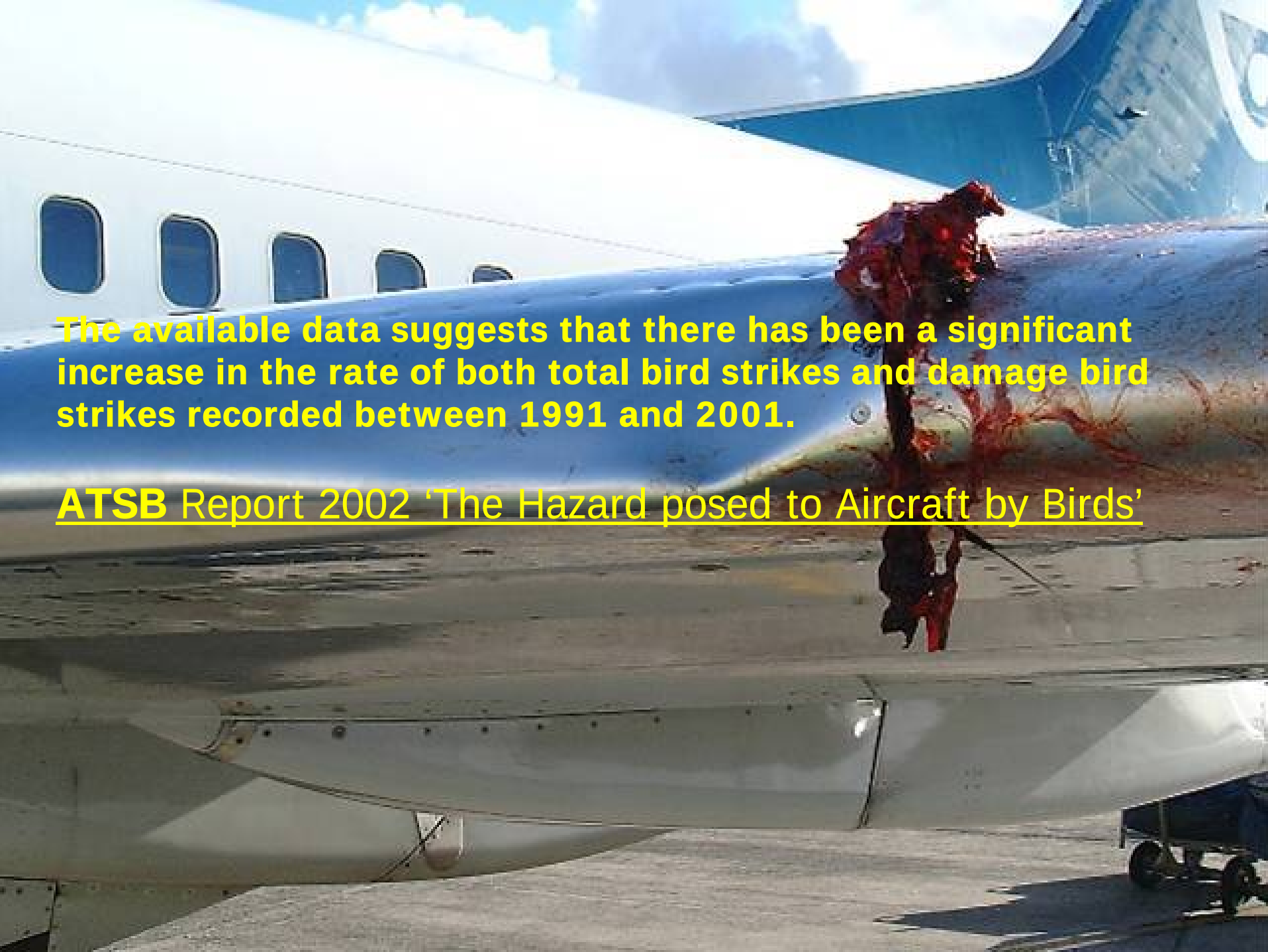
Bird Strikes – Is the risk increasing?

Prepared by Alan Moffat
Mount Cook Airline

In this presentation I would like to:

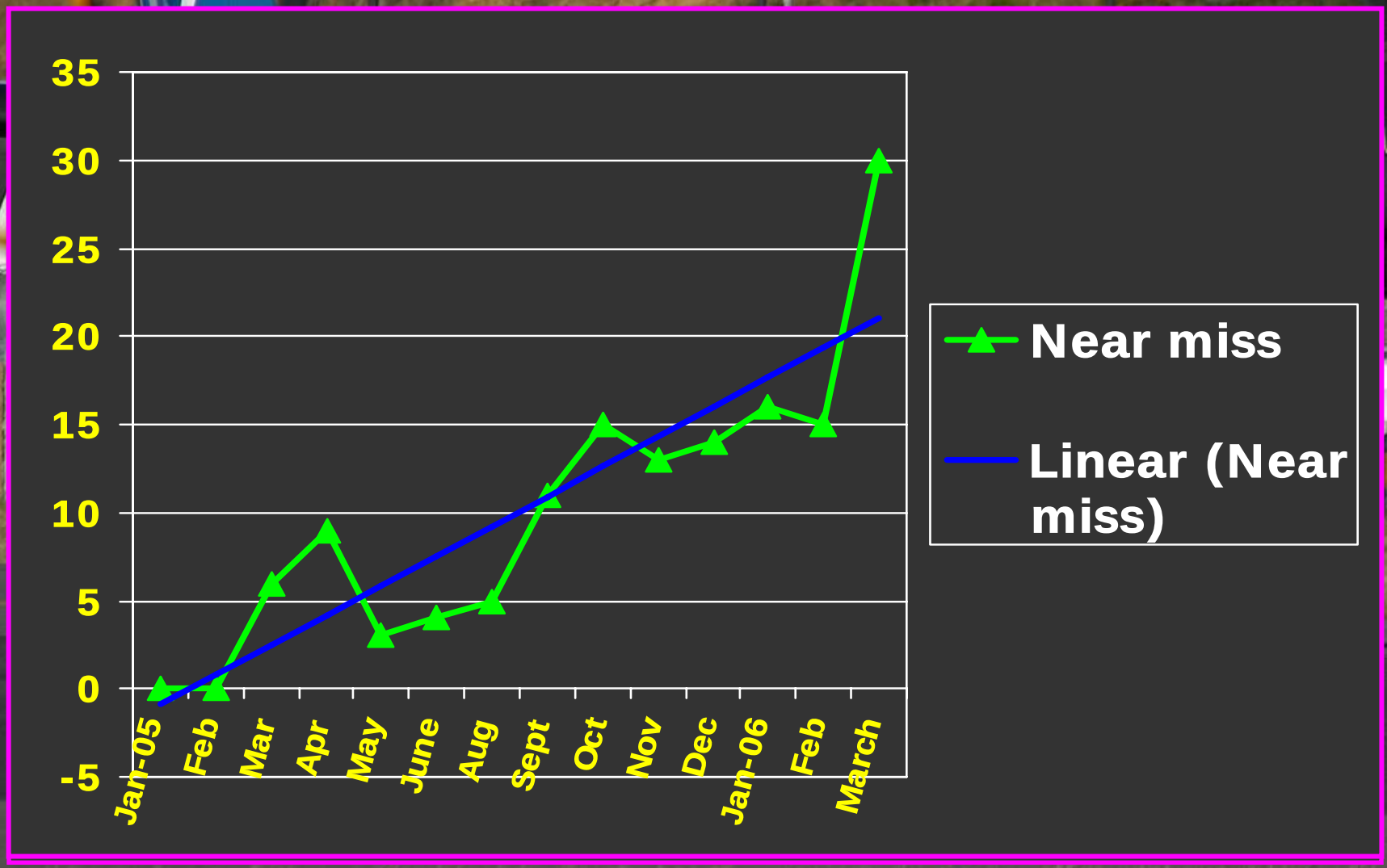
- Look at some regional bird statistics and examine what level of risk that bird strikes pose.
- Look at some of the problems airports face in controlling birds.
- Highlight some areas airlines can improve to reduce bird strike risk.



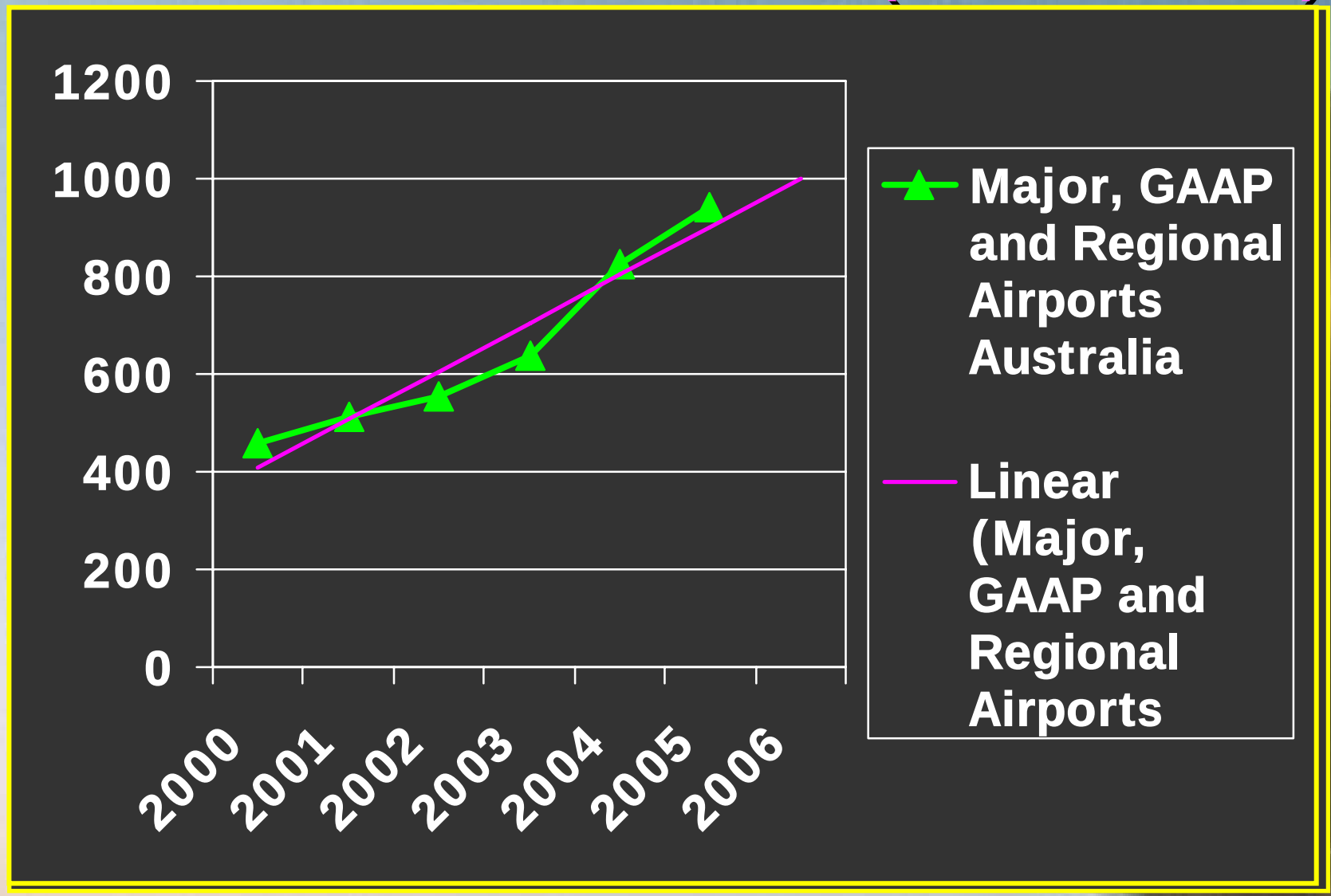
The available data suggests that there has been a significant increase in the rate of both total bird strikes and damage bird strikes recorded between 1991 and 2001.

ATSB Report 2002 'The Hazard posed to Aircraft by Birds'

Mount Cook Airline Bird Strikes and Near Miss Statistics

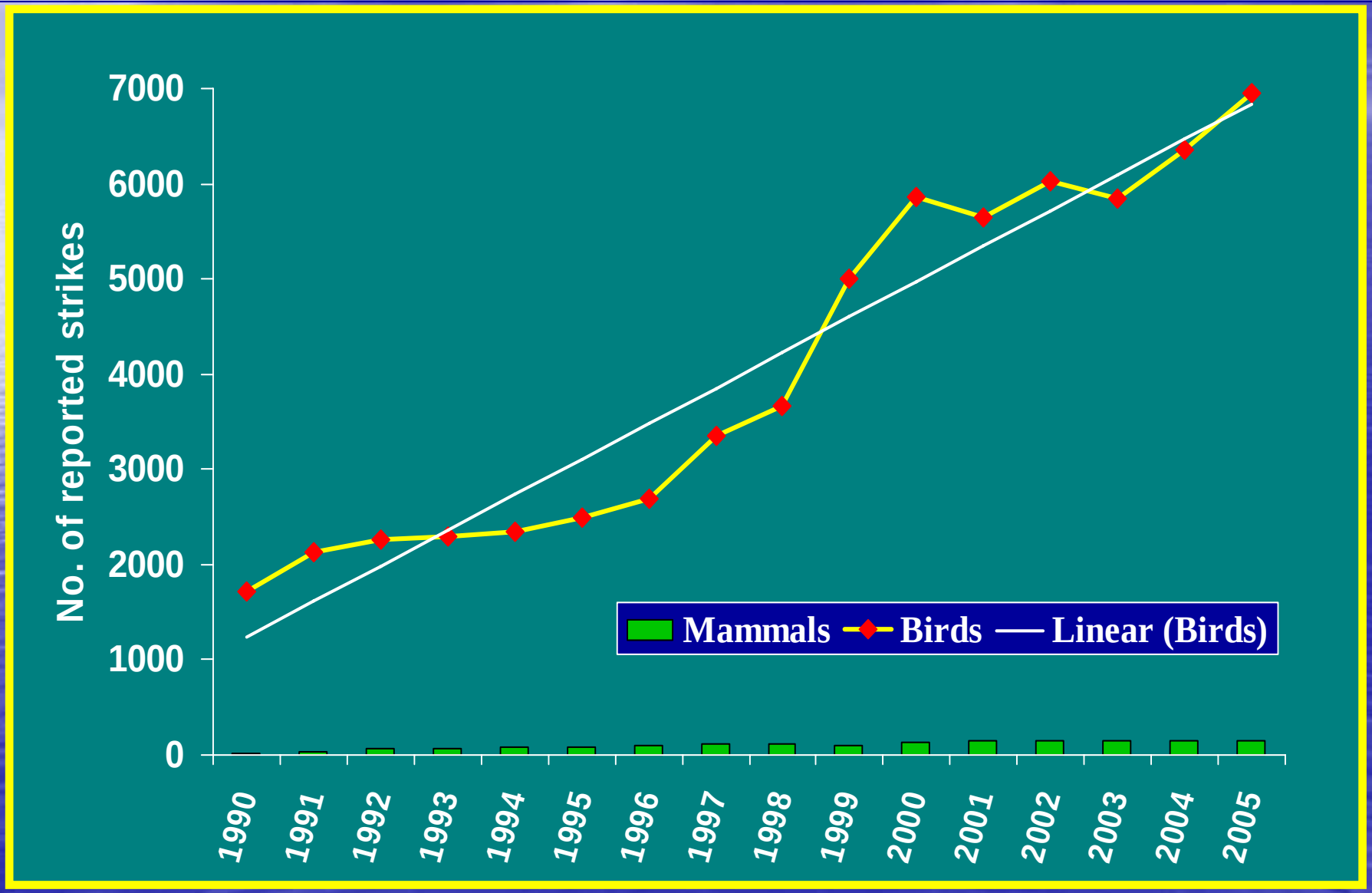


Australian Statistics – (from ATSB)

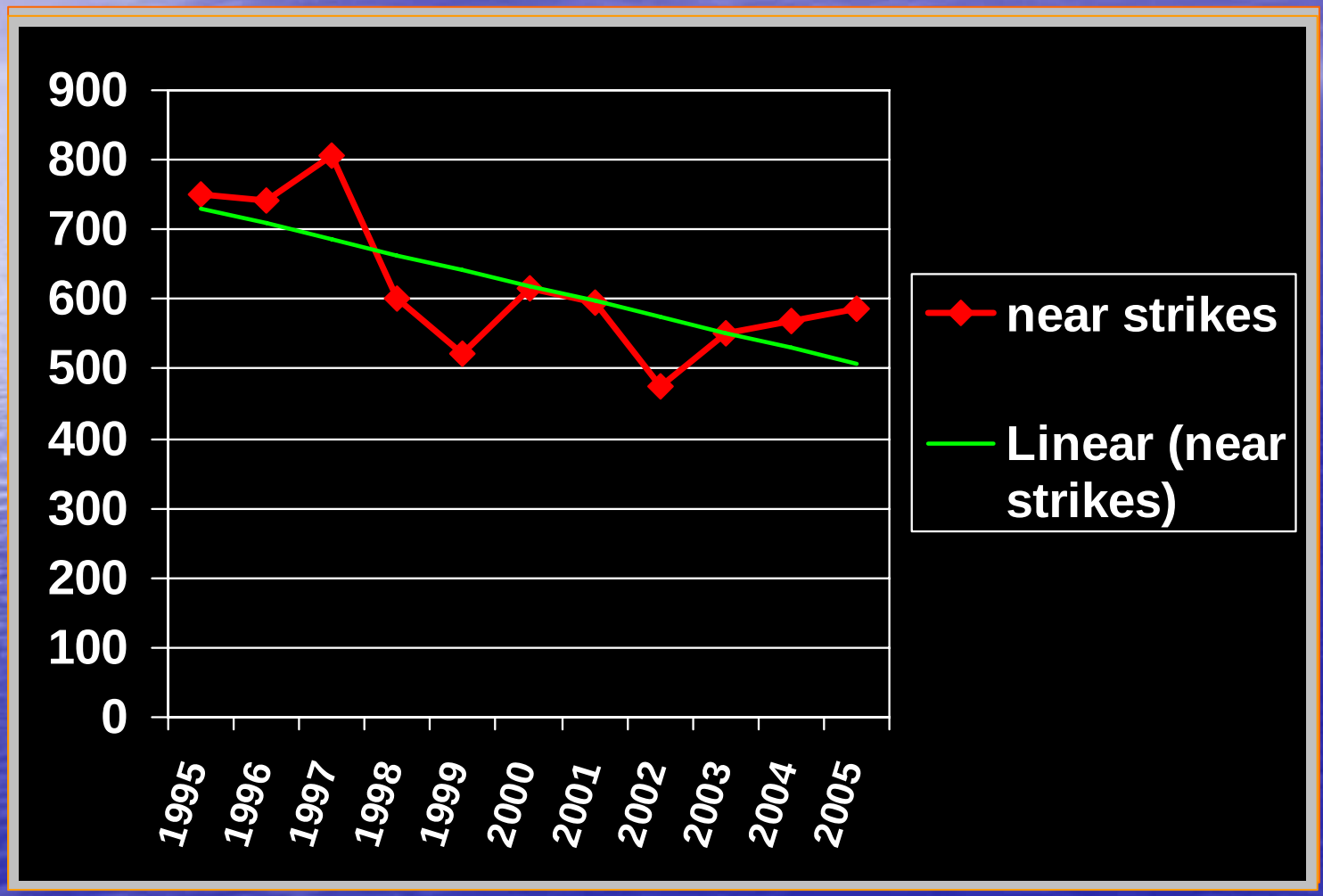


Reported Wildlife Strikes with Civil Aircraft in USA Tripled, 1990-2004

Source – US Fish and Wildlife Service



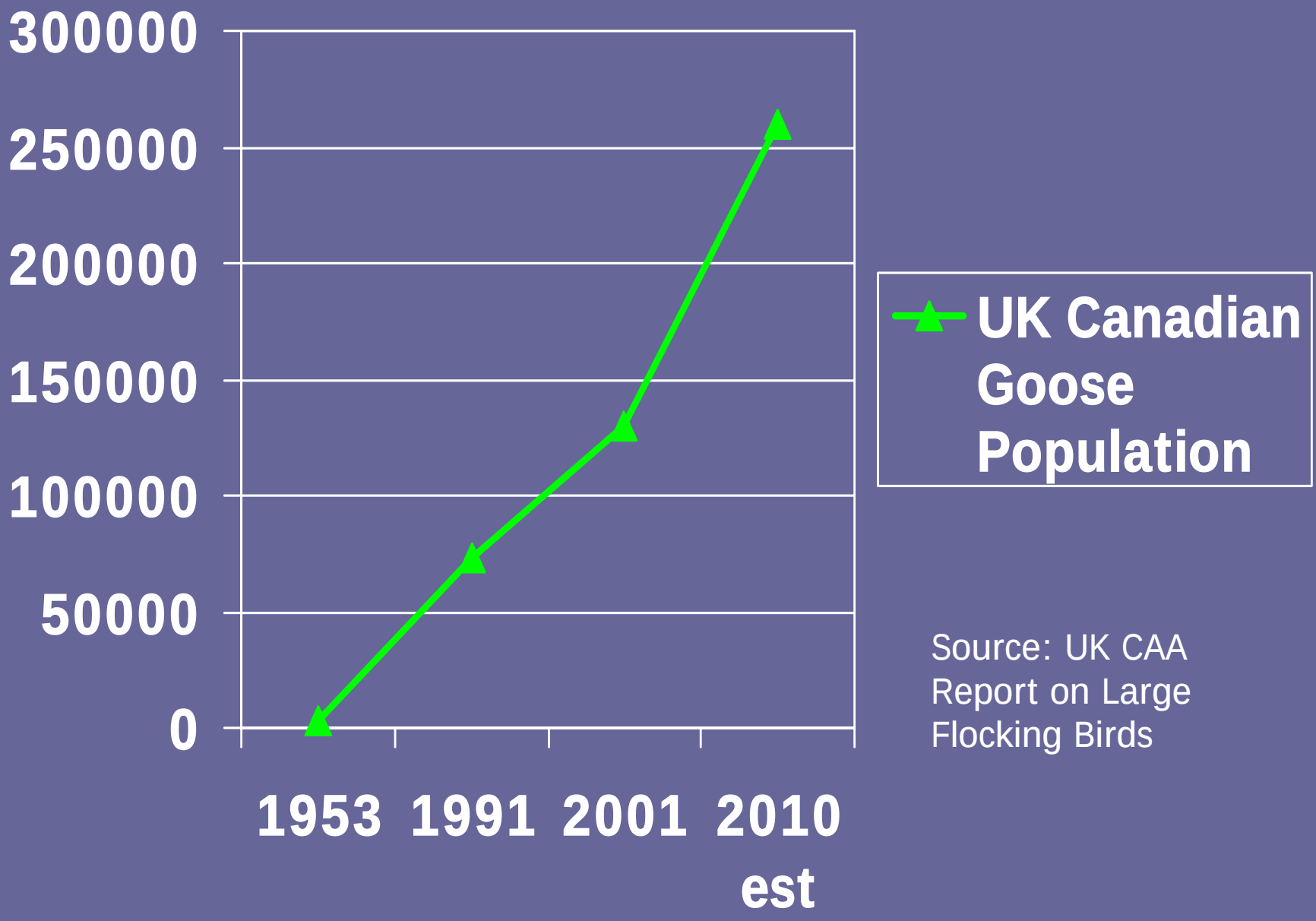
NZ Strike/Near Miss Statistics – Source NZCAA



Three Representative Species

- Large – Canadian Goose, impact forces at 250 knots up to 38 Tonnes.
- Medium – Cormorant, impact forces at 250 knots 5 – 20 Tonnes
- Small – Starling, impact forces at 250 knots up to 2.5 Tonnes

Impact forces taken from ATSB Report



Source: UK CAA Report on Large Flocking Birds

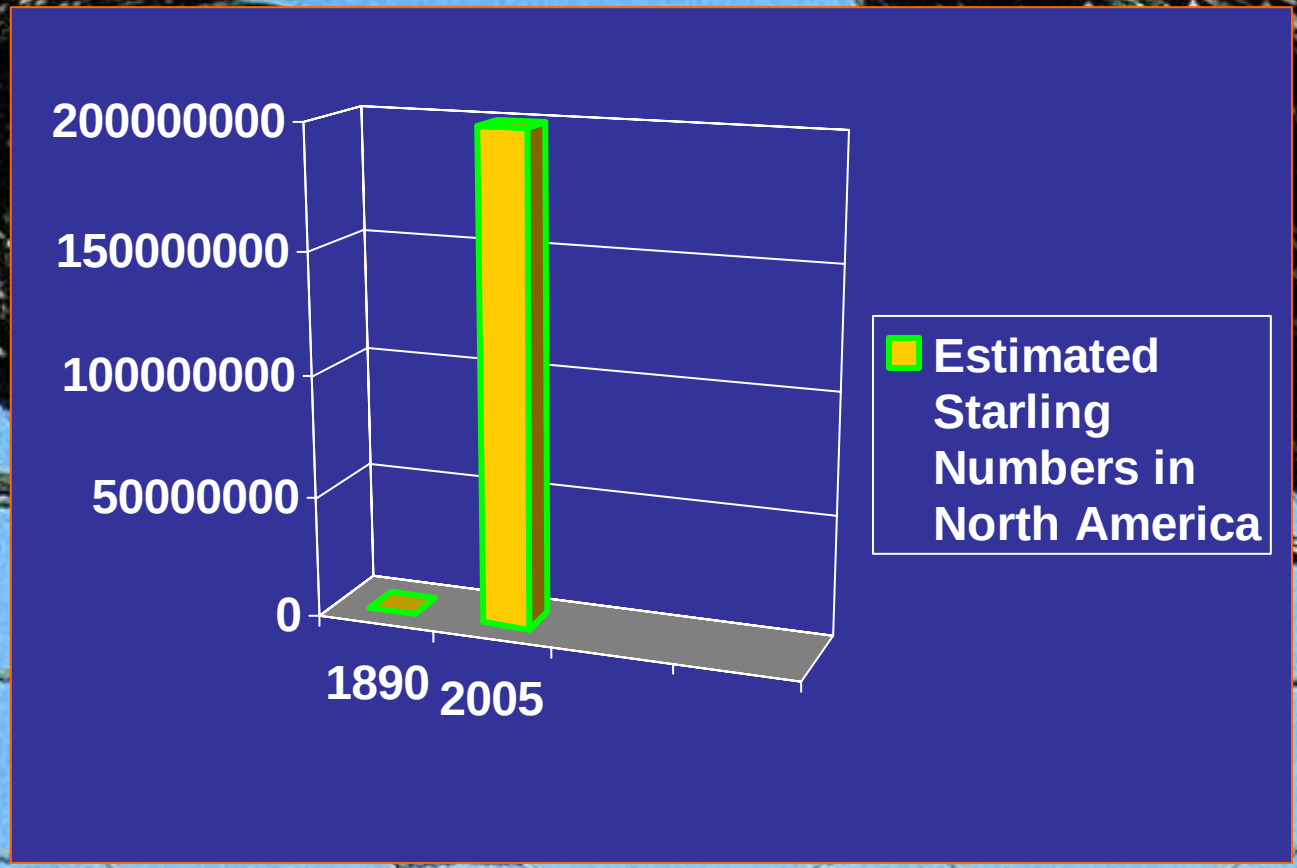
Boeing 727 engine after ingesting a Canadian Goose, April 2000

A320 engine totally destroyed after ingesting a Canadian Goose

BREEDING POPULATION OF CORMORANTS INCREASED OVER 1000-FOLD ON THE GREAT LAKES, 1972-2004

MD80 engine after ingesting a 5lb Cormorant

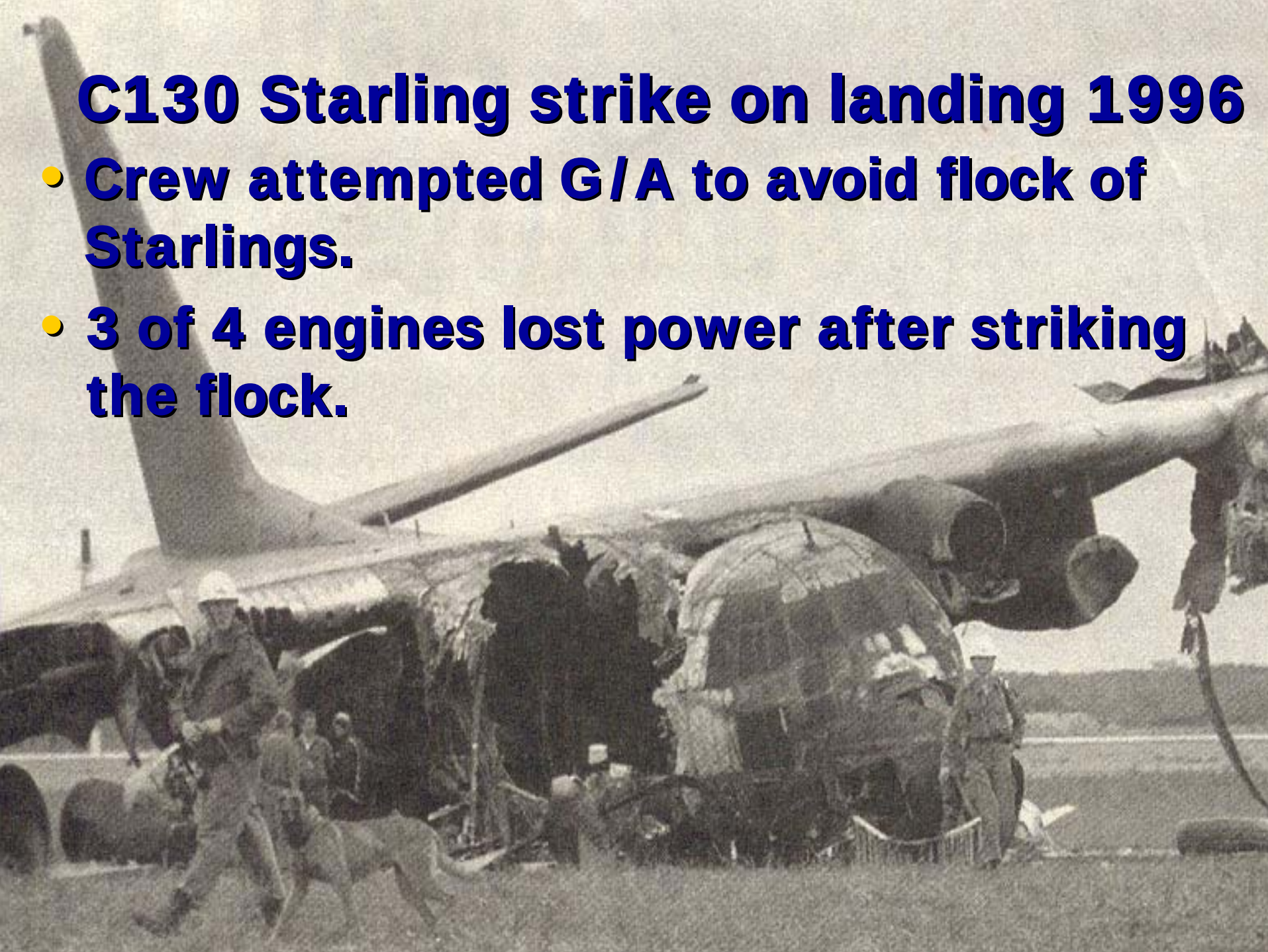
Starling population ('Feathered Bullet')

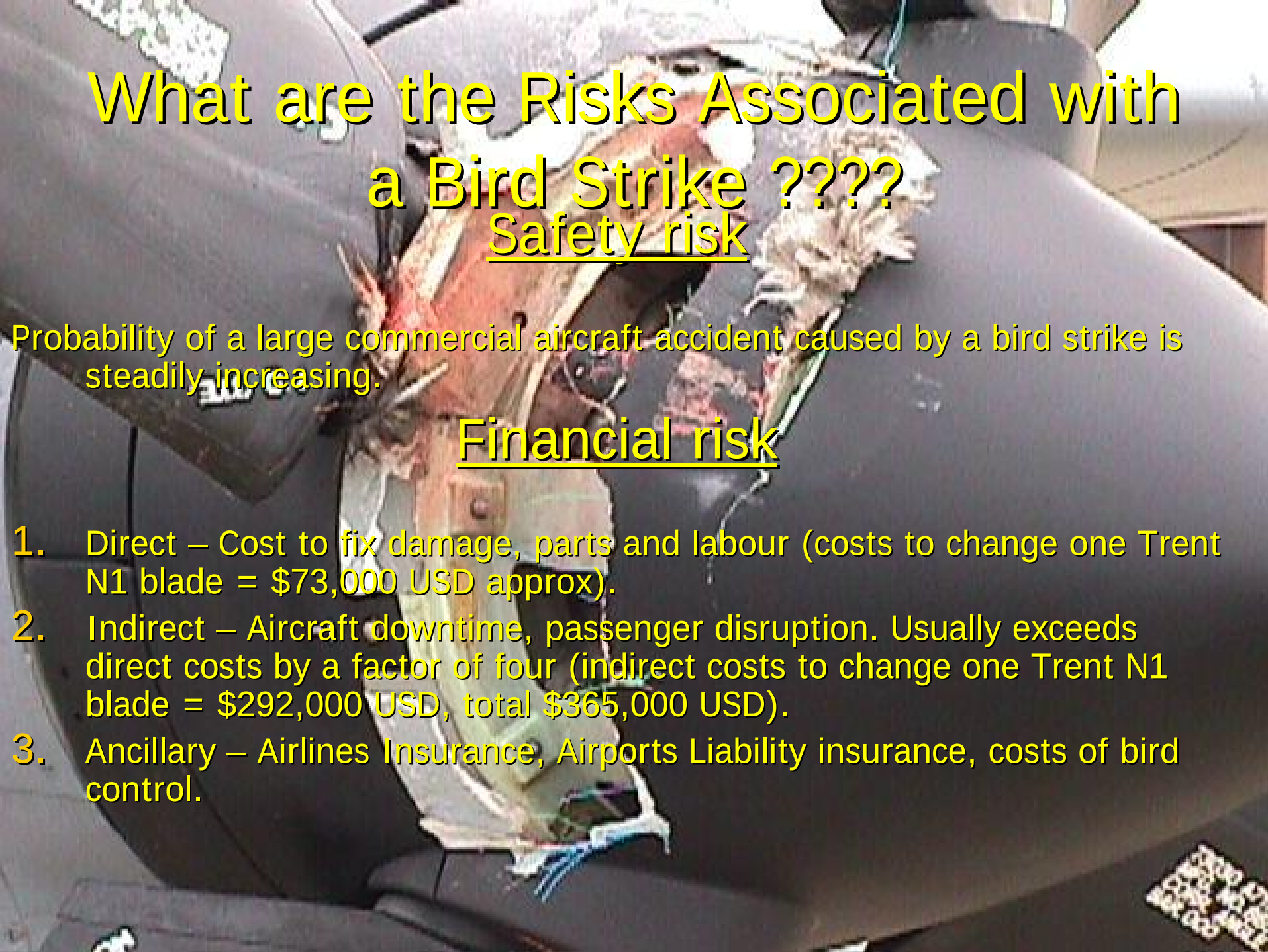


- **Starling flocks can contain thousands of individual birds.**

C130 Starling strike on landing 1996

- Crew attempted G/A to avoid flock of Starlings.
- 3 of 4 engines lost power after striking the flock.





What are the Risks Associated with a Bird Strike ????

Safety risk

Probability of a large commercial aircraft accident caused by a bird strike is steadily increasing.

Financial risk

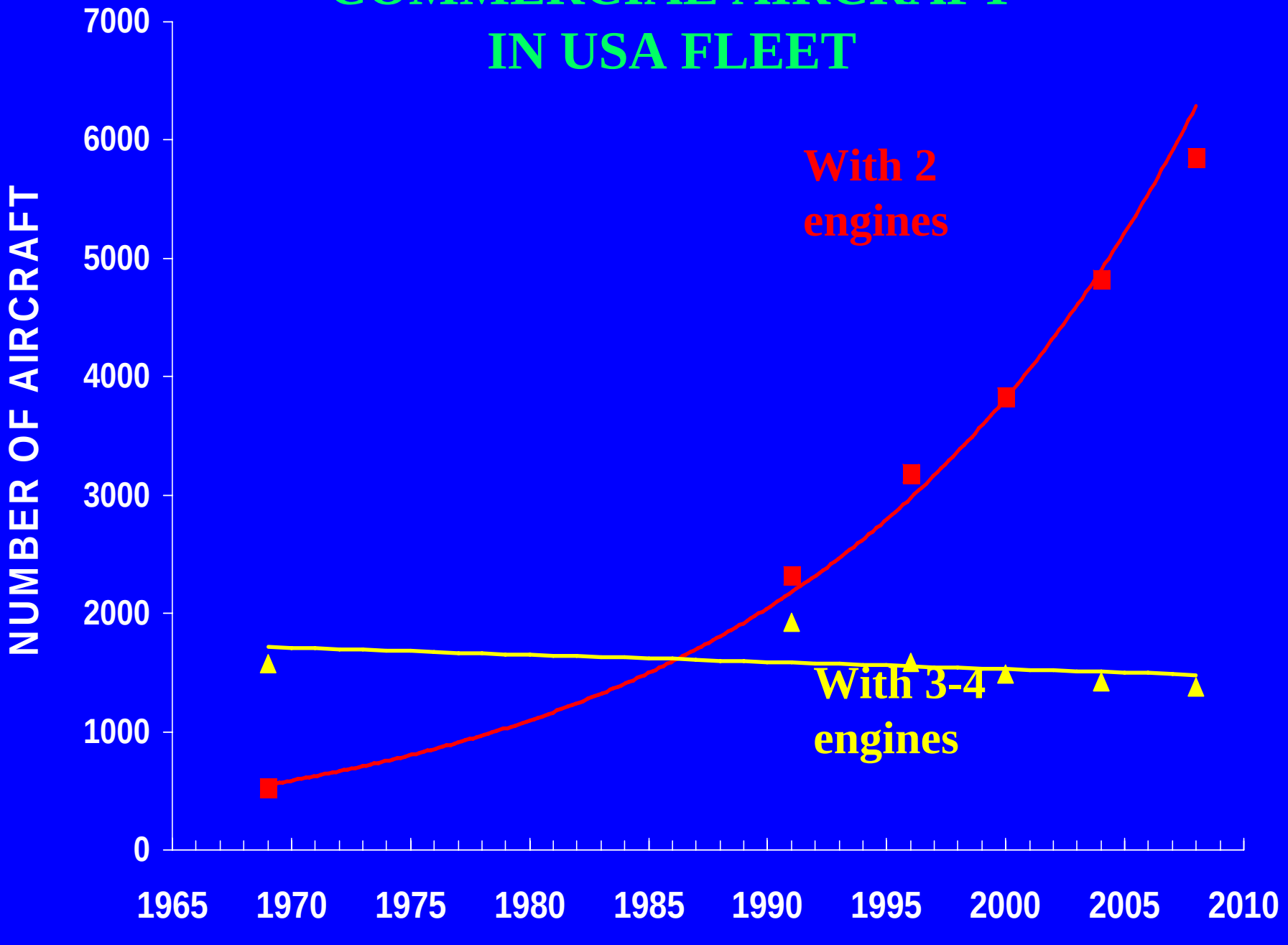
1. Direct – Cost to fix damage, parts and labour (costs to change one Trent N1 blade = $73,000 USD approx).
2. Indirect – Aircraft downtime, passenger disruption. Usually exceeds direct costs by a factor of four (indirect costs to change one Trent N1 blade = $292,000 USD, total $365,000 USD).
3. Ancillary – Airlines Insurance, Airports Liability insurance, costs of bird control.

USA 1990 -2003

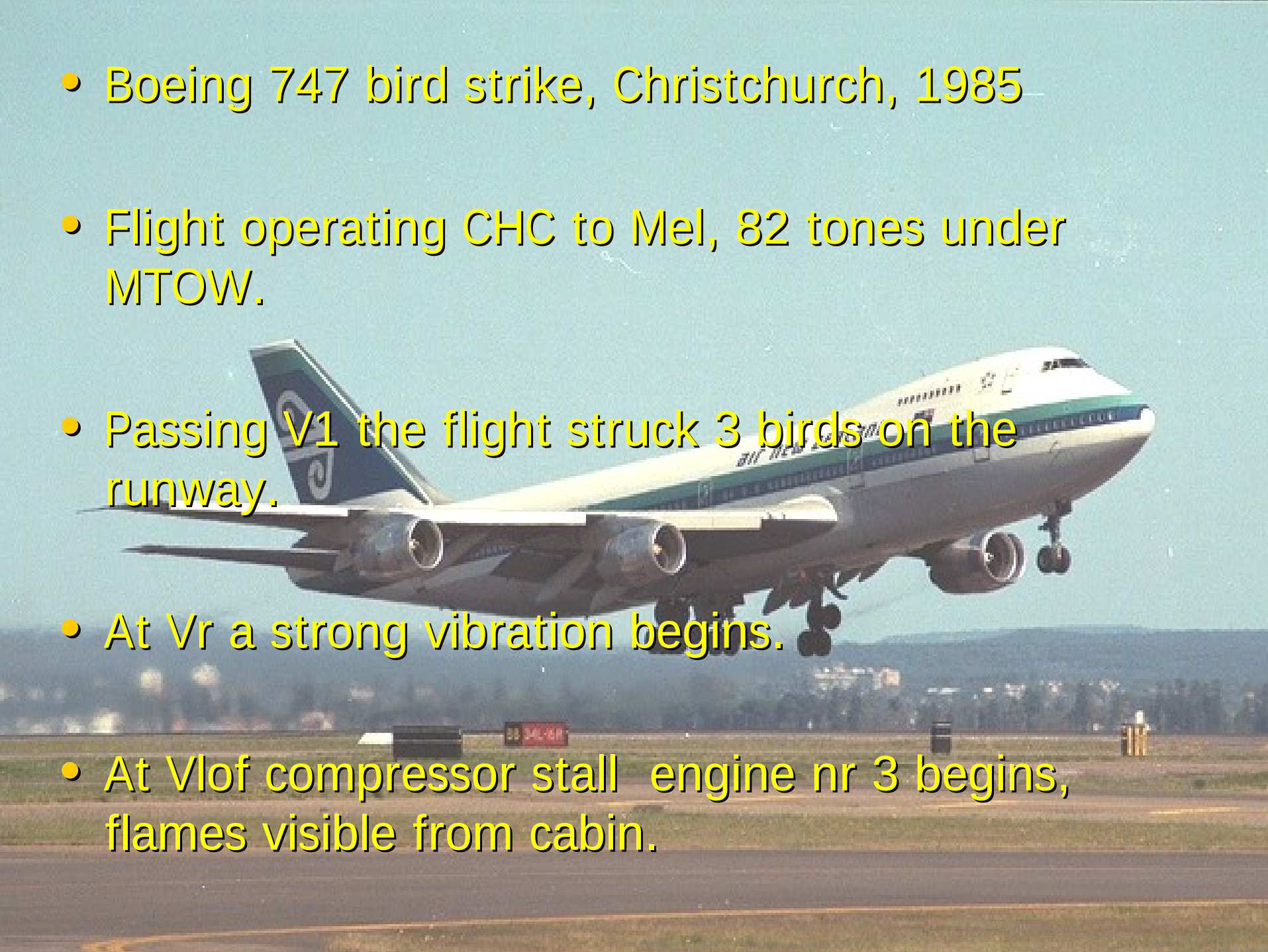
- 293 multi engine strikes occurred in this period.
- In 63 cases twin engine aircraft suffered damage to **both** engines.

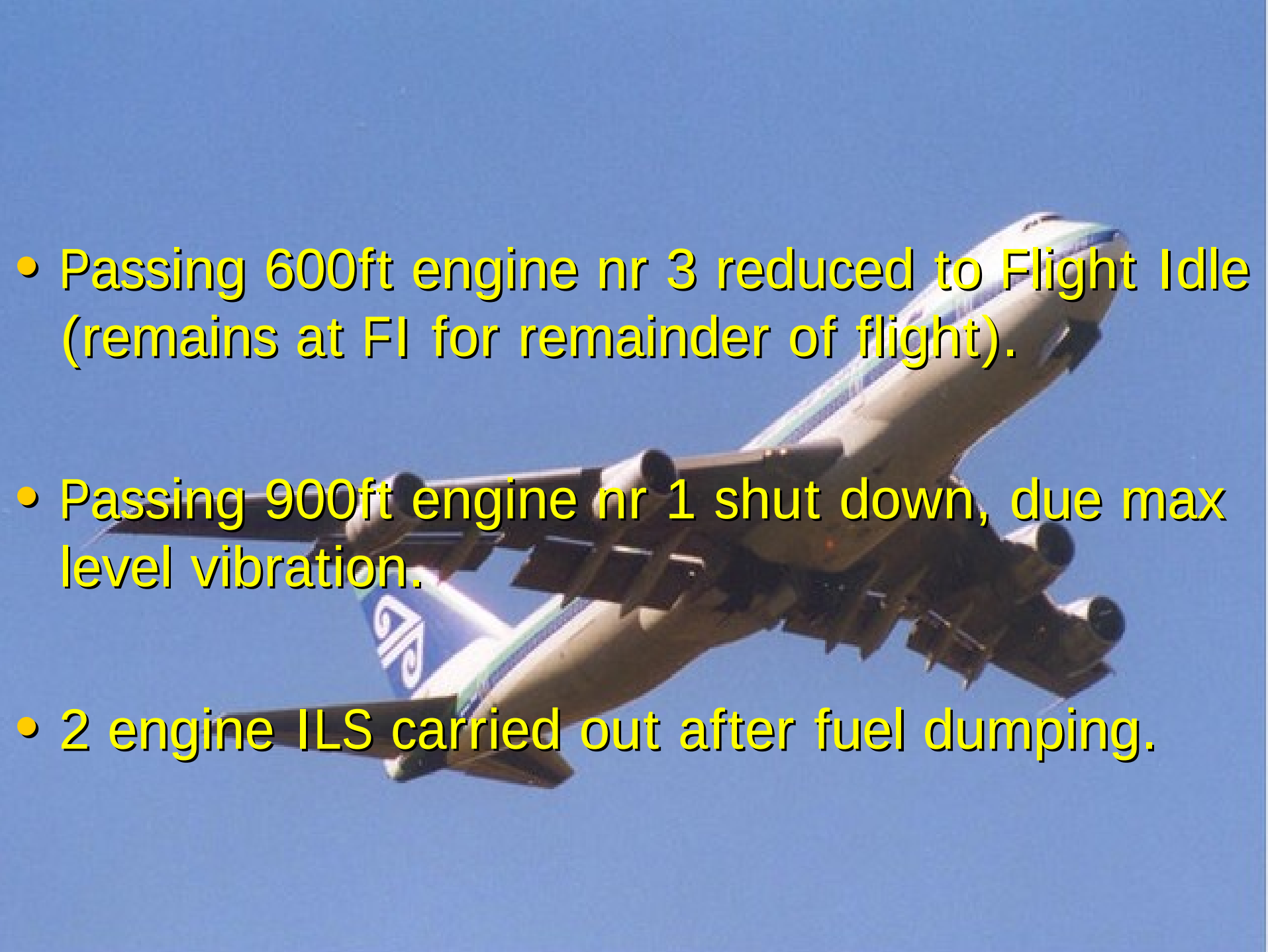
Source – FAA database

COMMERCIAL AIRCRAFT IN USA FLEET



- Boeing 747 bird strike, Christchurch, 1985
- Flight operating CHC to Mel, 82 tones under MTOW.
- Passing V1 the flight struck 3 birds on the runway.
- At Vr a strong vibration begins.
- At Vlof compressor stall engine nr 3 begins, flames visible from cabin.



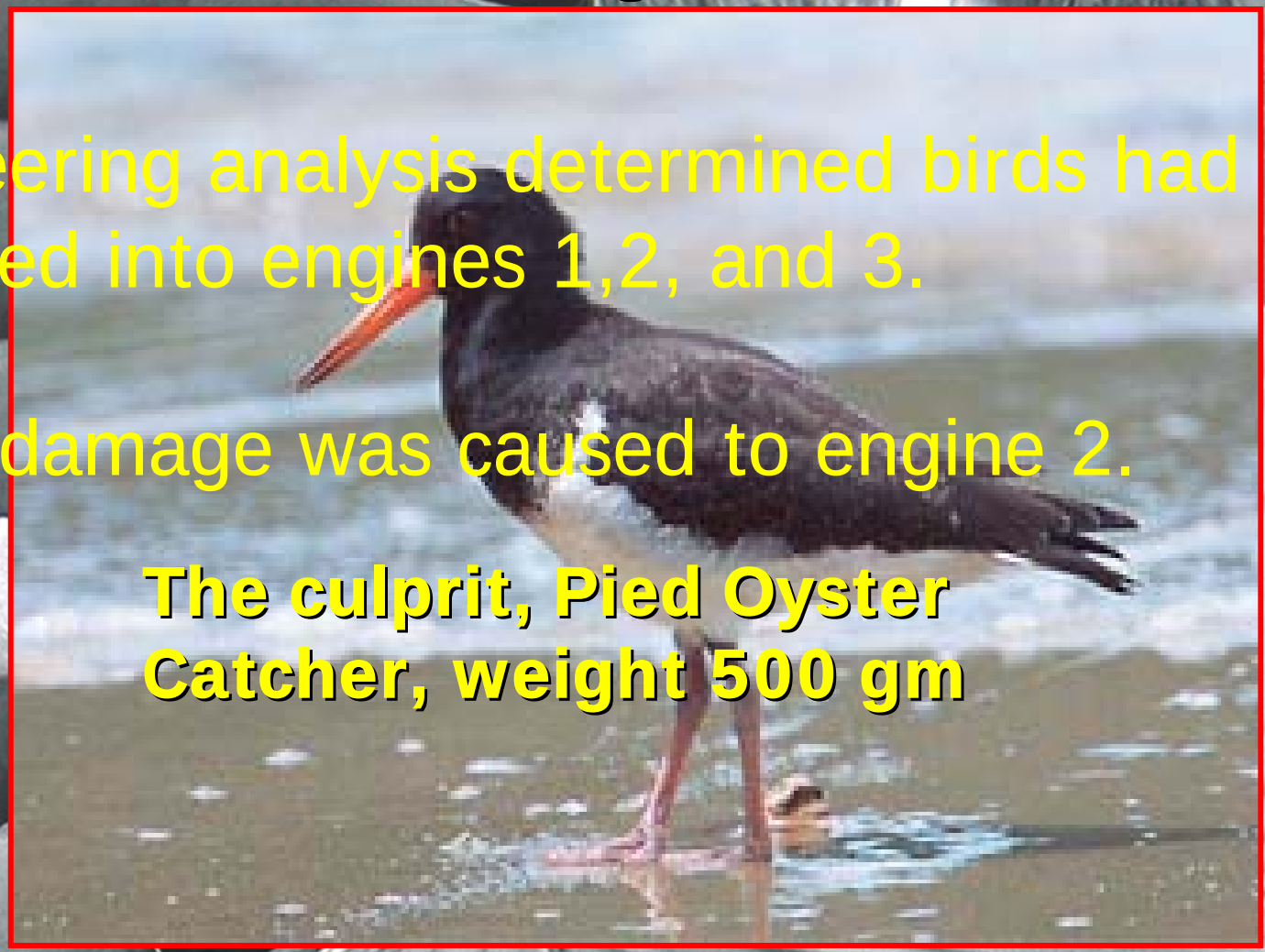


- Passing 600ft engine nr 3 reduced to Flight Idle (remains at FI for remainder of flight).
- Passing 900ft engine nr 1 shut down, due max level vibration.
- 2 engine ILS carried out after fuel dumping.

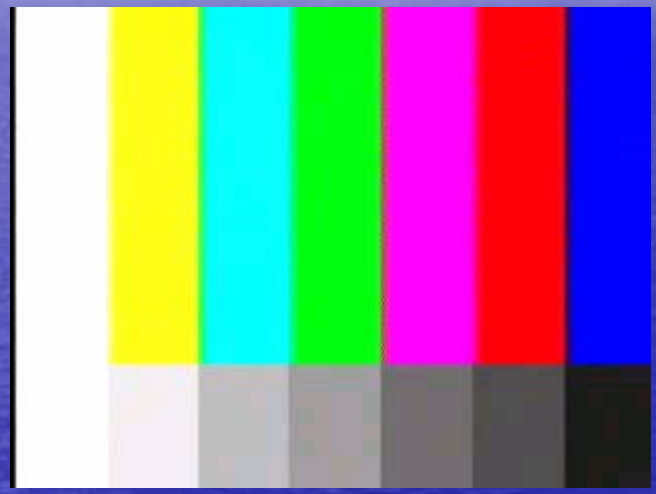
- Some of the damage.

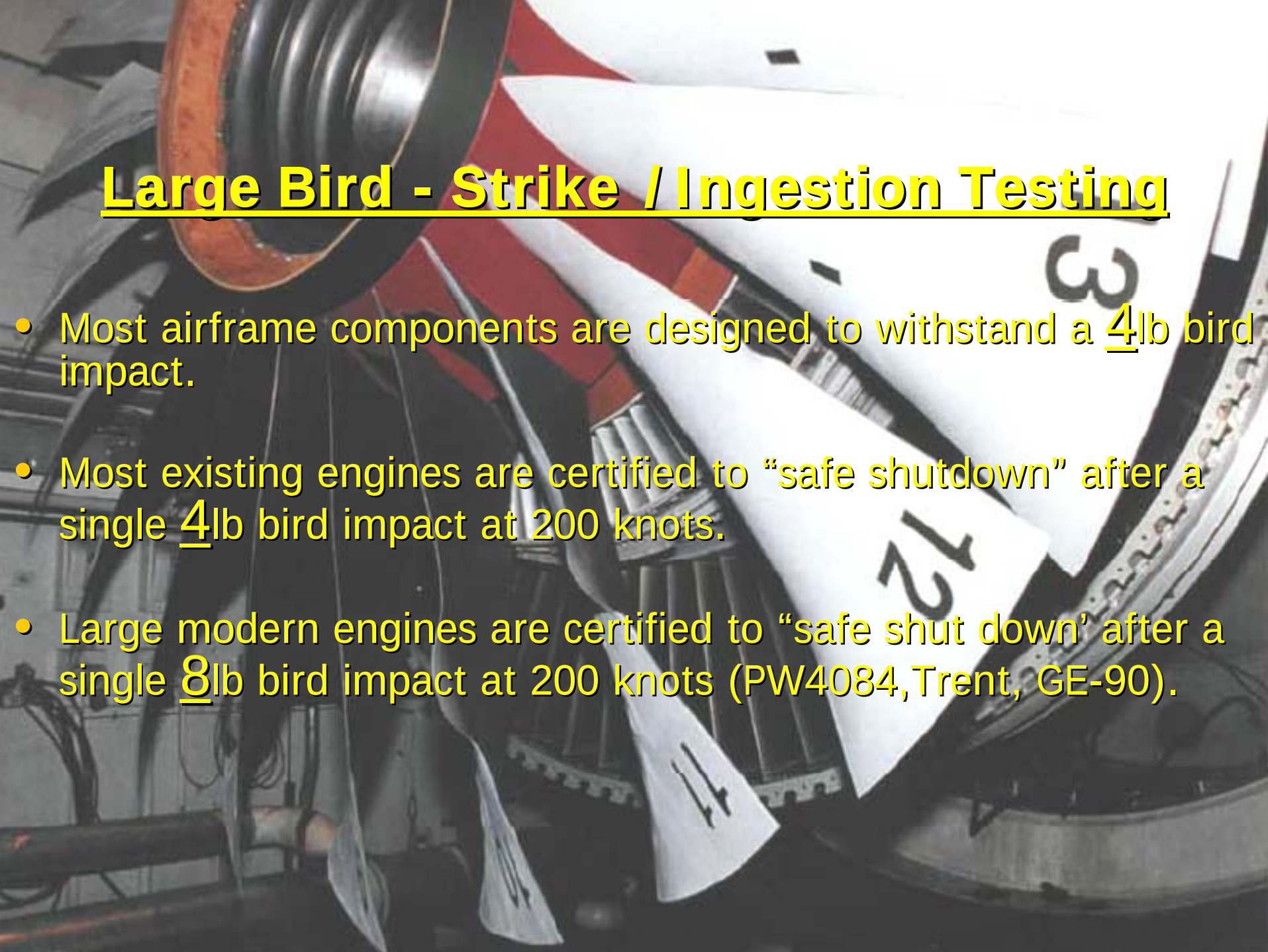
- An engineering analysis determined birds had been ingested into engines 1,2, and 3.

- No major damage was caused to engine 2.



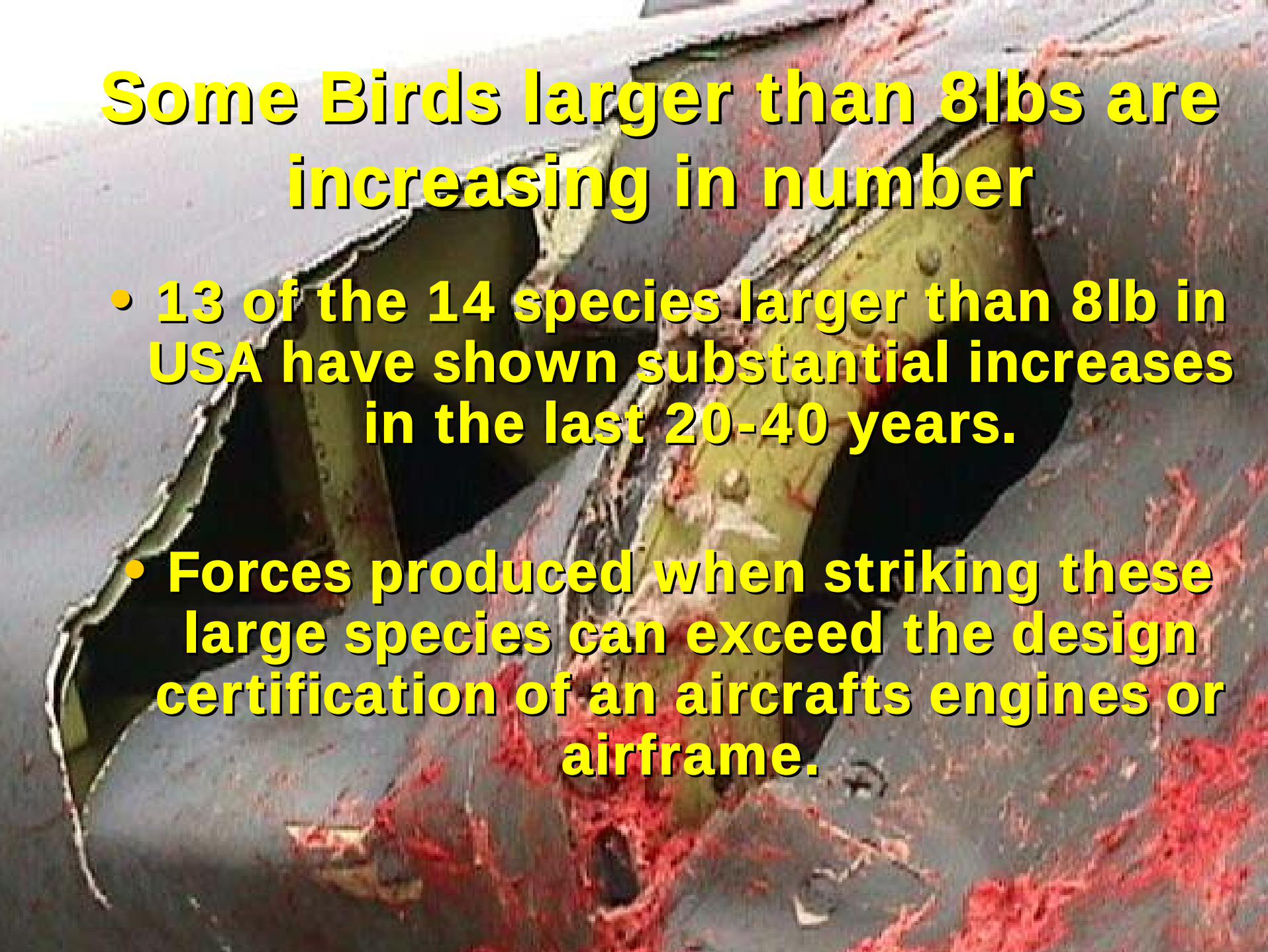
The culprit, Pied Oyster Catcher, weight 500 gm





Large Bird - Strike / Ingestion Testing

- Most airframe components are designed to withstand a 4lb bird impact.
- Most existing engines are certified to “safe shutdown” after a single 4lb bird impact at 200 knots.
- Large modern engines are certified to “safe shut down’ after a single 8lb bird impact at 200 knots (PW4084,Trent, GE-90).



Some Birds larger than 8lbs are increasing in number

- 13 of the 14 species larger than 8lb in USA have shown substantial increases in the last 20-40 years.

- Forces produced when striking these large species can exceed the design certification of an aircrafts engines or airframe.

Are Airports doing enough to control Wildlife??

Proposed rowing lake

Front Page of Christchurch Press

Inhumane – Animal Rights.

Cruel – Game Shooters Club.

Watery grave: Canada geese float on the Bromley oxidation ponds yesterday unaware their number may be up.

Photo: David Alexan

Bird-strike fears lead to culling

Blair Crean

Two thousand Canada geese were to have their heads chopped off in Christchurch overnight, leaving game shooters livid at a lost opportunity.

A cull of the birds on the Avon-Heathcote Estuary was expected to take place at full tide about 3.30am.

Fish and Game North Canterbury was to carry out the cull on behalf of the Christchurch City Council, at the urging of Christchurch International Airport Ltd over concerns the geese posed a bird-strike threat to aircraft.

Swift estimated more than 2000 Canada geese were living on the estuary.

He said the cull would likely account for nearly all of them.

Game shooters were angry that they were not being given the opportunity to shoot the birds.

Shooters paid their licence fees to Fish and Game, and resented the money being used to reduce their quarry.

Club past-president Warren Philpott said the loss of 2000 Canada geese from Canterbury's population

Ministry of Agriculture and Forestr and was within its guidelines.

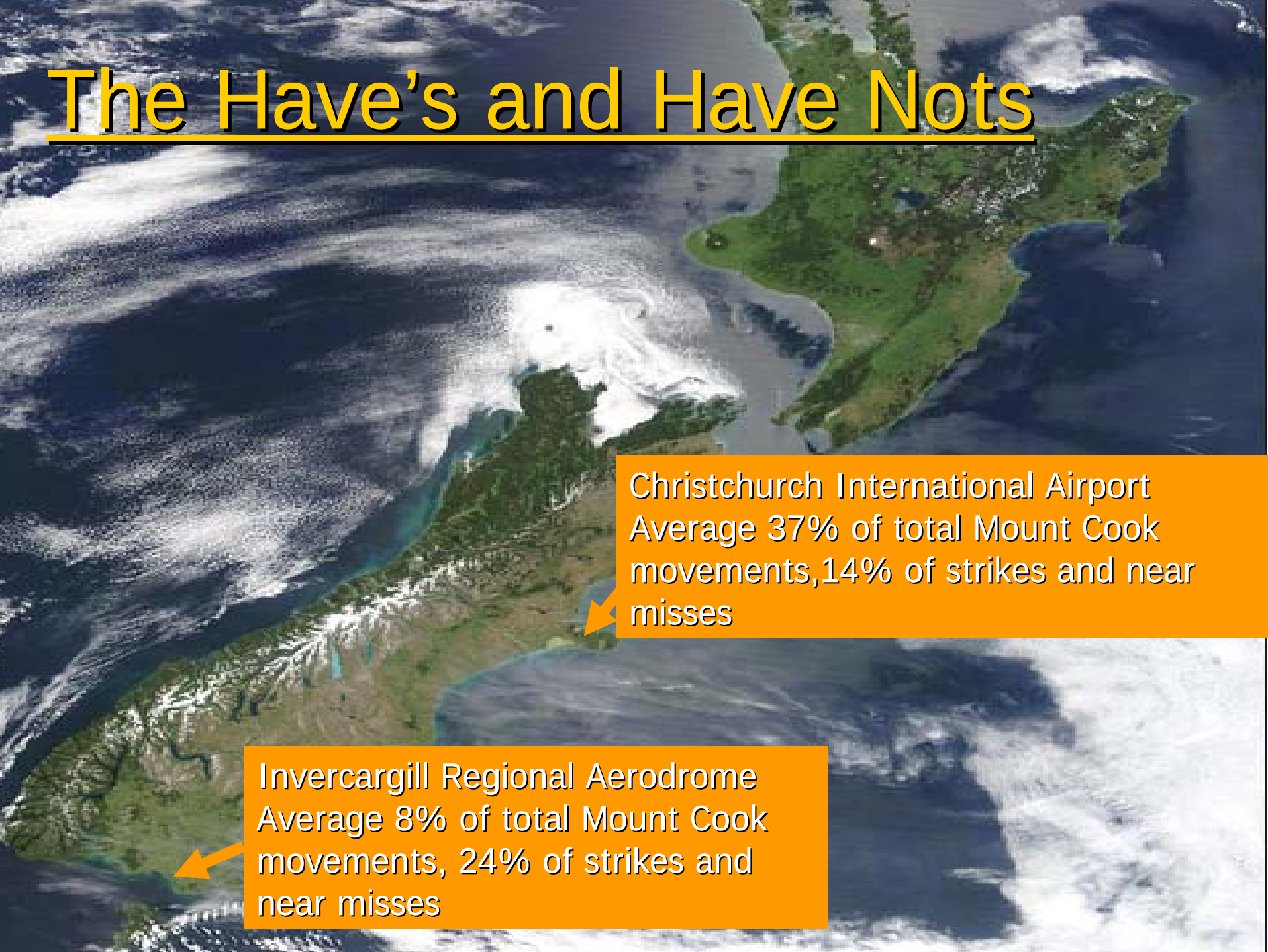
Aitken said the community had raised concerns about Canada gees spoiling fields and public parks.

Christchurch's population of Canada geese was over 3500. This was more than twice the number advised in Fish and Game's management plan.

He said the cull had been approved by the SPCA, and would be supported by veterinarians.

However, a spokesman for

The Have's and Have Nots

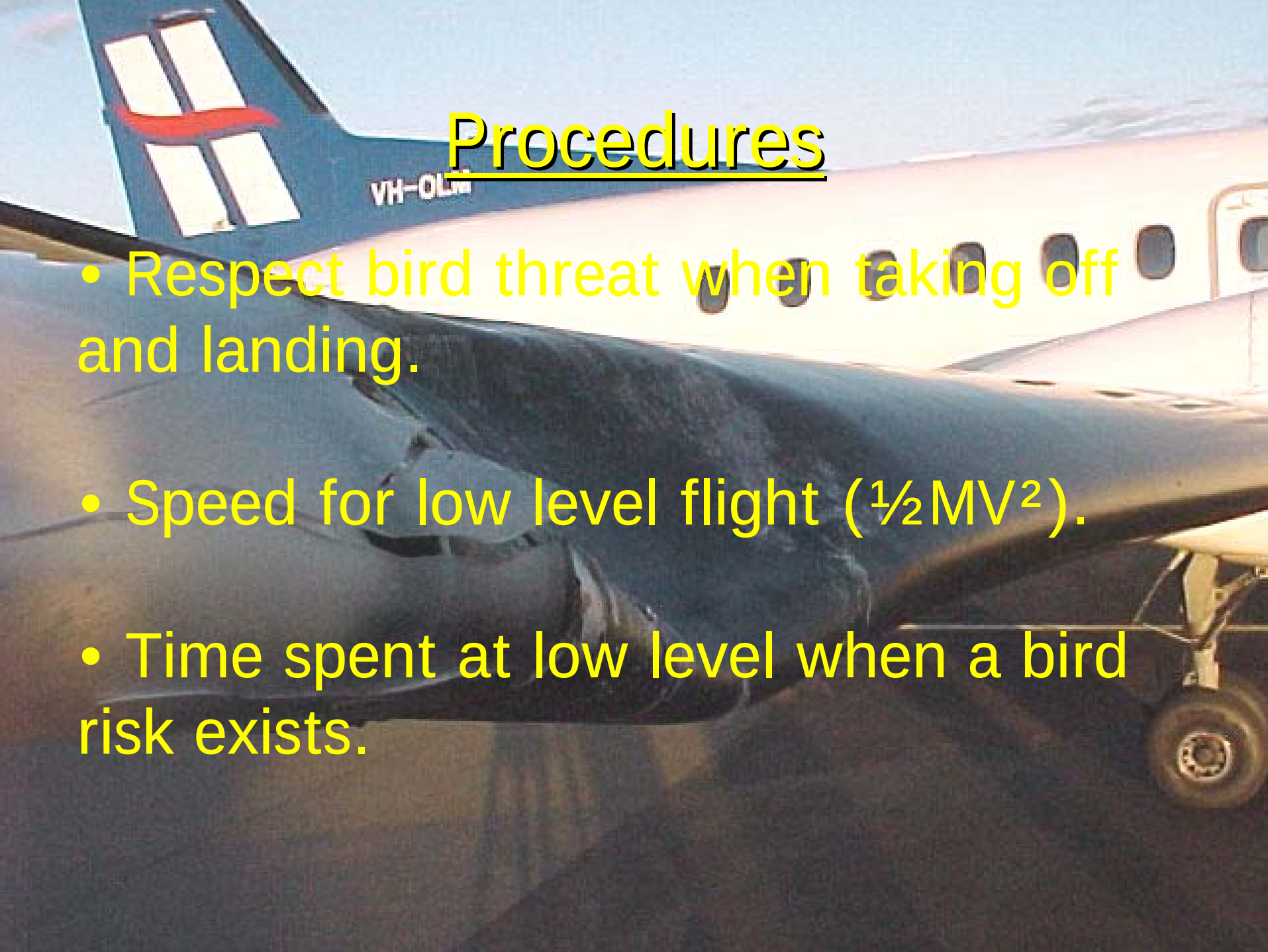


Christchurch International Airport
Average 37% of total Mount Cook movements,14% of strikes and near misses

Invercargill Regional Aerodrome
Average 8% of total Mount Cook movements, 24% of strikes and near misses

What can Airlines do to help reduce risk??

- Procedures and Training for staff.
- Participate in Bird Safety groups.
- Reporting – encourage.



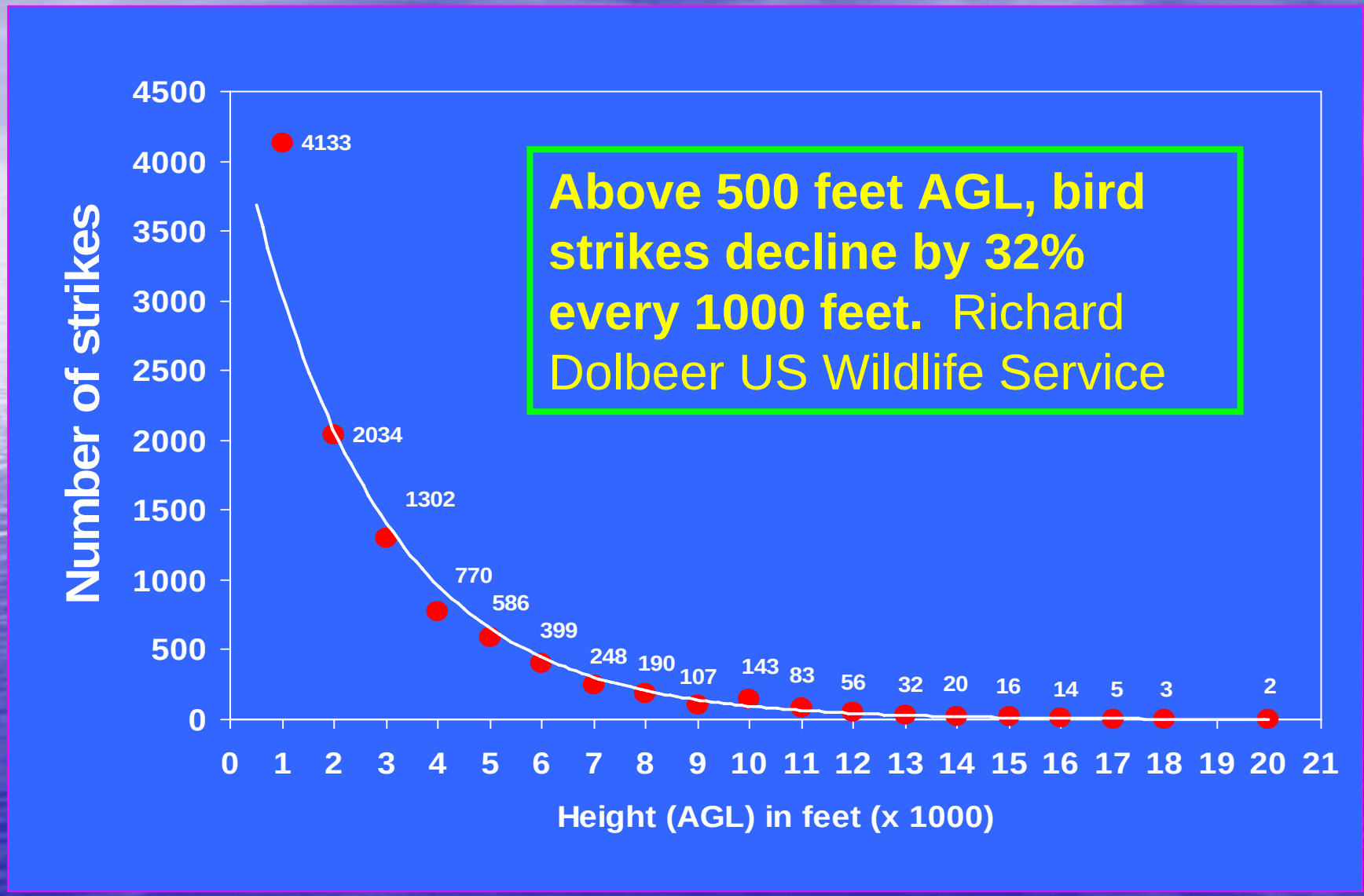
Procedures

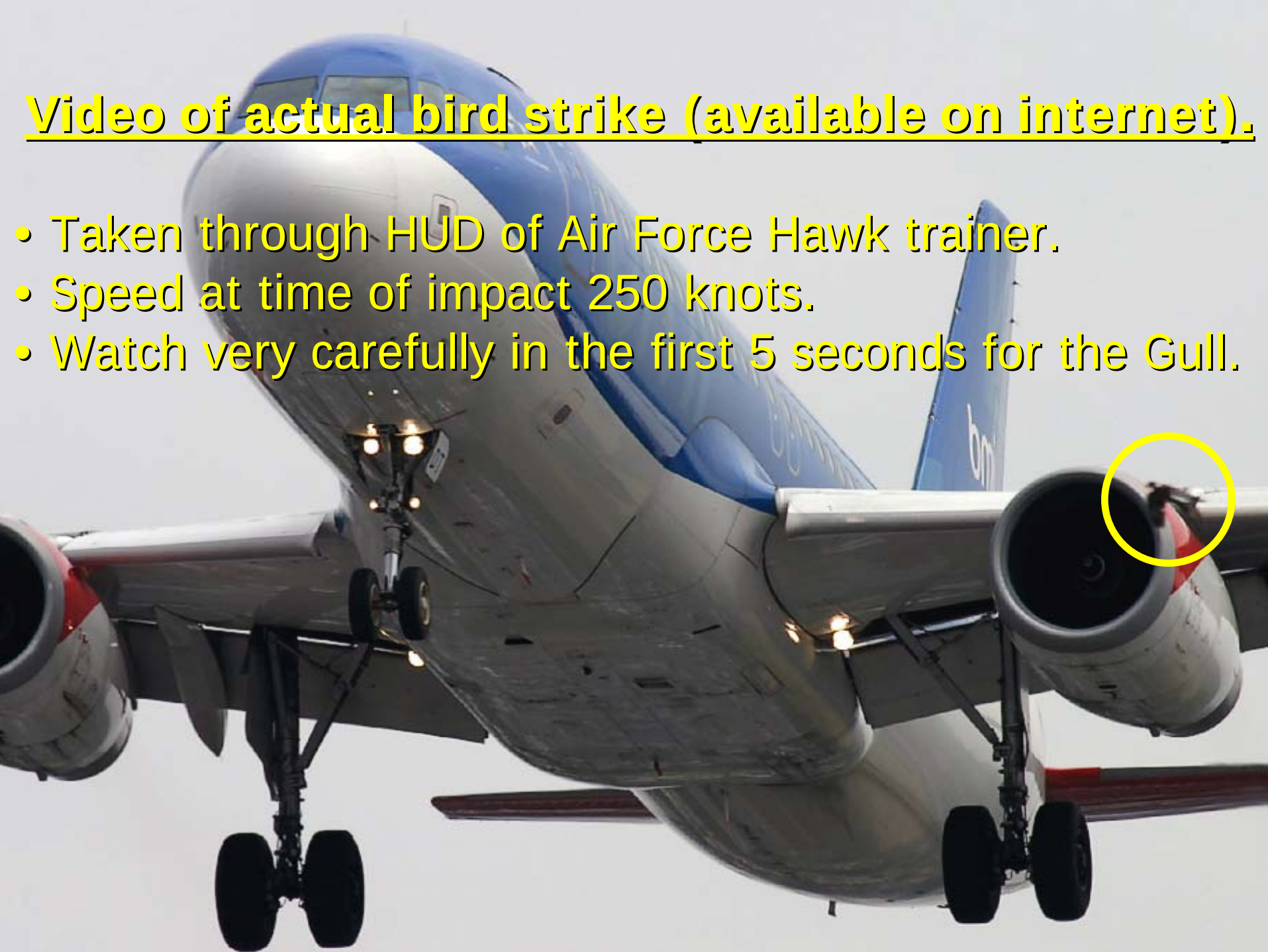
- Respect bird threat when taking off and landing.
- Speed for low level flight ($\frac{1}{2}MV^2$).
- Time spent at low level when a bird risk exists.

Training Ideas - Emphasise

- Importance of speed ($\frac{1}{2}MV^2$).
- Forces involved in bird strike.
- How fragile aircraft are.
- Bird Zone (90% of strikes at low level).

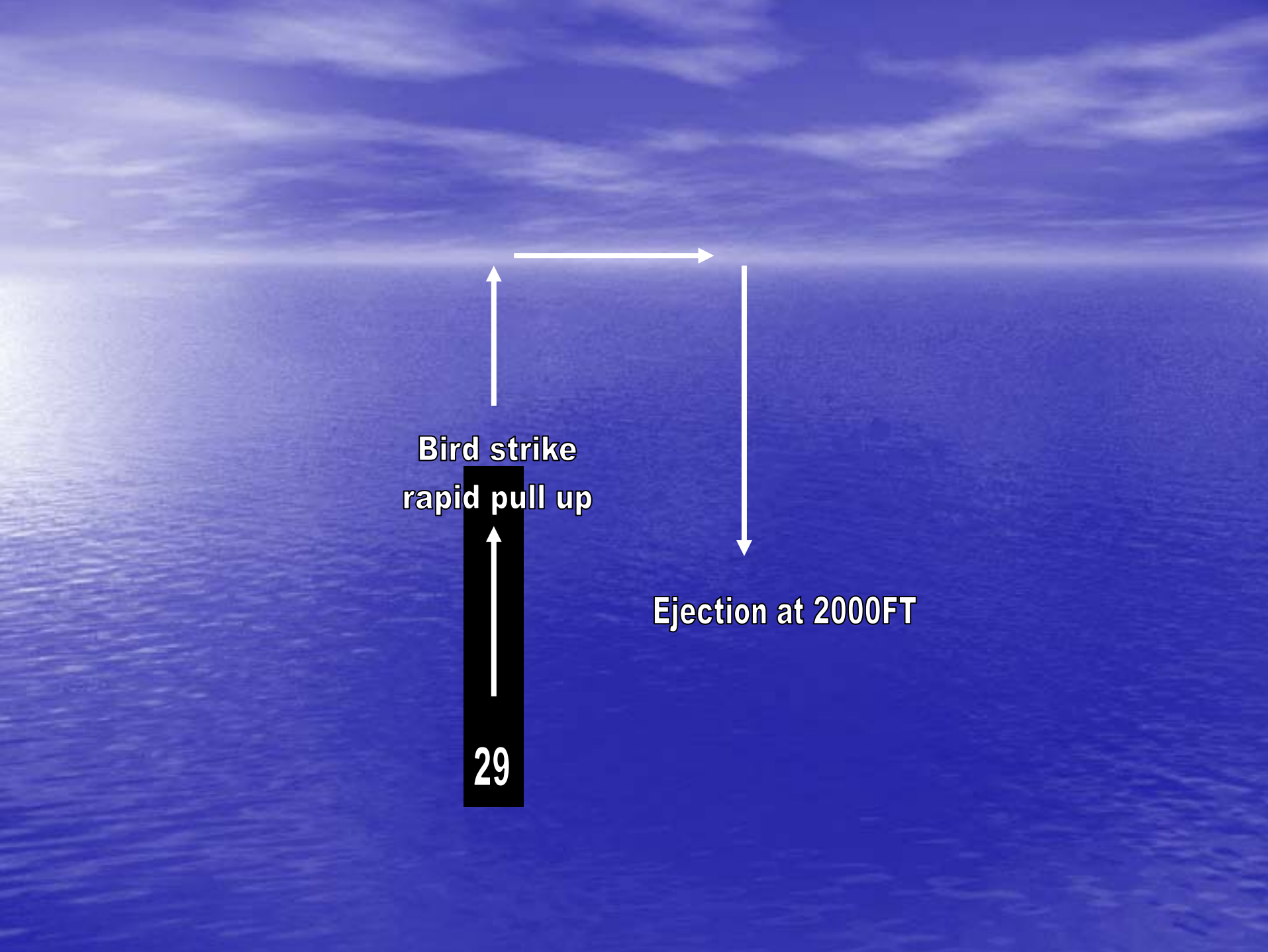
Number of strikes by 1000-ft intervals (501-20,500 ft AGL) (civil aircraft, USA,1990-2004)





Video of actual bird strike (available on internet).

- Taken through HUD of Air Force Hawk trainer.
- Speed at time of impact 250 knots.
- Watch very carefully in the first 5 seconds for the Gull.


Bird strike
rapid pull up
Ejection at 2000FT
29


TAC


TAC

- Fortunately the worldwide Giraffe population is not increasing.


The End