

SUMMARY OF BIRD-AIRCRAFT COLLISION

BEN-GURION AIRPORT

ISRAEL - 1983

Summary and Analysis of bird-aircraft collisions
and presence of bird carcasses on runways at
Ben Gurion International Airport 1983

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1. Introduction

The purpose of this summary is to present important basic data obtained from reports received and information gathered on bird-aircraft collisions and presence of bird carcasses on runways at Ben Gurion Airport.

From these up to date reports, we are able to determine the types and numbers of birds involved in collisions, the problematic sections of the runway, the most vulnerable sections of the aircraft, flight stage and so on, and thus to reach conclusions regarding methods of minimizing these hazards. Our conclusions will without doubt be influenced by the degree of reliability and speed with which the data can be collected in the future.



NATURE RESERVE AUTHORITY

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In 1983 there was a considerable increase in the number of reports which reached the Bird Strike Prevention Unit. Most of these reports came from Ben Gurion Airport and were also the most exact. However awareness on the part of the inland airfields is on the increase. There is a shortage of reports from the Airforce regarding collisions at airforce bases and particularly collisions in the air (i.e. not at airfields). There is also little information from agricultural aircraft. We hope that this summary will show the importance of reporting these occurrences immediately, so that pilots can be instructed to co-ordinate timing and height of their flights in accordance with our data on areas, heights and times of year at which collisions are most likely to occur. Impending danger will thus be greatly minimized.

This summary gives a detailed analysis of data from Ben Gurion Airport and a report based on unanalysed data received from inland airfields. In some cases, data was compared with those of 1982.

Thanks to publication of a coloured poster "Beware, flocks of birds", distribution of bags for collection of carcasses with official report forms at all airports, airforce bases, airline companies, agricultural aircraft companies and various maintenance units, awareness of the importance of reporting is on the increase, multiplying the data which reaches us. This will require the use of a computer for precise analysis and processing of the data.

Many departments and individuals such as the ground operations and services section at Ben Gurion Airport are aware of the importance of every item of information and we enjoy their co-operation and assistance. Thanks to them we have been able to publish this summary.

Special thanks are due to Motti Deby, Itzhak Sery and Ephraim Danieli who took the trouble to read the report and add their comments and to Tammy Shefi for her assistance with the illustrations.

1) General

23 reports on collisions with aircraft were received in 1983. (We assume that reports from Ben Gurion Airport cover most of the collisions which occurred there and that only a small percentage were not brought to our attention). To our knowledge, this is the greatest number of bird-aircraft collisions, although not typical of the general situation, since during July, August and September of this year an unusual problem occurred when thousands of turtle doves appeared on the runways. During these months alone, 15 reports on collisions were recorded (on 11.8.83., three in one day!). In addition, reports in previous years were very sporadic.

There are various sources of information on collisions:-

- immediate report by the pilot to control tower and via inspectors, to our unit;
- by members of the co-ordination center during routine inspection patrols;
- by technicians and mechanics from various maintenance departments;
- various airline companies;
- flight security officers at Airforce bases;
- flight security section at Airforce bases;
- Civil Aviation Administration;

(An interesting exception: A passenger, whose flight was delayed by a bird-aircraft collision, told his relatives who were acquainted with our work. They reported the incident to us. However, we later discovered that the collision had occurred in Munich!!).

Reports which are handed in immediately are naturally the most efficient, since maximum details may then be followed up. Most important of all, is the collection of bird remains, for identification.

11 out of 23 collisions known at Ben Gurion Airport in 1983 were not handed in in writing or in any detail. The information was collected by word of mouth and by investigation with technicians shortly after the event. Most of the missing (written) reports are from the Airforce. In addition, the Arkia Airline Company refrained from reporting in any detail, the two cases in which their aircraft were involved in collisions, despite repeated requests on our part.

In 8 out of the 23 cases, the bird was not identified. In 2 of these cases, we are unable to identify the minute remains which had been collected, due to lack of suitable equipment and of the remaining six there were no remains left to identify.

One collision occurred at a height of 5,600 feet (No. 3/83 in following table), when the aircraft was climbing over the sea. Another collision (19/83) was recorded despite the fact that it was not clear whether the collision had occurred at Ben Gurion Airport, since the fault was discovered by technicians on the ground although the pilot did not notice any collision.

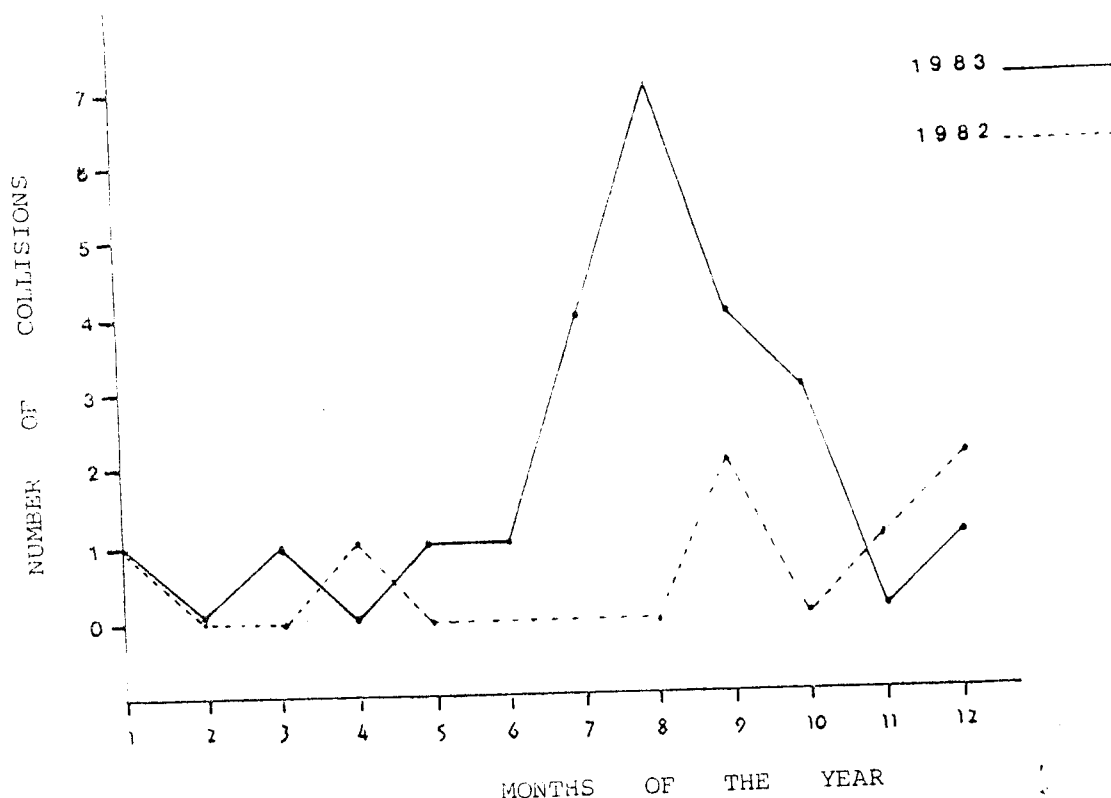
Following are details of collisions according to reports received.

Table 1: Bird-Aircraft Collisions at Ben Gurion Airport -
Reports received in 1983

| Number | Date | Local Time | AirlineCo./ Type of aircraft | Route | Flight phase | Height in feet | Bird Species | Number | Part of aircraft struck | Direct damage to aircraft | Remarks |
|--------|------|------------|---------------------------------|-------|------------------|----------------------|-----------------------------|--------|-----------------------------------|------------------------------------|---|
| 1/83 | 13.1 | 0630 | Airforce/ Boeing 707 | 12 | landing roll | 0 | Partridge | 6 | Landing gear | None | Pilot sensed hit. No official report |
| 2/83 | 9.3 | 0740 | Airforce/ Hercules C 130 | 20 | climb | 800 | Gull | flock | Engine No 2 | " | Pilot saw flock 2-10 collided with aircraft. Safety landing |
| 3/83 | 22.5 | 0720 | Swissair/DC10 | 26 | climb | 5600 | Unidentified medium size | 1 | None | " | Report handed in after one month and we were unable to examine remains of bird |
| 4/83 | 26.6 | 0409 | El Al/Boeing 707 | 06 | take-off roll | 0 | Partridge | 1 | Fuselage and starboard wing | " | Pilot sensed hit |
| 5/83 | 1.7 | 0600 | Arkia/ ? | 26 | take-off roll | 0 | Partridge | 1 | Landing gear | " | Pilot ceased take-off; after sensing hit. No official report. |
| 6/83 | 11.7 | 2000 | Airforce/ Hercules C 130 | 26 | take-off roll | 0 | Spur winged plover | 1 | Engine No. 1 | " | Engine stopped and pilot ceased take-off |
| 7/83 | 31.7 | 1400 | Aircraft Industries/ Cfir | 26 | landing | ? | Turtle dove | 1 | ? | " | No official report |
| 8/83 | 31.7 | 1800 | Swissair/DC10 | 12 | taxiing | 0 | Turtle dove | 1 | Engine No. 1 + rotor | " | |
| 9/83 | 7.8 | 1520 | SAS/ DC 8 | 30 | landing roll | 0 | Turtle dove | 1 | Engine No. 1 | " | Remains found in side engine |
| 10/83 | 11.8 | 1000 | Airforce/ Boeing 707 | 26 | take off roll | 0 | Turtle dove | 1 | ? | " | Pilot sensed hit. No official report |
| 11/83 | 11.8 | 1500 | SAS/DC 8 | 12 | landing roll | 0 | Turtle dove | 2 | Hood | " | Pilot sensed hit |
| 12/83 | 11.8 | 1755 | El Al/Boeing 707 | 12 | approach | 100 | Unidentified | 1 | Fuselage | " | Remains and blood stains |

| Number | Date | Local Time | Airline Co./ Type of air- craft | Route | Flight Stage | Height in feet | Bird Species | Number | Part of air- craft struck | Direct damage to aircraft | Remarks |
|--------|-------|------------|---------------------------------------|-------|------------------|----------------------|-----------------------|--------|------------------------------|---|---|
| 13/83 | 14.8 | 1820 | Maof/Boeing 720 | 12 | landing | ? | Turtle dove | 1 | Engine No. 2 | serious engine replaced | |
| 14/83 | 15.8 | 1700 | Airforce/ Dakota | 26 | take off | 15 | Turtle dove | 1 | nose | none | Pilot sensed hit and returned from take off. <u>No official record</u> |
| 15/83 | 16.8 | night | Airforce/ Hercules C 130 | 26 | take off roll | ? | Unidentified | 1 | Engine No. 1 | " | Remains found by technicians after landing <u>No official record</u> |
| 16/83 | 10.9 | 1430 | Arkia/Boeing 737 | 30 | landing | ? | Turtle dove | 1 | nose | " | Pilot sensed hit and saw bird. <u>No official record</u> |
| 17/83 | 10.9 | 2030 | Maof/ Boeing 707 | ? | landing | ? | Spur winged plover | 1 | port flap | " | Blood and feathers on aircraft. <u>No official record.</u> |
| 18/83 | 13.9 | 1852 | Swissair DC 10 | 12 | approach | 2000 | ? | 1 | nose | " | Reported after one week. Identification of bird not possible. |
| 19/83 | 14.9 | ? | Airforce/ Hercules C 130 | ? | ? | ? | Unidentified | ? | left wing leading edge | serious hole in wing leading edge | Large hole in wing leading edge was discov- ered by technicians. Pilot did not sense collision. Not clear whether damage caused at B.G. Airport. Remains very tiny and identifi- cation not possible. |
| 20/83 | 9.10 | ? | Airforce/ Boeing 707 | ? | ? | ? | Unidentified | flock | Engine No. 4 | None | Pilot encountered flock <u>No official report</u> |
| 21/83 | 10.10 | 1630 | Airforce / Westwind | ? | approach | ? | Unidentified | flock | Nose | " | <u>No official report</u> |

| | | | | | | | | | | | |
|-------|-------|------|-------------------------|----|------------------|-----|--------------|---|---------------------------|---|--|
| 22/83 | 16.10 | 0945 | Airforce/ Boeing 707 | 30 | approach | 000 | unidentified | ? | left wing leading edge | " | <u>No. official report</u> |
| 23/83 | 2.12 | 0707 | T.W.A./ Boeing 707 | 30 | take off roll | 0 | Part ridge | 1 | Engine No | " | Pilot ceased take off. Tyre damaged during braking and changed. Aircraft took off after 1 1/2 hours. |

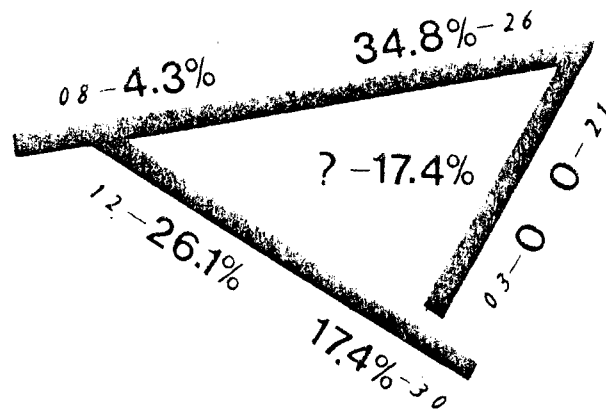
3. Graph according to months of the year - Ben Gurion Airport

65.2% of all collisions occurring in 1983 occurred during July-August-September during which the turtle dove is most active. (August was the peak month, in which 30.4% of all collisions occurred), when they found abundant food along the runway edges, while migrating south. However, other birds as well as turtle doves were involved in collisions during these months. In October 3 collisions occurred (13%) although none of the birds involved were identified. We were therefore unable to determine the cause of the collisions, although autumn migration during this month should be taken into consideration.

It is interesting to compare these data with figures on bird carcasses found on the runways (see page 24), when in the peak months of July, August, September, 50.5% of all the carcasses were found. Here too, the peak month was August - 26.6%).

4. Percentage according to runway

175

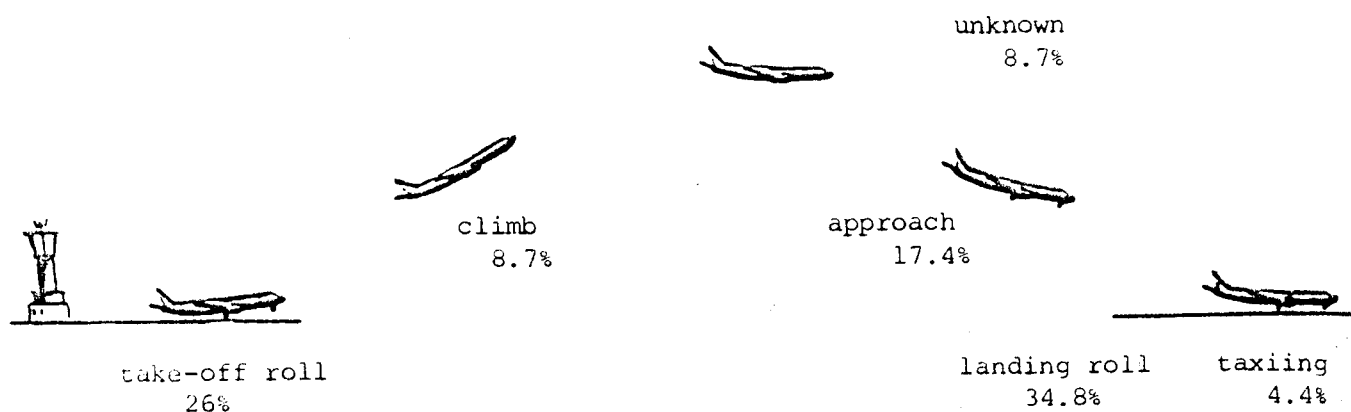


| Runway | 12 | 30 | 08 | 26 | unknown |
|-------------------------------------|-------|----|-------|----|---------|
| no. of collisions | 6 | 4 | 1 | 8 | 4 |
| total along entire length of runway | 10 | | 9 | | |
| % | 39.1% | | 43.5% | | 17.4% |

Note: Percentage according to runway only provides an accurate picture if data are compared on all aircraft activity on each and every runway.

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5. Divison according to flight state - Ben Gurion Airport 1983



Data analysis points to increased hits at ground level, i.e. while taxiing to runway from standing position or vice versa (4.4%) during landing roll and take-off roll (60.8%).

Aircraft which are hit while climbing and approaching, total 8.7% and 17.4% respectively and at this stage there is no clear explanation for the large difference. It is interesting to note here, that at Ben Gurion Airport, the aircraft use the same section both for climbing and for landing.

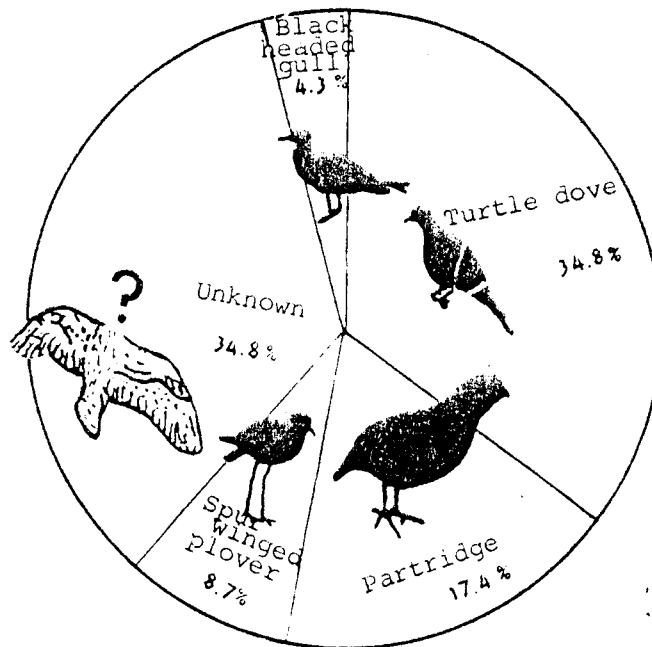
The remaining 8.7% of unknown hits, cannot be related to any flight stage (such as cruising) or to the state of the aircraft (such as in climb or landing) since there is no data on the height at which the incident occurred.

6. Division according to species and number of birds

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In 37.1% of reported collisions, the bird was seen before or at the time of collision, while in 52.2% of the cases the pilot did not see the bird involved and for the most part only felt a bang at the time of collision.

a) Division of collisions according to bird species - Ben Gurion Airport 1983



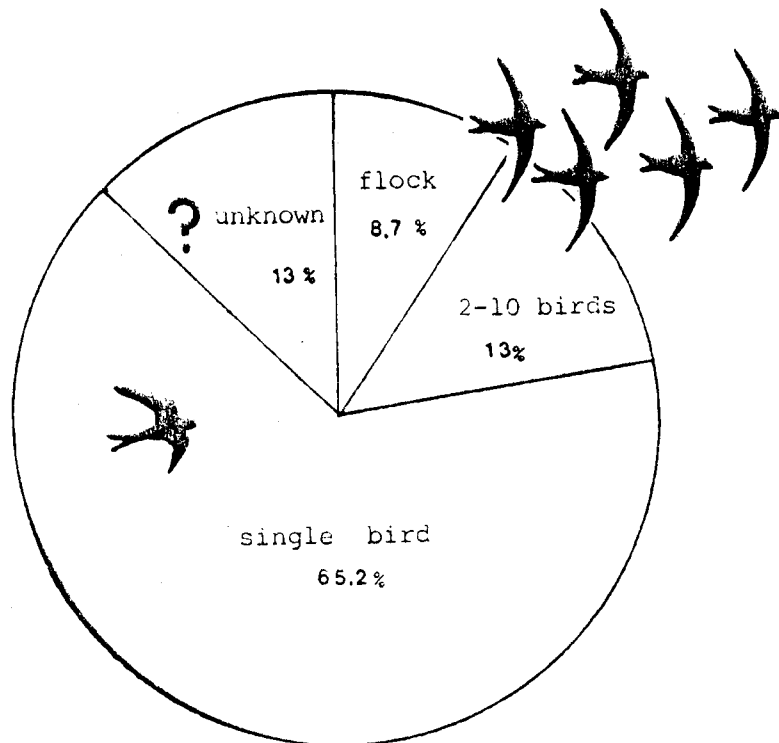
In 1982 eight reports were received at Ben Gurion Airport on collisions with birds according to the following division:

- 1) Black headed gull - 37.5%
- 2) Partridge - 12.5%
- 3) Unknown - 50%

It is important to note that in 1982 no reports on collisions with Turtle doves were made!

General note: The large number of unidentified birds indicates the importance of immediate reporting to the Bird Strike Prevention Unit, to enable us to extricate the bird remains for identification. (Here we must also stress the importance of suitable equipment such as a stereomicroscope for identifying minute remains).

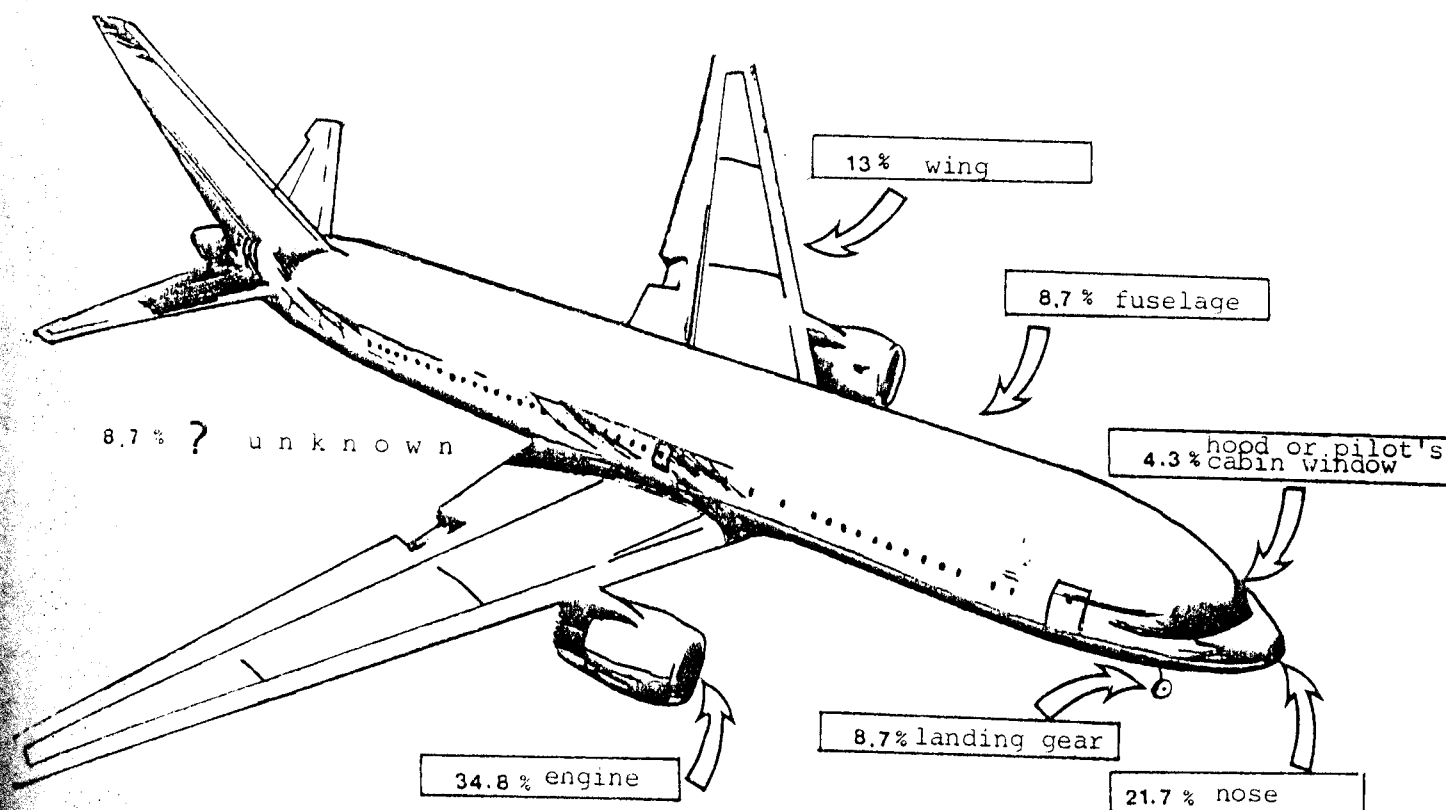
b) Division according to number of birds involved in same collision with one aircraft Ben Gurion Airport 1983



flock = more than 10 birds

- 1) In one case 6 partridge carcasses were found on the runway, after collision.
- 2) After collision with gulls (no. 2/83) pilot saw a large flock, while in his report he stated that 2-10 birds actually hit the aircraft.
- 3) With one exception, all collisions with turtle doves involved one bird only, despite the fact that hundreds of the species were found on or near the runways at the time of collision.

7. Division according to parts of the aircraft involved in collision 179
Ben-Gurion Airport 1983



Division according to direct damage to aircraft - Ben-Gurion Airport 1983

91.4% of reported cases of collisions with birds there was no direct damage to the aircraft. However, in many cases, indirect damage is caused when the aircraft is obliged to halt take-off, as in the case of a T.W.A. aircraft (19/83). The pilot halted suddenly in take-off after sensing that the engine had been hit and as a result one of the tyres was damaged, causing a delay of several hours.

Two of the only cases of serious damage are:-

- 1) Maof (13/83) - engine replaced
- 2) Airforce (19/83) - large hole in left wing leading edge. Unfortunately, we are unable to obtain information on cost of the above damages.



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9. Division of collisions according to height in feet - Ben Gurion Airport 198

Height in feet

| | | |
|-----------------|-----|-------|
| 5000 | --- | 4.3% |
| 3001 - 3500 | | |
| 2501 - 3000 | | |
| 2001 - 2500 | | |
| 1501 - 2000 | --- | 4.3% |
| 1001 - 1500 | | |
| 501 - 1000 | --- | 4.3% |
| 101 - 500 | --- | 4.3% |
| 0 - 100 | --- | 47.9% |
| 34.9% ? unknown | | |



According to the above table, it appears that most of the collisions occurred on the runway and most of these (9 out of 23 reported collisions), occurred at a height of 0 feet, i.e. before take off or after landing roll.

We wish to stress once more, the importance of accurate reporting in order that we may obtain more exact data (in 8 out of 23 collisions height of collision was not recorded).

2
10. Division of collision according to time of day - Ben Gurion Airport 1983

unknown ? 8.7%

Airfile

Eilat

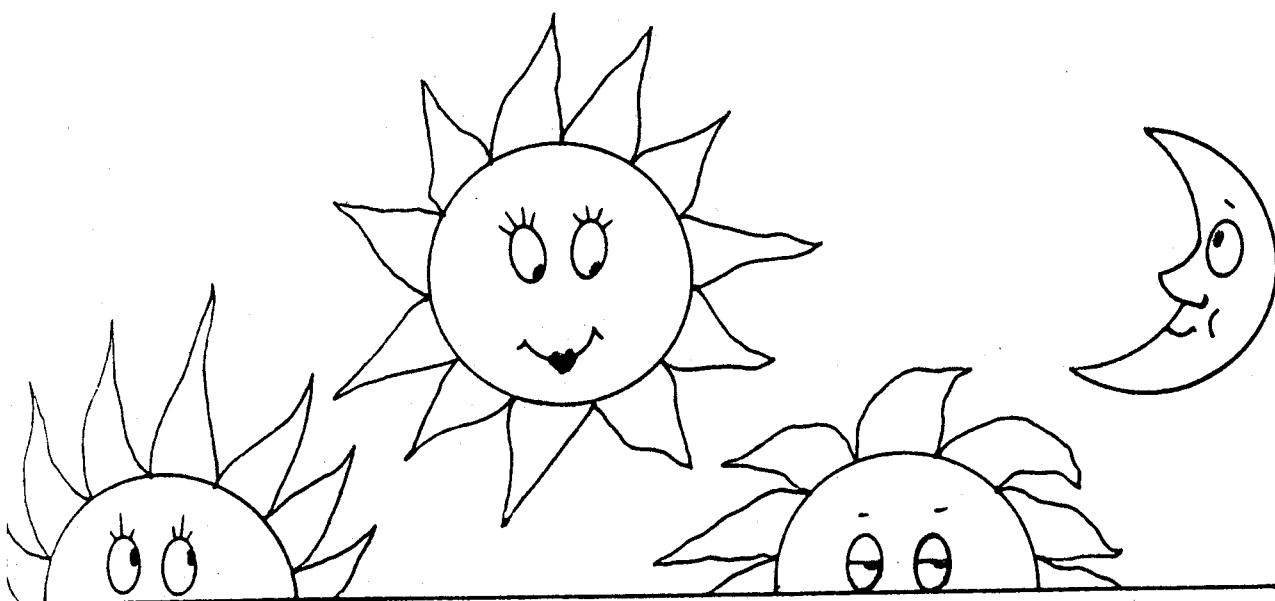
1

2

Tel A
Side D

1

3.



Dawn 4.3%

Daytime 69.6%

Evening 0

Night 17.4%

Dawn First light to sunrise

Daytime Sunrise to sunset

Evening Sunset to dark

Night Dark to first light

Most of the collisions occurred during the day which is the most active time for most birds (and most flights). There is some activity among night raptors, particularly Barn owls, but their number is comparatively small when compared with the number of birds in general.

| Airfield | Date | Time | Airline/Type of Aircraft | Runway | Flight Stage | Number & species of Bird | Remarks |
|--------------------|----------|------|--------------------------|-------------|-------------------------|---|---|
| Eilat | | | | | | | |
| 1 | 28.4.83 | 1700 | Arkia/Dash 7 | 03 | landing | 1 pigeon | Pilot saw bird collide with propellor. No damage to aircraft |
| 2 | 19.11.83 | 1700 | Arkia/Dash 7 | tarmac area | start-up | 1 pigeon | Bird was in engine rear opening & ejected "roasted" when aircraft started up. No damage |
| Pei Aviv (Sde Dov) | | | | | | | |
| 1 | 23.1.83 | 2030 | Arkia/Dash 7 | 03 | take-off height 100 ft. | 500-700 gull carcasses on runway | Serious damage to aircraft |
| 2 | 23.2.83 | 1030 | Airforce/Hercules | 21 | climb height 400 ft. | approx. 30 unidentified | Damage to engines 1&2 and rotor Serious damage to engine 1 |
| 3 | 23.12.83 | 0552 | Airforce/Cessna 206 | 03-21 | take-off | 2 black-headed gull carcasses on runway | No damage |

Bird carcasses on flight runways - Ben Gurion Airport 1983

In 1983, 71 cases of bird carcasses found on the runways at Ben Gurion Airport, are recorded. 95 birds of various species were involved. (In 1982 there were 0 cases in which 127 birds were involved).

Whenever a bird carcass is found on a runway, we attempt to reconstruct a list of all flights along that particular runway. However, direct relation between a bird carcass and damaged aircraft was found in only one case (recorded in Table 2). For this reason, and also because a large number (40.8%) of carcasses found on the runways were whole - with no external injuries - we assume that at least some of the birds were blasted to the ground by air pressure when the aircraft flew over them at take-off or landing, and were not directly damaged by the aircraft.

We can see no other reason for death of these birds on the runways. When suspicion of poisoning is involved, such as by pesticides in agriculture close by the runways, the carcasses are sent for laboratory analysis. In most cases (62.4%) a single carcass only was found. In one case (33/83 in following Table) 22 Turtle doves carcasses were found on the runway - totalling 23% of the carcasses.

Sources of information for bird carcasses found on the runways are:-

- Daily morning runway inspections by Marshaller;
- Runway electricians
- Firemen
- Pilot reports via control tower
- Bird Strike Prevention Unit daily inspection tours

The following is a table of bird carcasses found on the runways at Ben Gurion Airport 1983.

Table 2: Bird carcasses found on runways - Ben Gurion Airport 1983

| Number | Date | Time | Runway | Amount | Species | Condition of Bird | Remarks |
|--------|------|------------|--------|--------|---------------------|---------------------------------|------------------------------------|
| 1/83 | 9.1 | 0800 | 21 | 1 | Partridge | feathers | Reported by pilot who saw feathers |
| 2/83 | 13.1 | 0630 | 08 | 1 | Barn Owl | Body whole | |
| 3/83 | 30.1 | 1500 | 21 | 1 | Lapwing | Damage to other parts of body | Apparently hit by blast |
| 4/83 | 1.2 | 0630 | 26-08 | 1 | Lapwing | Whole, fresh | " " |
| 5/83 | 3.2 | 1640 | 03-21 | 1 | Lapwing | Fresh. Abdomen slightly damaged | Seen on runway by Arkia pilot |
| 6/83 | 24.3 | 1400 | 03-21 | 1 | Pigeon | Crushed | |
| 7/83 | 30.3 | 1530 | 08 | 1 | Spur winged Plover | Body whole. damage to wing | Reported by pilot |
| 8/83 | 21.4 | 1430 | 08 | 1 | Turtle dove | almost whole | |
| 9/83 | 28.4 | 0600 | 08 | 1 | Short-eared owl | Crushed | Apparently hit by blast |
| 10/83 | 29.4 | 0800 | 08 | 1 | Swift | Crushed | |
| 11/83 | 4.5 | 1330 | 08 | 1 | Swift | Whole | Apparently hit by blast |
| 12/83 | 4.5 | morning 26 | 1 | 1 | Long-legged buzzard | Whole. Fairly old | |
| 13/83 | 11.5 | 0700 | 08 | 1 | Barn owl | Crushed. Fairly old | Apparently hit by blast |
| 14/83 | 24.5 | 0945 | 21 | 1 | Swift | Whole. Fresh | |
| | | | | | | Whole. Fresh | Apparently hit by blast |

| Number | Date | Time | Runway | Amount | Species | Condition of Bird | Other f/lowers seen nearby |
|--------|------|------|--------------|--------|-----------------------------|----------------------|---|
| 15/83 | 27.5 | 1400 | El-AI tarmac | 1 | Spur-winged plover | run over and crushed | Other f/lowers seen nearby. Hare carcass found nearby. Crow probably hit by blast while approaching carcass. |
| 16/83 | 10.6 | 0500 | 21 | 1 | Hooded crow | completely crushed | |
| 17/83 | 10.6 | 0500 | 26 | 1 | Hooded crow | almost whole | |
| 18/83 | 10.6 | 0500 | 08 | 1 | Common stone curlew - chick | completely crushed | Curlew brooding site nearby. Its brother was caught several days later and transferred to the Zoological Gardens |
| 19/83 | 10.6 | 0600 | 08 | 1 | Common stone curlew - adult | eaten by crows | |
| 20/83 | 10.6 | 0700 | 08 | 1 | Spur-winged plover | body damaged | |
| 21/83 | 12.6 | 0500 | 08 | 1 | Barn owl | half body found | |
| 22/83 | 15.6 | 0800 | 08 | 1 | Spur-winged plover | crushed | |
| 23/83 | 24.6 | 0500 | 26-08 | 1 | Partridge | crushed | |
| 24/83 | 30.6 | 0500 | 26 | 1 | Spur-winged plover - young | crushed | |
| 25/83 | 7.7 | 0500 | 08 | 1 | Common stone curlew - adult | | |
| 26/83 | 14.7 | 0530 | 26-08 | 1 | Common stone curlew - adult | eaten by crows | |
| 27/83 | 19.7 | 0500 | 08 | 1 | Common stone curlew | live but weak | |
| 28/83 | 28.7 | 0630 | 08 | 1 | Barn owl | body damaged | Apparently hit by blast |

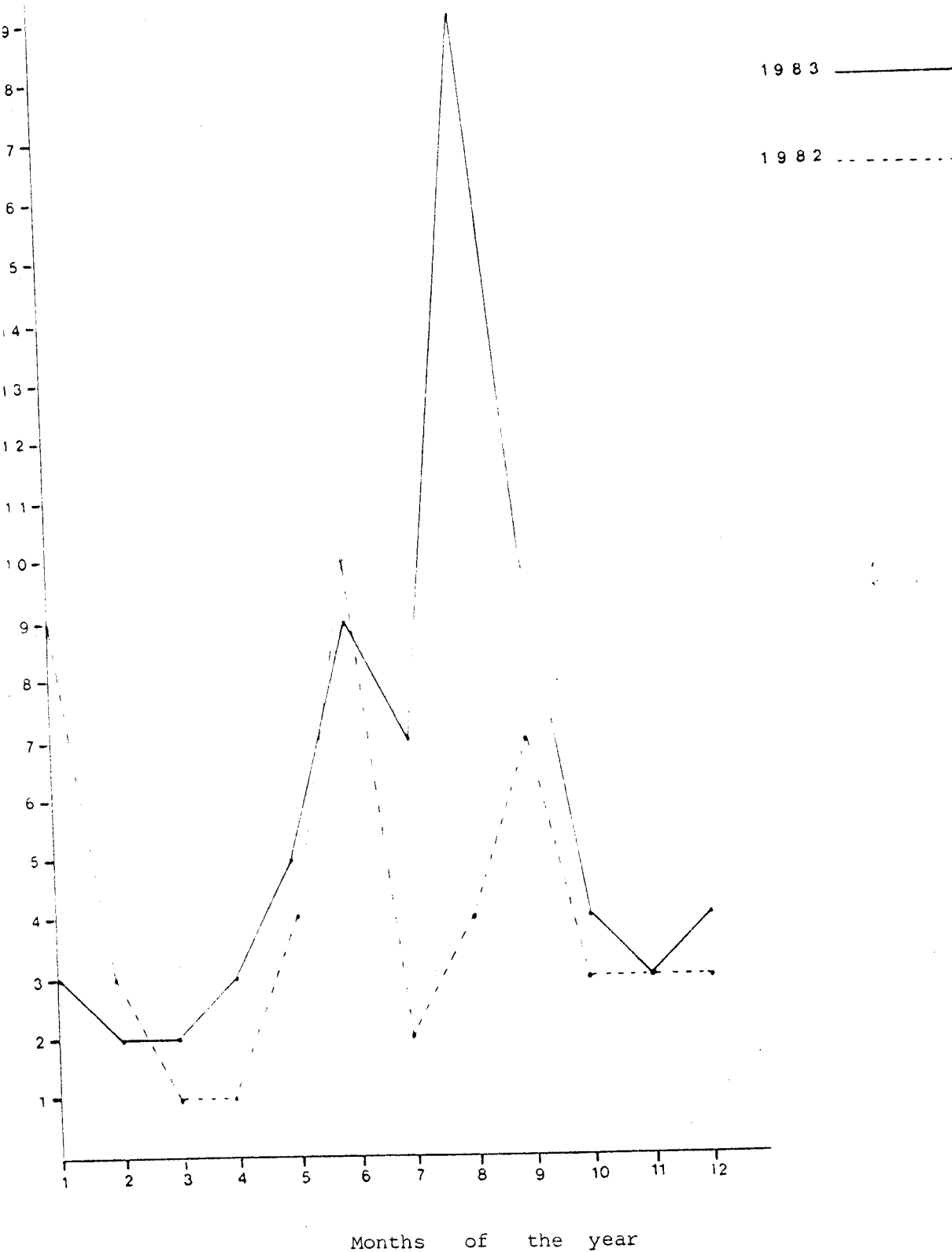
| Number | Date | Time | Runway | Amount | Species | Condition of Bird | Remarks |
|--------|------|------|--------|--------|--------------------|------------------------|--|
| 29/83 | 31.7 | 1400 | 26 | 1 | Crested lark | quite old | |
| 30/83 | 31.7 | 1800 | 12 | 1 | Turtle dove | ? | |
| 31/83 | 31.7 | ? | 26 | 1 | Crested lark | whole - old | |
| 32/83 | 1.8 | 1020 | 30 | 1 | Turtle dove | ? | |
| 33/83 | 1.8 | p.m. | 12-30 | 22 | Turtle dove | ? | |
| 34/83 | 3.8 | 0520 | 26 | 1 | Spur-winged plover | crushed | |
| 35/83 | 5.8 | 1545 | 12-30 | 3 | Turtle dove | whole.fresh | Apparently hit by blast |
| 36/83 | 7.8 | 0500 | 08-26 | 1 | Partridge | crushed | |
| 37/83 | 11.8 | 0700 | 12 | 1 | Barn owl | fresh. almost whole | Apparently hit by blast |
| 38/83 | 11.8 | 1030 | 03 | 1 | Partridge | crushed. old | |
| 39/83 | 12.8 | 1430 | 12 | 1 | Turtle dove | crushed | |
| 40/83 | 12.8 | ? | 12 | 1 | Kestrel | wings only found | |
| 41/83 | 16.8 | 1430 | 08 | 1 | Turtle dove | whole fresh | Apparently hit by blast |
| 42/83 | 16.8 | 1430 | 26 | 1 | Pigeon | live but wounded | Died shortly afterwards. Apparently hit by blast |
| 43/83 | 16.8 | 1500 | 30-12 | 1 | Turtle dove | whole fresh | Apparently hit by blast |

| Number | Date | Time | Runway | Amount | Species | Condition of Bird | Remarks |
|--------|------|------|--------|--------|---------------------------|--------------------------------|-------------------------|
| 44/83 | 17.8 | 1400 | 08 | 1 | Turtle dove | run over and crushed | |
| 45/83 | 17.8 | 1640 | 30 | 1 | Turtle dove | crushed | Part of carcass found |
| 46/83 | 17.8 | 1700 | 30 | 1 | Turtle dove | crushed | Apparently hit by blast |
| 47/83 | 23.8 | 0750 | 30 | 1 | Turtle dove | whole | Apparently hit by blast |
| 48/83 | 23.8 | 0815 | 30 | 1 | Turtle dove | almost whole | |
| 49/83 | 28.8 | 0530 | 21 | 3 | Partridge | crushed | Apparently hit by blast |
| 50/83 | 30.8 | 0800 | 30 | 1 | Turtle dove | whole - eaten | |
| 51/83 | 4.9 | 1530 | 12 | 1 | Turtle dove | crushed | Apparently hit by blast |
| 52/83 | 4.9 | ? | 12 | 1 | Quail | whole. old | Apparently hit by blast |
| 53/83 | 5.9 | 0700 | 12 | 1 | Hobby | whole | Apparently hit by blast |
| 54/83 | 5.9 | 0730 | 08 | 1 | Common stone curlew | found alive. died after 4 hour | Apparently hit by blast |
| 55/83 | 8.9 | 0715 | 03-21 | 1 | Partridge | feathers only found | |
| 56/83 | 15.9 | 0530 | 30 | 1 | young Common stone curlew | completely crushed | |
| 57/83 | 15.9 | 0600 | 30 | 1 | Quail | whole | Apparently hit by blast |

| Number | Date | Time | Runway | Amount | Species | Condition of Bird | Remarks |
|--------|-------|-------|---------|--------|----------------------|---------------------------|-----------------------------------|
| 58/83 | 18.9 | 0700 | 30 | 1 | Turtle dove | whole | Apparently hit by blast |
| 59/83 | 19.9 | 1500 | 12 | ? | unidentified | small feathers only found | |
| 60/83 | 25.9 | 0600 | 26-08 | 1 | Nightjar | whole | Apparently hit by blast |
| 61/83 | 4.10 | 0700 | 08 | 1 | Palm dove | whole | Apparently hit by blast |
| 62/83 | 13.10 | 0545 | 26-08 | 1 | Partridge | badly crushed | |
| 63/83 | 28.10 | 0600 | 26 | 1 | Partridge | | 20 crows surrounding carcass |
| 64/83 | 29.10 | 0640 | Delta 3 | 1 | Pigeon | body damaged | |
| 65/83 | 14.11 | 0600 | 03-21 | 2 | Common Stone Curlew | whole | Apparently hit by blast |
| 66/83 | 16.11 | 0600 | 21 | 1 | Young Kentish plover | whole | Apparently hit by blast |
| 67/83 | 20.11 | 0600 | 03 | 1 | Common stone Curlew | crushed | |
| 68/83 | 5.12 | 0620 | 08-26 | 1 | Partridge | | 8 crows surrounding carcass |
| 69/83 | 22.12 | 0630 | 30 | 1 | Partridge | crushed | |
| 70/83 | 27.12 | 0645 | 08 | 1 | Skylark | crushed | Several crows surrounding carcass |
| 71/83 | 27.12 | 10.30 | 08 | 1 | Kestrel | eaten | |

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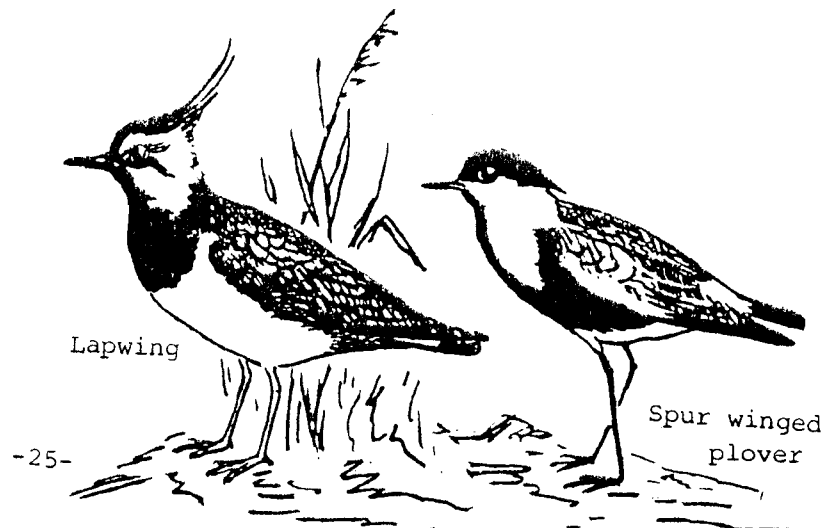
3. Graph according to months of the year (carcasses on runways) Ben Gurion
Airport



Carcasses found on runways according to months of the year - in percentages
Ben Gurion Airport 1983

| January | February | March | April | May | June | July | August | September | October | November | December | |
|---------|----------|-------|-------|-----|------|------|--------|-----------|---------|----------|----------|---------------------------|
| 3 | 2 | 2 | 3 | 5 | 9 | 7 | 19 | 10 | 4 | 3 | 4 | Number of Carcasses |
| 4.2 | 2.8 | 2.8 | 4.2 | 7 | 12.6 | 9.8 | 26.7 | 14 | 5.6 | 4.2 | 5.6 | Percent |

Peak date for carcasses found on runways in 10 June, when 5 carcasses were found in 5 different places. August, which is the peak month for finding carcasses on the runways is also the peak month for reporting of bird-aircraft collisions.



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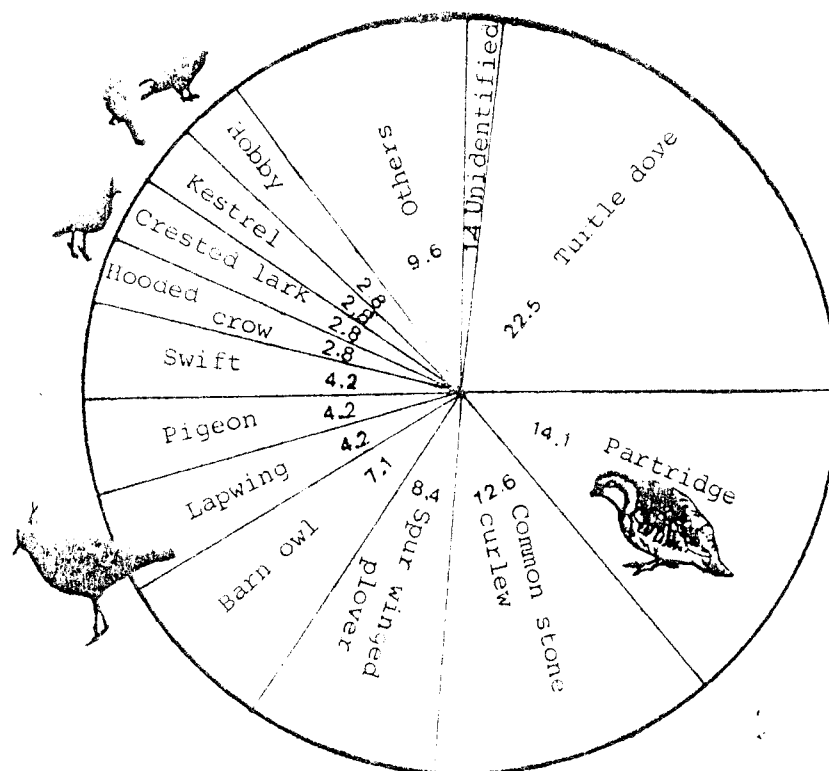
4. Division according to runways and various parts of runway (bird carcasses on runways) - Ben Gurion Airport 1983

| | | | | | | | | | |
|-------|-----------------|----|-------|-----------------|----|-----|-----------------|----|---------|
| 30 | 30-12 centre | 12 | 08 | 08-26 centre | 26 | 03 | 03-21 centre | 21 | carriac |
| 10 | 3 | 8 | 21 | 7 | 8 | 2 | 4 | 6 | |
| 21 | | | 36 | | | 12 | | | 2 |
| 29.5% | | | 50.5% | | | 17% | | | 3% |

It is interesting to note that most of the bird carcasses were found on runway 08-26 while the greatest Turtle dove activity took place along runway 12-30 (Turtle doves formed the greatest number of carcasses). This can probably be explained by the fact that runway 08-26 had been in intensive use, while runway 12-30 had been out of use for a prolonged period prior to the "Turtle dove season". In comparison: most of the reported collisions came from runway 12-30 (See page 9).

In 1982 most of the bird carcasses were found on runway 12-30 (46%).

5. Division according to bird species (bird carcasses on runway) Ben-Gurion Airport 1983. In percentages



a) Turtle dove carcasses (in 1983) were found in the greatest number on runways (16 out of 71 cases). 12 out of the 19 carcasses found in August alone were Turtle doves (a total of 22 carcasses on the runway).

Comparison: according to reports on bird-aircraft collisions, the Turtle dove is the species which is most involved in collisions (see page 11).

In 1982 no Turtle dove carcasses were found on runways.

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b) The Partridge takes second place, both in reports on collisions and carcasses found on runways (10 cases in which 12 partridges were involved).

c) The Common Stone Curlew is third (9 cases in which 10 curlews were involved). However, it is interesting to note that curlew remains were not found in any of the reports on bird-aircraft collisions).

d) The Spur Winged Plover as the curlew, usually broods in open areas on the ground (sometimes even on the edge of the runway). Our observations show that in 1983 there was an increase in the number of pairs of plover brooding close to the runways (mostly runway 08-26) and for this reason the number of collisions and carcasses found of this species also increased in this year. In 1982, however, there were no reports of collisions with plovers, and only one plover carcass was found on the runway.

Most plover carcasses were found in May-June which is their nesting and brooding season.

e) In 1983 Barn Owls formed 7.1% of all carcasses found on the runways, while in 1982 they took second place (22%). This may be due to the fact that a special effort was made to find Barn Owl nests and transfer eggs and nestlings from the airport to various "pet corners".

f) It should be noted that no Gull carcasses were found on runways in 1983 (with the exception of one reported case of collision of an aircraft with gulls) while in 1982 they formed the greatest number of carcasses (54.1%).



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6. Analysis according to condition of the bird (carcasses on runways) - Ben
Gurion Airport 1983

- A) In 30 out of 71 cases, forming 42.2%, the bird was found whole and we therefore assume that it was indirectly hit by an air blast from a low-flying aircraft.
- B) In 33 cases, forming 46.5%, crushed carcasses were found, some so badly that only feathers remained. Here we assume that a direct hit occurred, but that it was not felt by the pilot. In these cases, we examine take-off and landings on the same runway, prior to the collision and technicians are requested to look for remains on the aircraft.
- C) In some cases many crows were found in the vicinity of the carcass. One observation showed 28 crows. It is therefore most important that the carcass be removed from the runway immediately. In one case (10.6.83) a Hooded crow carcass was found next to a hare carcass on the same runway.

E. General Summary

1. Naturally, data accumulated over 1-2 years are not sufficient to reach any definite conclusions, on topics such as number and type of bird involved in collisions (p.11,12), or on the amount of damage caused to the aircraft (p.14). With clear and sufficient information, we should be able to determine various categories.

2. In some cases such as flight stage at the time of collision (p. 10) or section of the aircraft (p. 15), there is a clear similarity with international data (which is usually much more comprehensive and collected over a number of years).

3. In cases such as collisions according to time of day (p. 16) or type of bird (carcass) on the runway (p. 27) - analysis of data is helped to a great extent by daily observations carried out by us.

4. This summary does not include topics concerned with methods of preventing approaching of birds (agriculture, area clearance etc.) or preventive methods (noise transmission, netting, explosive sounds etc.). These topics have been dealt with in detail in previous reports and summaries. It is clear however, that these data greatly affect methods of action used by our unit and by the Airport Authority. We must once again stress the growing awareness among units at the Ben-Gurion Airport, assisting towards safer flying and preventing danger and damage.

Appendix A

Hare carcasses on Runways - Ben Gurion Airport 1983

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| No. | Date | Time | Runway | Amount | Remarks |
|-----|-------|------|--------|--------|--|
| 1 | 24.3 | 1530 | 26 | 2 | Crushed, crows seen on carcasses. 2 dogs arrived the next day, attracted by blood stains on the runway |
| 2 | 9.5 | 0500 | 08 | 1 | Almost whole. El Al aircraft which took off at 0130 felt hit but did not stop |
| 3 | 10.6 | 0500 | 26 | 1 | Almost whole |
| 4 | 12.6 | 0530 | 26 | 1 | Whole |
| 5 | 27.6 | 0500 | 26-08 | 1 | Almost whole |
| 6 | 5.7 | 0510 | 08 | 1 | Fresh, whole |
| 7 | 19.7 | 0500 | 26 | 1 | Young, whole |
| 8 | 2.8 | 0500 | 30 | 1 | |
| 9 | 15.8 | 0630 | 12-30 | 1 | |
| 10 | 23.9 | 0530 | 30 | 1 | Crushed |
| 11 | 14.10 | 0545 | 08 | 1 | Crushed |
| 12 | 1.12 | 0630 | 26-08 | 1 | Whole |
| 13 | 5.12 | 0620 | 08 | 1 | Whole |
| 14 | 6.12 | 0550 | 30 | 1 | Crushed |
| 15 | 9.12 | 0630 | 08 | 1 | Crushed |
| 16 | 23.12 | 0630 | 12-30 | 1 | Badly crushed and spread over large area |
| 17 | 25.12 | 0700 | 26 | 1 | Badly crushed |