof gutter as the best approach to this problem. HILD (1970) has made suggestions as how to construct such a gutter along the runway [*Figure 1*]. According to Blokpoel a laboratory test of such a gutter proved to be successful in preventing worms crossing it but it was judged unsuitable by SOLMAN (in Blokpoel, 1976) because of difficulty in keeping it clean and well draining.

In the RNLAF gutters of the type that Hild describes are used at some bases across intersections [*Figure 2]* and never posed these problems. At Twenthe airbase this type of gutter also was present in a derelict state along an old disused runway. These gutters originated from the early nineteenseventies and were installed in order to secure a

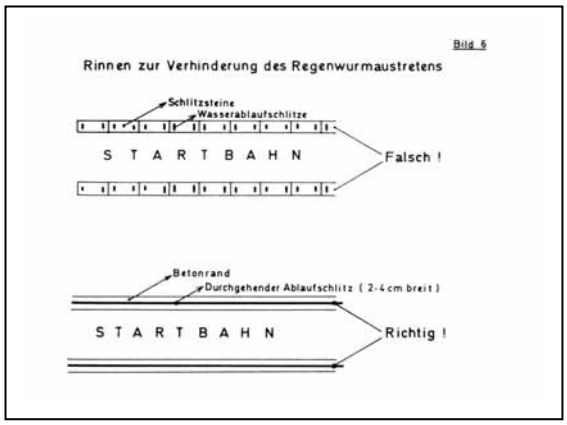

Figure 1. *Suggestion of slit type gutters (taken from Hild 1970)*

Figure 2. *Slit type gutter on intersection at Soesterberg airbase*

fast discharge of rainwater into the drainage system. When large-scale runway renovations were due on Twenthe airbase in 2001 the bird controllers, in a very early stage, drew the attention to these slit type gutters. As opposed to the regular runway, they never noticed any worm problems on this old disused runway.

Thanks to coincidental, informal contacts between Bird Controllers (BCU's), the Senior Air Traffic Controller (SATCO), the Support Operations Branch and the Infrastructure Office, the old concept of a slit gutter was included in the Program of Requirements (PoR) for the new runway and eventually constructed [*Figure 3*]. The result was a gutter that –at no extra cost- is an impregnable barrier for worms and slugs and very quickly discharges water while constructed in such a way that it can carry heavy vehicles (aircraft, fire brigade). The dimensions and construction are such that no clogging problems were experienced in the 18 months that it is in use now.

Figure 3. *Slit type gutters being installed at Twenthe airbase (Photo Harrie Linckens)*

2.2 A concrete runway verge

Grassland management in the runway environment in the RNLAF is aimed at reducing bio-productivity and thus reducing the availability of food for birds (DEKKER & VAN DER ZEE, 1996; *Dekker*, 2000). This aim is realised by taking away the mown grass immediately after mowing. Depending on the soil fertility this is done once or twice a year. Visibility demands are responsible for the much more intensive management of a one-meter wide strip adjacent to the runway tarmac in which the runway lights are situated. This strip has to be cut short four to eight times a year. This frequent mowing means that there is not enough material to rake and remove. Hence the mown grass is left, this means that the strip directly along the runway is not included in the extensive management regime to reduce bird numbers. Lawn mowing this strip resulted in an increased soil fertility as compared with the main area of grass, resulting in more worms (VAN DER ZEE, 1992). This not only means that there are potentially more birds foraging on the worms next to the runway. More worms also lead to more moles (IJSSELING & SCHEYGROND, 1962), which in turn attract Grey Herons and Buzzards. A costly way to overcome this problem is to use mowing equipment that vacuums away the cuttings, as indeed is used on some airbases. On those airbases with still high soil fertility this method has proven effective. A structurally better way is to avoid having verges that have to be mown. Thanks to the inclusion of bird strike specialists in the project team on Twenthe airbase this is realised by creating a concrete verge in which the runway lights are situated and permanently very well visible.

2.3 Permanent now flags acting as an anti-perching device

Worm proof slit gutters and runway lights in concrete verges were the results of deliberate actions in the planning phase of runway renovation. The snow flags that were installed on stainless steel rods with springs, in the concrete verges next to the runway lights proved to be an unexpected bonus for bird strike prevention. Kestrels and Buzzards that in the past frequently used runway lights to sit on, did not use the new lights. Not only because this was, depending on wind directions often physically impossible, also the unrest of the flapping flags acted very well as a bird scaring device. [*Figures 4 and 5*]

Figure 4. *Slit type gutters, runway lights in concrete runway verge and snow flags at Twenthe airbase*

Figure 5. *Runway light in concrete verge with snow flag acting as antiperching* ***device***

3. Other structures in the runway environment needing a bird proof design

When looked at in detail, the runway environment is scattered with obstacles that may be used by birds as a perching place. To name a few: antenna's for Instrument Landing Systems (ILS), 1000ft markers, PAPI, runway lights and landing lights. All of these structures do at one time or another act as perching place for birds like Carrion Crow, Jackdaw, Kestrel, Buzzard and Starling, to name a few. Also radar reflectors, visibility sensors and other meteo equipment, traffic signs etc. often are suitable perching places for birds. If the structures are recognised by the staff as potential bird attractants, modifications are realised that are aimed to make them unsuitable for birds to sit on. Porcupine wire, monofilament nylon lines and sticky substances are well known devices that are on the market. For a variety of reasons the application of these means is not always successful. Sticky substances are only effective for a limited time and have hygienic drawbacks. Monofilament nylon lines have to be attached in such a way that they will not be easily broken by windforce, also the mounting construction should not be able to support sitting birds [*Figure 6*]. Porcupine wire is a very effective way to prevent birds perching but it is not always possible to use. Apart from technical reasons (possibilities of attaching) also the metal spikes can be prohibitive when used on radio or radar equipment.

Figure 6. *1000ft marker with nylon line that broke despite spring attachment, replaced by steel line on which birds can (and do) sit. Eindhoven airbase*

Figure 7. *Landing lights on Soesterberg airbase used as perching place*

In conclusion it is clear that in almost all cases the equipment in the runway environment is potentially very suitable as a perching place for birds while mounting anti perching devices is often problematic and sometimes even impossible.

4. Discussion

In the process of purchasing equipment that is positioned in the runway environment full emphasis is put on the primary function of the equipment and its effect on the anti-obstacle policy. This has resulted in the present situation in which this equipment often has to be retrofitted with devices that prevent birds using it for perching. As so often with retrofitting, the result is not as satisfactory as integration in the design itself. The first problem is choosing the right anti-perching device in the given circumstances. Secondly, there is the problem of attaching the device in a way that does not violate the prime purpose of the equipment on which the device is to be fitted. Furthermore, warranty problems may arise when devices are retrofitted to high tech equipment. This may even lead to discussions on legal liability for the sometimes remote chance that the retrofitted items influence the functioning of the equipment it is fitted to.

If retrofitting anti-perching devices is such a “next best approach” one would expect that manufacturers would have included anti-perching functionality in the design of their equipment. Unfortunately this an exception rather than the rule. I can only guess about the reason for this but I suppose there are two factors that are responsible for it that are linked to each other in such a way that things are hard to change. On the one hand there are the airfield authorities that are still not fully aware of the effect of their choices on the presence of birds on the airfield. On the other hand there is the industry. They have not been confronted with customers that demand an anti-perching design of the equipment they try to sell. They also are not aware that this could be a good marketing argument and thus are not stimulated. So in all, there is a customer that is not aware that it should ask for a product and a manufacturer that is not aware that there is a potential market. This means that the key to the solution is in the hands of the bird strike specialists. Only if they are more alert and aggressive there might be progression. They should see to it that Programs of Requirement that are written for all devices in the runway environment contain a paragraph on anti-perching design. If manufacturers are frequently confronted with these demands they will recognise that there is a bonus for them in the market if they provide “state-of-the-art” equipment. There is a parallel with the inclusion of safety devices in cars: For decades this was not an issue. Then safety belts were introduced and later even became mandatory. Nowadays safety is recognised as a serious marketing argument by car manufacturers. Impact absorbing zones and air bags, once rare and up-market, are now getting more and more common. I sincerely hope that an anti-perching design of all the equipment in the runway environment will also become the common standard. It is us bird strike specialists that will have to make this happen.

5. Acknowledgements

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