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Mitigating the Risk: An Analysis of Wildlife-Strike Data From São Paulo International Airport (SBGR) [2011-2017]

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BIRD STRIKE COMMITTEE USA MEETING

PURDUE AVIATION TECHNOLOGY

OVERVIEW

Introduction

Methodology

Findings & Discussions

Management Implications

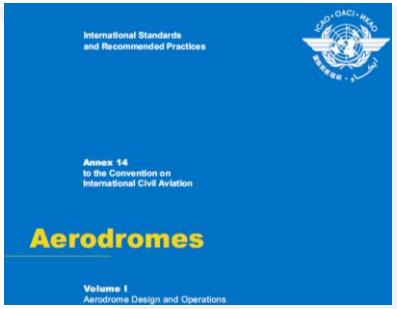
INTRODUCTION

- São Paulo (Guarulhos) International Airport;
  - Busiest airport in South America;
  - Major hub in Latin America;
  - Commercial Operations - 93%;
    - International Commercial Operations - 27.1%;
      - Major routes – Argentina, Chile, and U.S;
      - LATAM, GOL, Azul, American Airlines, Copa, Aerolineas Argentinas, TAP, United Airlines – Most International Flights.

INTRODUCTION

- The number and rate of wildlife strikes have increased in Brazil...Why?
  - Aircraft Registered – 18,710 in 2011 to 21,905 in 2016;
  - Total aircraft movements increased 59% from 2011 through 2017 in the five-busiest airports in Brazil (**SBGR** / SBSP / SBBR / SBGL / SBRJ);
  - Inadequate and/or conflicting regulations and policies in the past impacting the safety management of wildlife;
    - Land-use practices, habitats, and human-activities near some Brazilian airports that potentially attract hazardous wildlife.

INTRODUCTION



- ICAO Annex 14 – “States shall certify aerodromes used for international operations […];
- The Brazilian CAA (ANAC) issues airport operating certificates to airports:
  - That host domestic, flag, and supplemental (Part 121); and
  - Hosting commercial operations involving international air carriers (Part 139);
    - They should conduct a WHA and implement a WHMP;
      - Guarulhos SBGR received an airport certificate in 2015!

METHODOLOGY

- Two datasets were the primary sources of data (JAN through JUL-2018);
  - The Brazilian national wildlife database (NWSD), managed by the Brazilian Aeronautical Accidents Investigation and Prevention Center (CENIPA); and
  - The Air Traffic Operations Annual Reports, published by the Brazilian Air Traffic Control Department.
- Data analysis;
  - Descriptive data analysis to provide an intuitive and overall trend of wildlife strikes at (and around) Guarulhos;
  - The one-way Welch ANOVA was used to investigate whether there was a statistically significant difference in reported wildlife-strikes per 100,000 movements between the four quarters of the year.

FINDINGS AND DISCUSSION

- There 12,716 reported wildlife strikes in Brazil (2011-2017);
  - Estimated annual monetary losses US$65;
- Total reported strikes in Guarulhos → **794**
  - 95.9% involved birds!
- Damage to aircraft – 194 (24.43%);
- No fatalities during this period;
- Operators;
  - Commercial – 723;
  - GA – 12;
  - Military – 3;
  - Unknown – 56

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YEAR	TOTAL STRIKES	AIRCRAFT MOVEMENTS	STRIKES / 100,000 AIRCRAFT MOVEMENTS
2011	79	274,875	28.75
2012	117	279,036	41.93
2013	125	290,433	43.03
2014	80	311,230	25.71
2015	117	299,457	39.07
2016	151	272,141	55.49
2017	125	271,237	46.08

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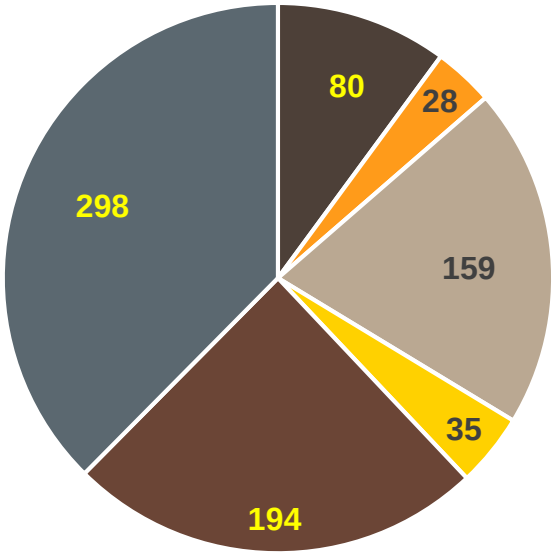
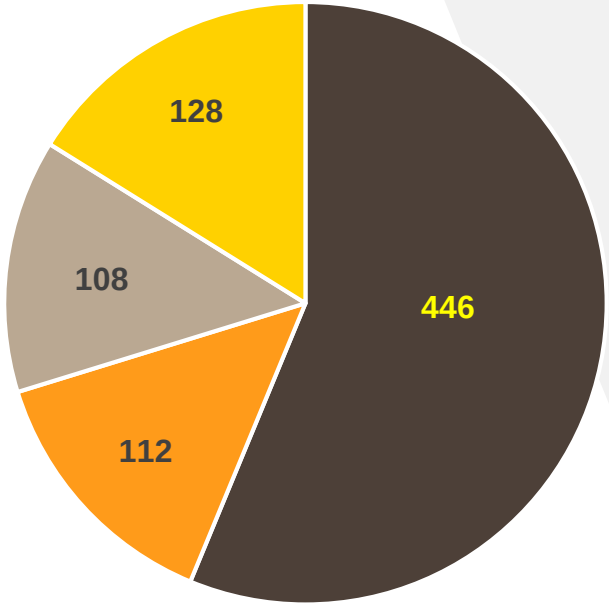
Other Findings

Sources of Report



- Airport Personnel
- Flight Crews
- ATC
- Maintenance Technicians
- Safety Personnel
- Others

Sky Condition



- No Clouds
- Some Clouds
- Overcast
- Not Reported

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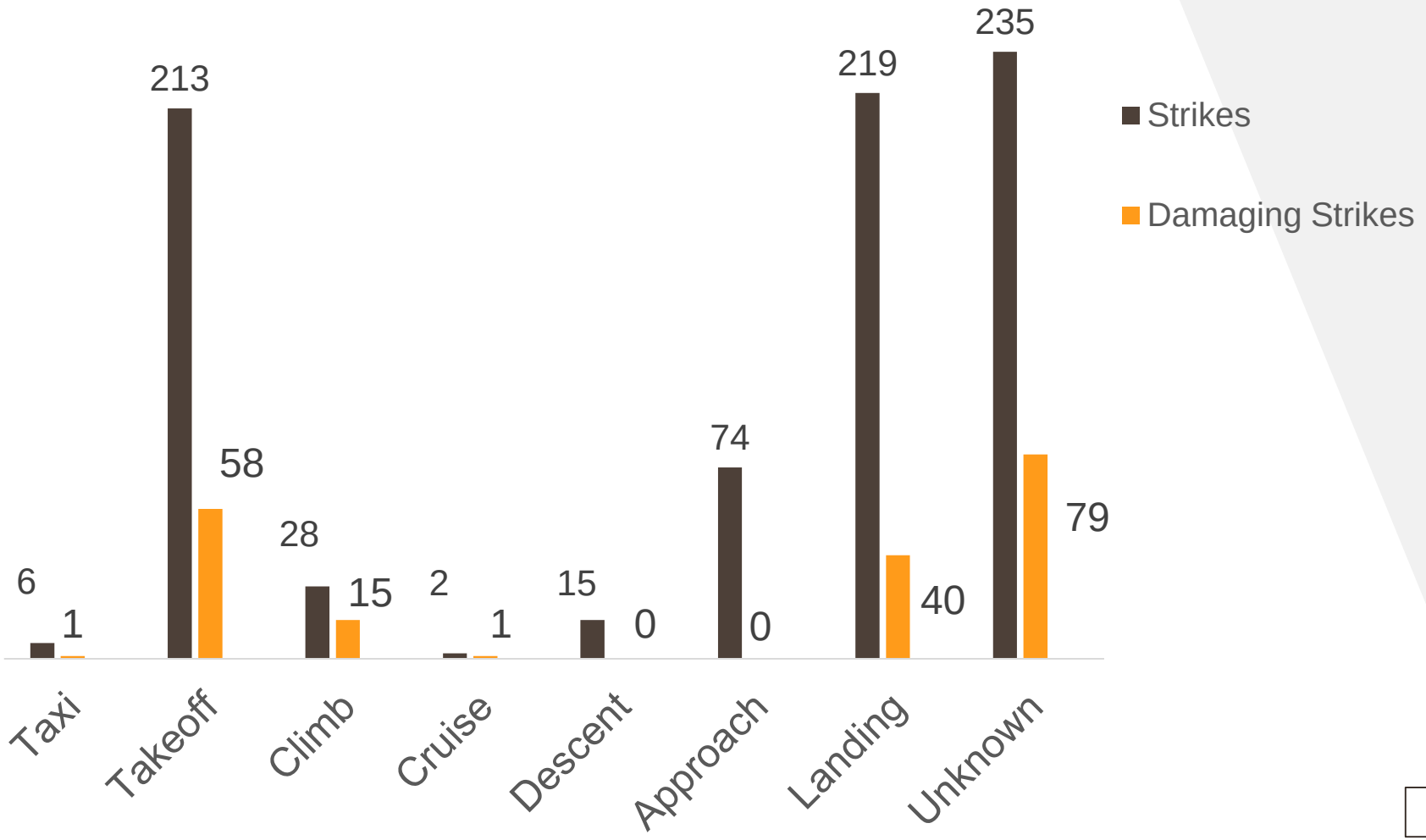
Number of Strikes and Damaging Strikes per Phase of Flight



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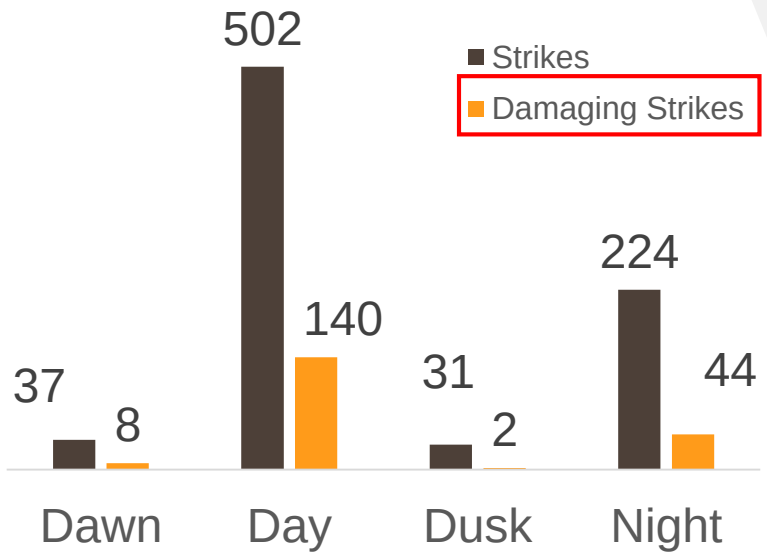
Damaging Strikes

Commercial Operators – 188

GA - 6

Part Damaged	Number of Strikes
Radome	12
Windshield	6
Wing	27
Fuselage	5
Engine	69
Landing Gear	4
"Other"	66
Multiple Parts	5

Time of the Day



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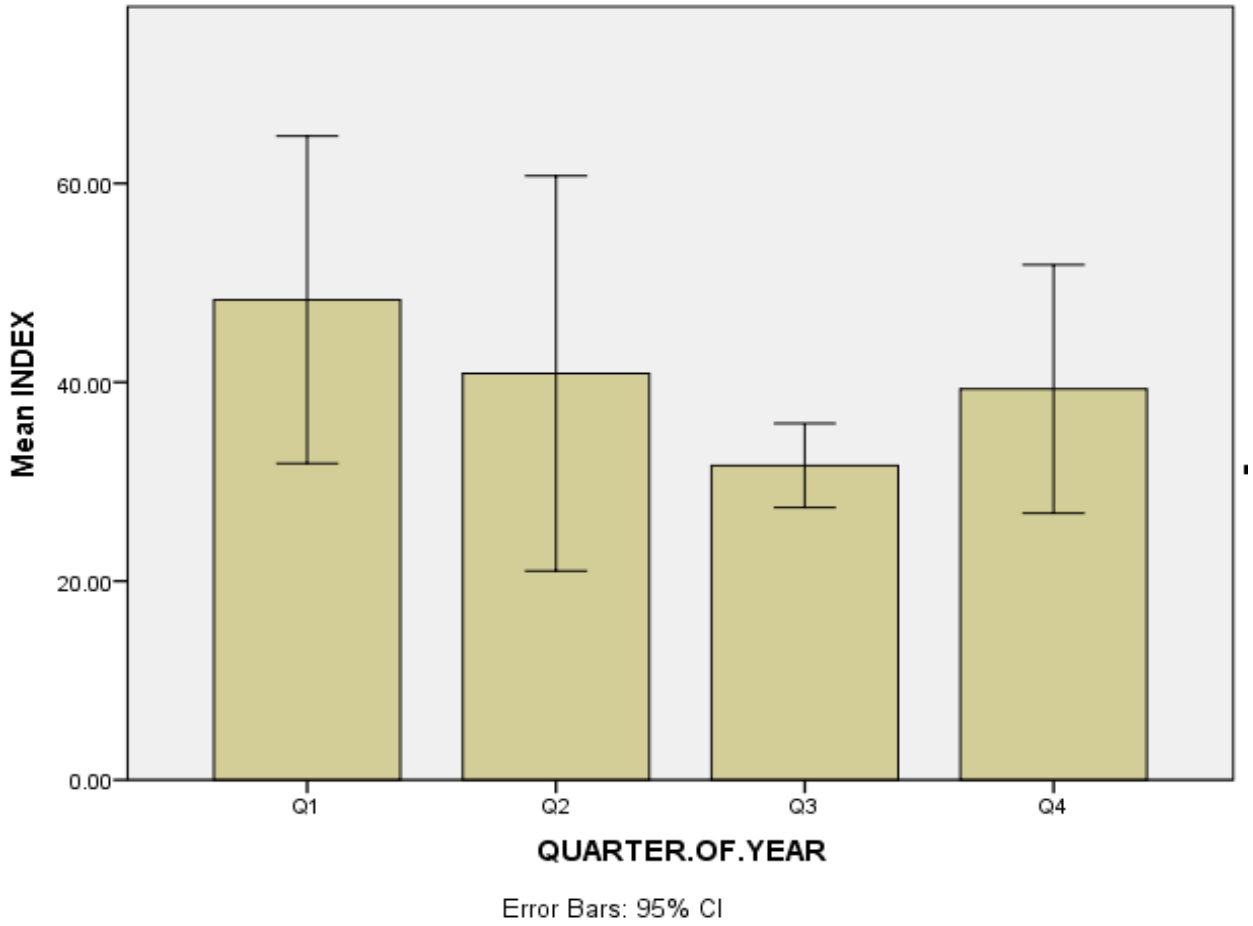
Summary Statistics of Wildlife Strike Index at Guarulhos 2011-2017



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Summary Statistics of Wildlife Strike Index at Guarulhos 2011-2017

Quarter of Year	Number of Strikes	Number of Aircraft Movements	Index
Q1	239	494,326	48.34866
Q2	195	482,539	40.41124
Q3	161	508,706	31.64893
Q4	199	512,838	38.80368

- The number of wildlife strikes per 100,000 aircraft operations was not statistically different for the quarters of the year!
  - Welch's $F(3, 11.203) = 2.424$, $p > 0.05$

LIMITATIONS OF THE STUDY

- There is a need for data / information about the number of aircraft movements per time of the day;
- Several strike reports were incomplete (e.g., missing information about phase of flight; costs);
  - Researchers assumed that the reported wildlife strike data, although incomplete, was accurate!
- **It is important to note that comparison of reported wildlife strike data from an airport in relation to other airports is not a valid metric!**

MANAGEMENT IMPLICATIONS

- There is a need to improve the quality of wildlife strike reporting in Brazil;
  - Only 3.5% of the strikes were reported by flight crews;
    - *Safety efforts to mitigate the risk of accidents due to wildlife strikes should be supported by robust data and information*.
- Findings of concern:
  - The rate of wildlife strikes per 100,000 aircraft movements has increased from 28.75 to 46.08 in Guarulhos (2011-2017);
  - Fifty-five percent of the strikes occurred during the arrival phases of flight. However, 65% of the damaging strikes occurred during the departures phase of flight.

Questions

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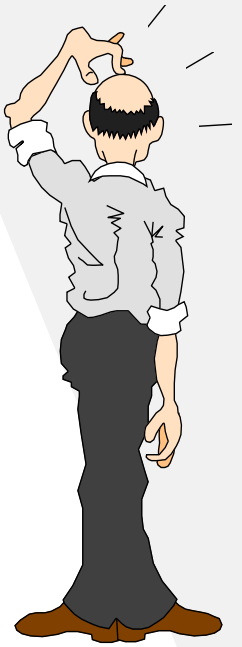


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Thank you!

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