

## 13th Meeting on Bird Hazards to Aircraft (BSCE-13)

Report from an ICAO workshop on reducing  
birdhazards.

L-O Turesson, Sweden

Abstract:

An ICAO Workshop on reducing bird hazards was held in the ICAO regional office of Bangkok 20-23 March 1978. Upon request from ICAO some BSCE members assisted in the workshop, presenting papers and moderating discussions. There were 32 participants from 14 states in the Far East & Pacific region and 5 participants from IATA. - The workshop was planned and organized by the Air Navigation Bureau of ICAO Headquarters and the local arrangements were carried out by the regional office in Bangkok.

Background:

The idea of holding a workshop in the Far East & Pacific region of ICAO concerning the bird problems of aviation came up already in 1973 at the Asia/Pacific Regional Air Navigation Meeting. It was found for various reasons, however, that the time was not yet ready for such an event and also some later plans have not been possible to realize. In connection with the last World Conference on Bird Hazards to aircraft, which was held in Paris, October 1977, the intention to hold a workshop was taken up again and soon after the Paris conference ICAO decided to do so. In the meantime the organization had also got in touch with BSCE asking for suitable persons to assist in a workshop. After the final decision to go on with this project ICAO sent a letter to the employers of the designated persons asking for assistance by making these experts available for participation in the workshop.

It was possible to do so for all members that BSCE had proposed for the task and the list of experts got the following appearance:

B Bruderer	Schweizerische Vogelwarte, Switzerland
V E Ferry	Direction Générale de l'Aviation Civile, France
W Keil	Deutscher Ausschuss zur Verhütung von Vogelschäden im Luftverkehr, West Germany
V E F Solman	Department of environment, Canada
J Thorpe	Civil Aviation Authority, UK
L-O Turesson	Board of Civil Aviation, Sweden.

ICAO had designated K K Wilde from its headquarters in Montreal as responsible for the organization of the workshop and C-O Nordlander of its Far East and Pacific region as responsible for the local arrangements in Bangkok.

#### Opening

The workshop was opened by the deputy representative of ICAO regional office in Bangkok, Mr P M Peralta. He mentioned the historical background of the workshop and expressed his pleasure for the fact that it had now finally become possible to realize this event. A good result of the workshop was assured, he meant, by the group of experts that had been possible to bring together!

Mr K K Wilde, chief of the AGA Section at the Air Navigation Bureau of ICAO headquarters sketched the main lines of the coming work, explaining the different items of the agenda. He also expressed his satisfaction with the fact that so many ICAO memberstates in the Far East & Pacific region were represented and that the total number of participants was as high as 32, 5 delegates from IATA not included.

In the evening of the opening day ICAO regional office gave a reception at the Sheraton hotel of Bangkok with Mr & Mrs Peralta as hosts. Besides the participants of the workshop there was also invited some people from the field of aviation in Thailand including several representatives for airlines with traffic to Bangkok. The reception was very much appreciated by both participants and lecturers at the workshop as a "bringing together" at an early stage and also making possible contacts with airline people.

### Participation

The following 13 ICAO memberstates from the Far East & Pacific region were represented at the workshop:

Australia  
Brunei  
France  
HongKong  
India  
Indonesia  
Japan  
Malaysia  
Pakistan  
Philippines  
Singapore  
Thailand  
USA

The most numerous delegations had Japan with 6 and Indonesia with 4 participants. Even if not belonging to this region Uganda had asked ICAO for permission to take part in the workshop and they were of course welcomed to do so. Uganda has shown an unusual interest in the bird problems of aviation during the last year both at the world conference in Paris and now in Bangkok. Their working papers at both occasions also show that there are difficult problems at the airport of Entebbe.

IATA indicated that they are highly interested in the matter by sending 5 delegates to the workshop. They represented the IATA office in Bangkok, Quantas Airways of Sydney, Australia and Lufthansa of Frankfurt, West Germany.

### Agenda

- Agenda Item 1: Overview of the problem
- 1.1: Strike rates/accident records
  - 1.2: Bird movements and population in SEA/PAC Regions
  - 1.3: Susceptibility of aircraft to bird strike damage
  - 1.4: ICAO position and activities
  - 1.5: Experience in Canada
- Agenda Item 2: Environmental management
- Agenda Item 3: Dispersal techniques and devices
- Agenda Item 4: Radar Observations
- Agenda Item 5: AIP and NOTAM communication procedures

- Agenda Item 6: Organization
- 6.1: At the aerodrome
- 6.2: At the national level
- 6.3: At the regional level
- 6.4: Bird strike reports
- Agenda Item 7: Regional Bird Strike Committee
- 7.1: Experience in Europe
- 7.2: Organization in regions

Way of working

Each of the 6 BSCE experts, was responsible for one of the agenda items 1 to 6. They had prepared one or more working papers for their resp items. If the time so had permitted the papers had been sent out in advance to the member states of this ICAO region. Also a IATA paper had been prepared in advance of the workshop. When this started many of the participants delivered further working papers so the total number of them went up to as high as 37.

Most of the papers were presented during the workshop under the agenda item they belonged to. For some of the papers, however, the time permitted only that a short information was given about them. - In order to cover as much as possible under each agenda item the workshop started as early as 8 o'clock every morning Tuesday through Thursday.

The BSCE-expert responsible for a specific item also had the task to moderate the discussions after each presentation and at the end of his item. Many of the participants were very active during the discussions so we really got to know a lot about their problems and we also had the possibility to tell them about our experiences in Europe.

Agenda item 1: Overview of the problem

J Thorpe, UK, was moderator for agenda item No 1 and started with the presentation of his paper, DP/9, "Bird strikes in South East Asia/Pacific region". The paper is an analysis of about 300 strikes in the region reported by civil aircraft of over 5700 kg. Noticeable is among other things that in 25% of the incidents damage is caused, which is about 5 times the rate in Europe. Also worth mentioning is the high proportion (64%) of strikes caused by birds of prey. The top rate has in many countries the black kite, which has a weight of 1 kg and mostly appears in flocks.

P M Davidson, Australia presented his paper: "Susceptibility of aircraft to bird strike damage". The document provided interesting details for 5 of the most serious occurrences in Australia during the period 1969-1976. All of these strikes happened to big passenger aircraft with gulls involved in two cases and large birds in the others. - Considering the total bird strike situation in Australia it was evident that large birds such as pelicans ibis, eagles and hawks tend to inflict the most damage. - At a later occasion of the workshop Davidson showed some slides with aircraft damage by birds.

It was also revealed (had not been known to BSCE before) that the Civil Aviation Authorities of Australia had introduced automatic data processing of bird strike data. The experience gained from this system can certainly be used for the planned BSCE automatic databank.

"Susceptibility of aircraft to bird strike damage" was the title also of a paper presented by V D Moorthi of Air India who is presently working for the IATA office in Bangkok. He showed in table-form those birdstrikes occurring to IATA airlines in the Far East & Pacific region during the period 1972-1977. The costs for the strikes was also given for all cases where it was known. Among data available in the latter table can be mentioned that during 1976 6 airlines suffered birdstrikes to a cost of \$2 millions.

The paper also discussed whether it is worth requiring stronger structures and engines to reduce the amount of damage caused by the significant bird strikes or not. It was stressed that an increase in strength of the critical areas of the aircraft (windshield, leading edges of wing and tail surfaces, engines, radomes) would probably reduce, although not eliminate, the total cost of bird strike damage but would also certainly lead to an increase in weight. As an example was mentioned an assumed strengthening of all aircraft belonging to the ICAO nations by material for each weighting 1000 lb which would lead to an increase in the purchase price of

about \$ 600 millions and in the operating costs of \$ 35 millions per year.

K Wilde of the ICAO headquarters presented a paper on the agenda item 1 with the title "ICAO positions and activities". He formulated there the activities of ICAO concerning the bird problems in a way that the "Organization must do what it can within its resources to:

- 1) reduce the risk of bird strikes occurring;
- 2) improve the airworthiness of aircraft to bird-strikes; and
- 3) make States more aware of this problem".

The paper in one section called "Reducing strikes" described what ICAO has done on the bird strike problem over the years. This review stated that one of the most important ICAO actions was the inclusion in 1969 of a Recommended Practice in Annex 14 saying that:

"The appropriate authority should take action, as necessary, to decrease the number of birds constituting a hazard to aircraft operations by adopting measures for discouraging their presence on or in the vicinity of an aerodrome".

The development of the Airport Services Manual, Part 3 "Bird Control and Reduction" was also mentioned. ICAO has prepared this manual with the help of Canadian authorities and it has recently been revised with the aid of Bird Strike Committee Europe.

Another section of this paper dealt with "Airworthiness aspects" and explains what ICAO has done since the early nineteen sixties for the "development of detailed airworthiness requirements to enable aircraft to withstand bird strikes". The work of the ICAO Airworthiness Committee about this problem was reviewed quite comprehensively ending up with the conclusion of this Committee in 1976 that "the 1,71 kg (4 lb) bird criteria used in national regulations of some countries was satisfactory and should form the basis of any ICAO specifications for the design of aeroplanes".

After this presentation there was some discussion. Wilde underlined here that ICAO is considering to give help with the system for automatic processing of bird strike data that is planned by BSCE.

Ferry asked if ICAO is considering any revision of its form for bird strike/incident reports.

Thorpe had the opinion that each memberstate had to decide itself about the form to be used if the recommendations of ICAO concerning the content were fulfilled. Wilde stressed that ICAO had not been asked to revise its form and does not have any actual plans to do so.

Other speakers had the opinion that the smallest possible number of form was an advantage for the international work. Turesson informed here that Sweden has reduced its number of forms from three or four to one.

V E F Solman of the Canadian Wildlife Service presented a paper about the Canadian experience of the work with the bird problems.

The history of bird strikes in aviation was scetched from the first strike in 1912 to the early sixties with the well known serious bird-strikes which occurred then in U S A. Also Canada had difficult problems and therefore formed their Committee on Bird Hazards to Aircraft.

The necessity of good knowledge of the bird situation in an airport was underlined. When the bird problems are defined and the knowledge of how to tackle them is available the work can start. - The paper contained all different points of the work and the most important ones were specially stressed in the presentation. The enormous problems in Canada with north/southerly bird routes and east/westerly air routes for human beings were also mentioned.

In a discussion after this presentations Omar bin Saman of Malaysia asked if it was really necessary to continue with bird strike statistics when it has been going on for several years.

Solman said that the birdsituation of an airport can be changed and that the art and effectiveness of the bird reducing work have then to be adapted to the new situation.

Thorpe referred to a recent article in Newsweek (10 February) about the bird strike risks for aviation.

The participant from Hongkong, D Melville, had compiled a very comprehensive paper with bird strike data from Kai Tak airport of Hongkong for the years 1974-1977. The statistics contained tables and diagrams showing both reported strikes and the number of dead birds found. It was evident that the latter number was much higher than the number of strikes in spite of the fact that in most strikes only one bird was involved and that sometimes birds of prey find the dead birds and pick them up before the airfield staff. However,

an unknown percentage of birds are killed by wake turbulence behind starting and landing aircraft.

In the discussion after the presentation of this paper it was announced that the Australian Department of Transport had published a book entitled: "Guide to the recognition and reduction of aerodrome bird hazards". Among other things this book reports of similar studies of the bird strike situation of airports as the HongKong document. A list for those interested to get one or more copies of the book was circulated and the book has been distributed during the month of April this year.

Major Wong Ah Ngam of the Malaysian Airforce presented a paper "Bird strike report" with the number of birdstrikes for the years 1970-1977 and summaries of the birdsituation in the different provinces of the country during the seasons of the year.

The lecturer highlighted the intense migration of birds along the East coast of Malaysia which is believed to cause difficulties for airports of this area. As a conclusion from his point of view about the content of the whole agenda item No 1 (the paper was the last one of this item) the lecturer submitted two proposals concerning the agenda of possible future workshops of this type:

1. The agenda should contain more about bird movements and less statistics
2. Methods for the improvements of the aircraft structure and strength to withstand strikes must be stressed very much.

The board of the workshop expressed its gratitude for contributions of this type and also pointed out that experiences and thoughts about this workshop was intended to be discussed at the end of the session.



Agenda item 2: Environmental management

V E F Solman, Canada, was moderator for agenda item No 2 and presented a paper, DP/4, with the title: "Environmental management of airfields to reduce bird hazards".

The leading thread through this paper was the first sentences of the abstract: "The components of the environment may together offer great attractions to birds on airfields. Modifications of the components can reduce or increase the attraction". About the airfield problems it was generally said that " it may be necessary to carry out construction, to modify drainage structures, plant cover and even buildings to make the airfield environments less attractive to bird so they will leave the area and not constitute birds hazards"

A considerable part of this paper dealt with the airfield soil and the necessary vegetation cover. In Canada they have made comprehensive studies during many years with the aim to find an ideal plant not offering bird attractions, stabilizing the soil, preventing erosion during heavy rains and not being a fire hazard. Unfortunately they did not find any plant with all those useful characteristics so a mixture of grasses is still found to come closest to the optimal goal. The management of the airport with all its details affecting the birdsituation was also discussed: the availability of water including the drainage situation, the disposal of food wastes, the use of land in and near the airport, the architecture of the airport buildings etc.

At a discussion following the presentation of this paper E Edroma of Uganda asked for advise concerning their Entebbe airport with its difficult birdsituation being almost surrounded by lake Ukerewe (Victoria). Solman had the opinion that in this case birdpatrols might be necessary.

W Keil of West Germany presented his paper, Dp/23: "Birdstrike management on airports on the base of a biotop-expertice".

The paper also covered organizational problems of this type of workig on airport. In this respect the paper shortly explained the "Regulations for the prevention of collisions between birds and aircraft" that was issued by the German Federal Ministry of Transport in 1974. The background to these regulations was a very comprehensive researchprogramme that lasted for 10 years. This research programme was made up by studies in the airport and its vicinity of birds and other animals, vegetations, water-situation (rivers, ditches, lakes, gravels), garbagedumps tec.

As one of the main points of the regulations was stressed the demand for biotop expertice for initial studies of the environmental conditions of the airports and follow up programmes of them.

As a whole the regulations had about the same content as the Canadian recommendations but were perhaps more detailed.

The presentation of this paper was illustrated by a number of slides from the airports of Frankfurt, Köln-Bonn, Bremen and Hamburg. In a discussion after the presentation some specific problems concerning parts of the regulations were taken up and discussed.

The presentation by P M Davidson of a paper entitled: "Environment management" showed that Australia had some regulations too concerning environmental problems of airports but reduced to the exposure of waste foodstuffs. The regulations had been invoked to eliminate the attraction of birds to two garbage dumps near Sydney airport.

As an essence of environmental management the paper underlined the effectiveness of encouraging the birds to change their pattern of living so they do not come into conflicts with aircraft so often. In an attachment to the paper was delivered a draft with notes to be used at aerodrome inspections of air safety problems caused by birds. The notes were very detailed and must be looked upon as a good help for an inspection of these matters.

In a discussion after this presentation Davidson pointed out the black kite as the worst bird for air safety in Australia. Solman meant, however, that besides this fact the conditions seemed to be rather similar in Australia as in Canada.

V E Ferry, France, chairman of BSCE, presented the two French films on the subject of bird strike problems: "L'aille apostrophe (interceptible wings)" and "Les oiseaux et des anges (bird and angels)". The former one gives the elementary views on the bird strike problems in a very nice way showing the different flight phases (departure, on the route flight, landing) of both birds and human beings as well as possible methods to separate the movements in and near the airport of the two airspace users. The latter film shows information on more advanced studies of birds movements as seen by radar, resistibility of aircraft structures against foreign objects etc. As the first film stressed the dangers for aviation of garbage dumps in the vicinity of airports a discussion developed on this matter. Information was given concerning international and national recommendations dealing with distances from dumps to airports, etc. Turesson also mentioned decisions by Swedish authorities for environmental conditions that deposition of waste near airports (within 4 miles radius) is permitted only if arranged in such a sophisticated way that birds will not be attracted to the plants.

J J Gwahaba of Uganda presented a paper: "Causes for the presence of birds at Entebbe international airport, Uganda". The paper explained a recently performed study of the birds life on and around Entebbe airport. Many species of big birds live in this area that forms a peninsula out in lake Ukerewe. Black kites give most problems but there are also geese, ibises, ducks etc. The kites are here particularly dangerous because of their curious habit of resting on the runways doing nothing. The purpose of the study was to find measures to reduce the number of large birds on the ground and it's also believed that this will be possible by some drainage actions.

In the discussion after this presentation Davidson said that they had similar experiences with black kites also in Australia. The behavior of this birdspecie is causing unusually difficult problems which have not been able to solve so far. Edroma had a theory that the kites sometimes land on hot runways in order to warm up their feet after an earlier cooling at high level flights during soaring.

Agenda item 3: Dispersal techniques and devices

W Keil, West Germany, was moderator for agenda item 3 and also presented a paper: "Possibilities for ad-hoc dispersals of birds from an airport - a general way". The paper dealt shortly with a great number of scaring methods: different types of visual as well as acoustic means for bird dispersal, falconry, trapping, poisoning and hunting. The necessity of changing method from time to time or to combine two or more methods with each others was specially stressed. Local experimental work has to be done in order to find out which method or which combination of methods is the best one for the bird species of a specific area. Here was also pointed out the importance of a good knowledge about those bird species that are most dangerous for the airtraffic. In the discussion after this presentation A Moh-luddin of Pakistan explained the main birdproblems of airports in his country. Vultures and kites were mentioned as the species causing most strikes. A V Souza of Singapore wanted some complementary information about the German way of trapping crows and Keil explained this more in detail.

V E F Solman presented a paper entitled: "Bird dispersal techniques and devices" which among other things underlined the motivations for bird dispersal at an airport. "Dispersal must be done by knowledgeable, dedicated staff who understand the need for and the effective application of the methods selected" The work is often difficult and it's necessary to use scaring methods repeatedly to drive away the birds whenever they come back in order to keep bird strikes at an acceptable level.

The necessity in some airfields to use liveammunition and kill birds was discussed after this presentation. Solman here stressed that killing/shooting of birds should not be used until all other methods had been used. He also said that a hurted bird on the runway can cause confusion and that it had happened that a pilot refused to depart because a hurted bird had been surrounded by other birds. Fieldstaff had to take care of the hurted bird and there was a delay of 20 minutes at this occasion.

P M Davidson of Australia presented a paper with the title "Dispersal techniques and devices"

A large number of different bird dispersal techniques and devices had been evaluated at Australian aerodromes and of all these the most effective method was to have "a mobile patrol of aerodrome personnel in radio contact with the control tower and armed with bird-scaring cartridges and live ammunition".

In the paper was also included technical instructions for safe and effective use of firearms issued by the Australian Department of Transport. This was a very comprehensive document of 7 pages plus an appendix with "Safety precautions for the handling of firearms and ammunition".

Following this presentation it was quite natural with a discussion concerning the necessity to be careful with the use of guns and pistols for birdscaring. Accidents have happened, i.e. in Sweden a pistolbarrel exploded some years ago.

An inquiry was done around the table about the use of shellcrackers. It was found that they were used in most countries but some states, like Malaysia, preferred shotguns.

#### Agenda item 4: Radar observations

Moderator for agenda item 4 was B Bruderer of Switzerland who presented a paper with the title "Possible use of radar for the prevention of bird/aircraft collisions". He stated that the aim of the paper was to outline possibilities and limitations of radar application against bird strike of civil aircraft (which may differ from one region to the other) and to suggest research work, where limitations are unsufficiently known.

The author had studied the frequency in different countries of bird strikes beyond the confines of the airports and found values varying between 7 and 25% of all strikes. As the proportion of this type of strikes varied so much it was found valuable to define them for areas of interest and here quantitative radar observations and bird strike reports are the main tools to get the necessary information.

Dealing with the sources of risk the paper divided bird flights relevant for radar studies in two categories: local movements (at low levels, usually with a regular twice-a-day traffic) and migratory movements (with high variety of flight levels and flying times). Studies of birds migration with the aid of radar were explained rather detailed with data about the height of migration, intensity of migration, etc. Questions were here raised whether flights at high level of large birds are confined to certain times and/or routes, if they are so regular in space and time that maps can be drawn and/or forecasts are possible and finally if they are so clearly observable on radars that actual warnings are meaningful. It was the opinion of the lecturer that so-called migration maps are of limited value for civil aviation.

The limitations of new surveillance radar equipments were also highlighted in this paper. This type of radar incorporates digital or computer-aided data processing, which exclude unwanted targets, such as birds. Only raw radar displays can be used for bird studies.

Finally the paper underlined that in most countries only local movements are so regular that warnings can be issued and the air traffic service have use of them. In less frequented air space, however, adaptations of flightplans, flight levels or flight paths are possible (example: Canada).

In the discussion after this presentation Montgomery asked what a pilot can do in order to avoid bird-strikes, specially on approach.

Solman went through the few possible measures stressing reduce of speed as an important manoeuvre. Ferry related a case where a small, twin engined jet aircraft had a collision at a level of 3500 ft in clouds above Paris. It took 30 minutes to get control of the aircraft. Turesson mentioned the possibilities for civil aviation to manage in the same way with schoolflights as the militaries do with their aviation.

Agenda item 5: AIP and NOTAM communication procedures.

V E Ferry, France, was moderator for agenda item No 5 and presented a paper (in French) with the title: "Sommaire guide de discussion"

The paper emphasized that there are two important conditions which must be fulfilled in order to make it possible to prevent (or to reduce) birdstrikes:

- a knowledge as good as possible about the risk
- distribution as fast as possible of information about the risk.

For a quick distribution it's necessary with the development of a network of observation stations, safe means of communications, a code for the reduce of the length of messages and a basic documentation. The network of information was then described more in detail i.e. bird observations visually or by radar performed inside or outside an airport. There was also a division between studies of local or migratory movements.

The way of communication including the code now in use in western Europe was explained. A list of the different types of basic information to be published in the various documents of civil aviation i.e. maps of migration routes and bird concentration areas, ended the paper.

To the paper belonged also a French circular from the "Service de l'information aeronautique" about the prevention of risks for aviation dealing mainly with the content of BIRD WARNINGS and how they are communicated in France. Another appendix to the paper was a serie of French aerodrome maps with essential bird routes marked.

There was a short discussion after the presentation of this paper dealing mainly with the coding of messages and with the expected value of them.



Agenda item 6: Organization

L-O Turesson, Sweden, was moderator for agenda item No 6 and also presented papers for the different subitems: at the aerodrome, at the national level, at the regional level and bird strike reports. It had been decided before the opening of the workshop that agenda item 7 should be included in item No 6.

"Organization at the aerodrome" underlined that there is no other section of the work with the bird problems where so much can be done in order to avoid collisions between birds and aircraft as when it comes to the activities in the airport. The organization of this work is therefore of utmost importance.

It was recommended in this paper to have a working group for the total work with prevention of bird strikes in the airport. For the field work a special bird patrol can be set up in bigger airports with difficult birdproblems but in smaller airports it's normally not possible to employ staff only for bird scaring. Examples of organizational solutions (UK and Denmark) were shortly described. Finally was mentioned the "special methods for the limitation of bird population" in Denmark that are referred to in the ICAO document "Airport Services Manual, Part 3, Bird control and reduction" para 7.11.

The paper about the "organization at the national level" stressed that the problems created by collisions between birds and aircraft must be looked upon as air safety problems like many others of the aeronautical service complex of problems. Here was also cited an important part of a paper for the world conference 1977 of R B Campbell, Canada. After that the paper gave a rather comprehensive account of how to form a national committee mentioning all types of officers suitable for such a group and the different tasks of it. Just to give an idea of the content might here be cited the subtitles pointing out what kinds of work that can be carried out by a national committee on bird hazards: strategic planning (specially the preparational work for a new airport), information and education, bird strike statistics, actions in the airport including special studies and research, inspections of airports, bird intensity forecasts and mapping of bird concentration areas, communications and international work. The importance of good public relations was also highlighted.

P M Davidson contributed to this agenda item with short papers explaining the organization both at the aerodrome and at the national level in Australia.

The high importance of frequent inspections of aerodromes was emphasized. Information was also given about the Australian organization of the Department of Transport into a central and 5 regional offices where each region has a committee on bird hazards to aircraft. This regional organization depends on the large size of the country.

V E F Solman presented a paper entitled: " Organization for the control of bird hazards to aircraft". In the abstract of this paper was stressed that such an organization "must bring together persons from several disciplines who can examine the problem from many points of view". The paper also stated the necessity of a good chairman for a possible committee saying that any organization is only as good as the abilities of the members and the vision and leadership of the chairman. The Canadian organization was explained giving rather detailed information about the tasks of an inspector of aerodromes.

After the presentations of papers dealing with the subitems 6.1 and 6.2 there was a discussion on related matters. The constitution of a national committee should have the widest possible representation was the opinion of V Solman. He also cited some important paragraphs of the Canadian instruction on this type of work. E Edroma meant that in the practice it's difficult to comply with all demands and also to have a big national committee. L-O Turesson agreed, saying that a committee with participants from all parties concerned might form a too big group. Edroma also raised the question if a special secretariat is needed at a national level for a successful work. It seemed, however, as if the majority of the experts present did not feel this as a necessary thing.

"Organization at the regional level" was also presented by the moderator for this item. The paper referred very much to the work of BSCE and experiences from there so therefore it also covered to a great extent the purpose of the original agenda item 7.1.

In the paper is stated as the main advantage with a regional committee that it gives a good "possibility for all participating states to keep each others informed about all studies going on within this field of work and how the total work is organized in the different countries".

The history of BSCE and contacts with other organizations was described with an emphasis on the co-operation with ICAO. Further was explained the different ways of working of the committee mentioning the annual conferences, the aim of the so called "Editing committee, the activities of the working groups, work by the aid of correspondence etc.

The paper was illustrated by an example of working papers for a BSCE conference (BSCE/11), recommendations after BSCE/11 based on the activities of the working groups, terms of reference of the Editing committee, pictures showing the aim of the working groups in a humorous way and an outline of the different mediums and of the ways of working of BSCE.

The last paper presented under this item and also during the whole workshop was "Bird strike reports" (subitem 6.4).

The introduction of this paper stated that: " Experiences have shown that for the management of the airfield and for the use of land both inside the airport and in the environments studies of birdstrike reports are very valuable.

Bird strike/incident report forms were described as well as the purpose of them. As an example was attached the Swedish form (similar to the ICAO one) and also a well completed report of a bird strike. The result of an inquiry to pilots about their knowledge of the bird hazards was shown too.

Organization for the distribution of bird strike/incident reports was given a rather large space in this paper. Examples were given for a correct handling of reports if collisions had taken place in different airports of this region.

Finally was underlined the importance of studies of the bird situation in an airport by the aid of a special reporting system. In that way the real occurrence of birds dangerous for aviation in an airport will be safer and quicker laid down. That type of studies has been carried out in many countries in western Europe and also in Australia and Hongkong.

After the presentation of papers on agenda items 6.3 and 6.4 there was a discussion mainly on the system for distribution of bird strike reports. It was evident that many different systems were in use. Some states have reports only from pilots whereas other states also include reports from air traffic controllers, field staff and aircraft maintenance personnel (in some cases on different forms).

The delegates from IATA had here the opinion that all different means should be used in order to make the reporting system as efficient as possible.

Difficulties with the identification of birds involved in collisions with aircraft was also stressed and Field Note No 51 on names of birds in English and Latin issued by the National Research Council of Canada was mentioned as a help with these problems.

J Thorpe informed about the content of "Serious bird strikes bulletin" issued by the Civil Aviation Authority of U K in co-operation with BSCE. These bulletins contain reports from the most difficult strikes of the world which come to the knowledge of C A A and so far three issues have been published.

Studies of serious bird strikes have among other things revealed that some types of engines are more sensitive to bird ingestion than others.

V E Ferry underlined the importance of good contacts with other international organizations. There is a need of constant exchange of information and of knowledge from experience.

He also focused the attention on the significance of the activities carried out in the periods between meetings.

### Fieldtrip to Bangkok airport

During the workshop a fieldtrip to Bangkok airport was arranged for all participants. After the arrival we were received by the airport manager and some members of his staff who gave us a general idea of the airport in form of different types of statistics also including information on the bird strike situation. It was claimed that Bangkok so far had had a low frequency of birdstrikes but according to the opinions of the IATA-representatives it was evident that all reports from foreign airlines had not come through. One main impression from the visit to the airport which is also of importance for the occurrence of birds was that the whole area was very clean.

The studies also included a visit to the Aviation Museum of the airport with a great number of old airplanes and helicopters. The participants of the fieldtrip were quite impressed by the size of the museum and the nice arrangement of the aircraft. It was also evident that everybody was pleased for the possibility to get an inside glance to the management of an airport in this region.

After the arrival back to the city and the ICAO office there was a short discussion about things that had been observed during the fieldtrip. Solman then expressed his impression for the fact that the bird population of the airport seemed to be so low in spite of the numerous waters in the surroundings. He said that there must be some birds in the approach areas that are difficult to get sight of. Melville thought that there had been a specially low frequency of birds at the time for the visit because this was done during the hot early afternoon hours. Solman also gave his compliments to the airport authorities for a clean airport. They have done a good job, he said! Thorpe and Keil expressed the same opinion.

### Concluding discussions

When the workshop had finished its agenda K Witte of ICAO headquarters took up a discussion on two important matters:

1. What can be done to improve the national work in the different countries?
2. What can be done to improve the international co-operation in this region when it comes to the bird problems of aviation?

In the discussion starting up on the above mentioned matters representatives of IATA had the opinion that establishing of national committees in the ICAO member-states of the region was desirable.

After this contribution a question was raised around the table concerning the presence of national committees in the area. The inquiry showed that only Japan had a national committee on birdstrike problems.

Uganda, belonging to another region, had also such a committee which was said to have a strong position.

The representative of Bruner said that they have a Flight Safety Committee which also takes care of the bird problems. He also said that the workshop had been very valuable and expressed gratitude to ICAO for the initiative to the meeting. Indonesia pointed out their difficulties for geographical reasons (very large extension of the country East/West) to form national committees.

Australia has administrative resources for taking care of this problem but they don't have a real national committee for birdstrikes. They have also geographical difficulties for establishing of national committees of this type so they have gone in for a regional organization.

The representative of Thailand said that they have no committee but he was going to request the formation of such a group.

The representative of U S A informed about some activities in his homecountry within the birdstrike section of flight safety work; strike reports are treated with the aid of an FAA computersystem operated in Oklahoma City. The Airline Pilots Association has a subcommittee taking care of the bird problems. It was also emphasized that the New York State Port Authority has spent several hundred thousand dollars in order to improve the flight safety situation at Kennedy airport after the DC-10 accident there in the autumn of 1975.

After the enquete about the national committee situation there was a general discussion on the international work in the region concerning the birdstrike problems.

Melville expressed thanks to ICAO for the arrangement of the workshop. Much valuable information and advise had been received. Improved international contacts should certainly become favourable. Perhaps still too early for the establishment of a regional committee. A regional workshop without any help from outside should probably better fit the actual needs of the region.

The representatives of Australia, Brunei and India said that they had the same opinion as Hongkong.

V Ferry thought that the formation of a regional committee rather soon could be mainly of favour for the international co-operation of the region.

P M Peralta of the ICAO Bangkok office expressed a wish that Terms of reference for the formation of a regional committee or other international body should be prepared.

K Wild meant that the BSCE corresponding document could be used as a model for a future committee in this region.

Davidson had the opinion that a regional activity could favourably be started up in a simpler way than by a regional birdstrike committee.

Wong Ah Ngam of Brunei supported the opinion of the Australian delegate. He was also very pleased for the fact that he had now got to know about similar problems in other states as in his homecountry (how to go on with black kites etc).

Melville refered to the preceding contribution about regional exchange of experiences e g concerning the problems with the birds of prey in this area. He should be glad to share with others the experiences made in Hongkong.

The main delegate of Japan wanted to know what kind of equipments that was used in other countries for the dispersal of birds from airports. Type of staff used for this purposed was also of great interest.

Nordlander meant that Melville certainly was a suitable person for these matters and therefore had better take care of this section of the international work.

Davidson and Thorpe expressed their willingness to distribute all type of information about the work going on in their resp countries.

Ferry said that BSCE could also contribute with all type of information available inside the Committee i e in the reports from the annual meetings.

Wilde asked if there were any other specific bird-problems of the region.

Wilkinson here stressed that some parts of the region (outside the Tropics) had also considerable gullproblems.

Wilde underlined that so far no good methods had been developed against kites/hawks.

Y Hoto of Japan informed that in Tokyo the worst bird-problems was caused by gulls.

de Souza, Singapore, declared that specific studies of Kites should be valuable.

Edroma and Davidson had the opinion that all birds of interest for the airport safety had to be studied.

Nordlander expressed the view concerning such typ of studies that ICAO in a state letter should underline the importance of co-operation between museum and aviation authorities.

Davidson supported this opinion and Cheok Hock San of Brunei said that he wanted to suggest a better co-operation with the musum authorities of his country (there was also a representative for Brunei Museum present at the workshop).

L Oriondo, Philippines, suggested that Australia or Hongkong could become the hostcountry for an informal workshop for the region.

A Mohiuddin suggested the workshop to take place in 1980.

Ferry had the opinion that two years was a too long time to wait but Wilde, Wilkinson and Nordlander declared that two years was a reasonable time for preparations.

At this stage of the discussion Wilde made a short summary of the activities during the workshop and called in question how to make future similar workshops better.

Wilkinson assured that the expertise of the workshop certainly was first-rate. However, it's probably an advantage to study to a greater extent the special problems of the region.

Kitakule, Uganda, found the workshop to have been very useful. It was evident, he said, that some delegates had become aware of these problems for the first time.

de Souza and Omar bim Samam wanted more information on the bird problems in Southeastasia.

Mohiuddin was thankful for what he had learnt and promised



to share of his new knowledge in the homecountry.

Hoto declared that they have good information on the birdsituation in Japan. He and his delegation had learnt a lot, he said, and should take it home.

N K Tripathi, India, said that the outcome of the workshop was very valuable for his country.

Melville stressed the same opinion as the representatives of Malaysia and Singapore saying that there is a need for more international co-operation about the bird problems of this region.

Ferry was delighted for the fact that this workshop had been possible to bring about.

Cheok Hock San had the meaning that it was a strong wish for a careful discussion of the bird problems of the region. We have to try to avoid bird strikes.

Davidson underlined the importance of the fieldtrip. Another time it will perhaps be possible to demonstrate and discuss types of equipments for this activity.

Wilkinson and Edroma stated the desirability to have as much basic data as possible on the birdsituations in different countries available before a future conference or workshop.

Thorpe asked if somebody could accept to take care of bird strike analysis for this region. Perhaps Australia?

Davidson, Australia, thought this could be possible and also stressed once more the necessity of coming together to discuss related problems.

Montgomery expressed the opinion that even if gulls caused only a minor part of the collisions bird/aircraft in this region they perhaps give rise to the worst damages.

Davidson did not agree with this saying that the gulls of this region are smaller than those of Europe and that multiple strikes with kites also occur.

Discussion on WP:s 10, 11, 12, 14, 25, 27 and 28

All the above enumerated working papers dealt with the activities of working group aerodrome and the evaluation of answers received after the distribution by that group of a questionnaire. The latter had met a very good response from national bird strike committees so that answers from no less than 16 countries had been received.

The chairman expressed the gratefulness of himself and of BSCE for the excellent work that had been carried out by working group aerodrome during the last year.