Loss of Control Inflight Accident Data

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Loss of Control Inflight Accident Data (2012 -2016)

IATA Safety Data

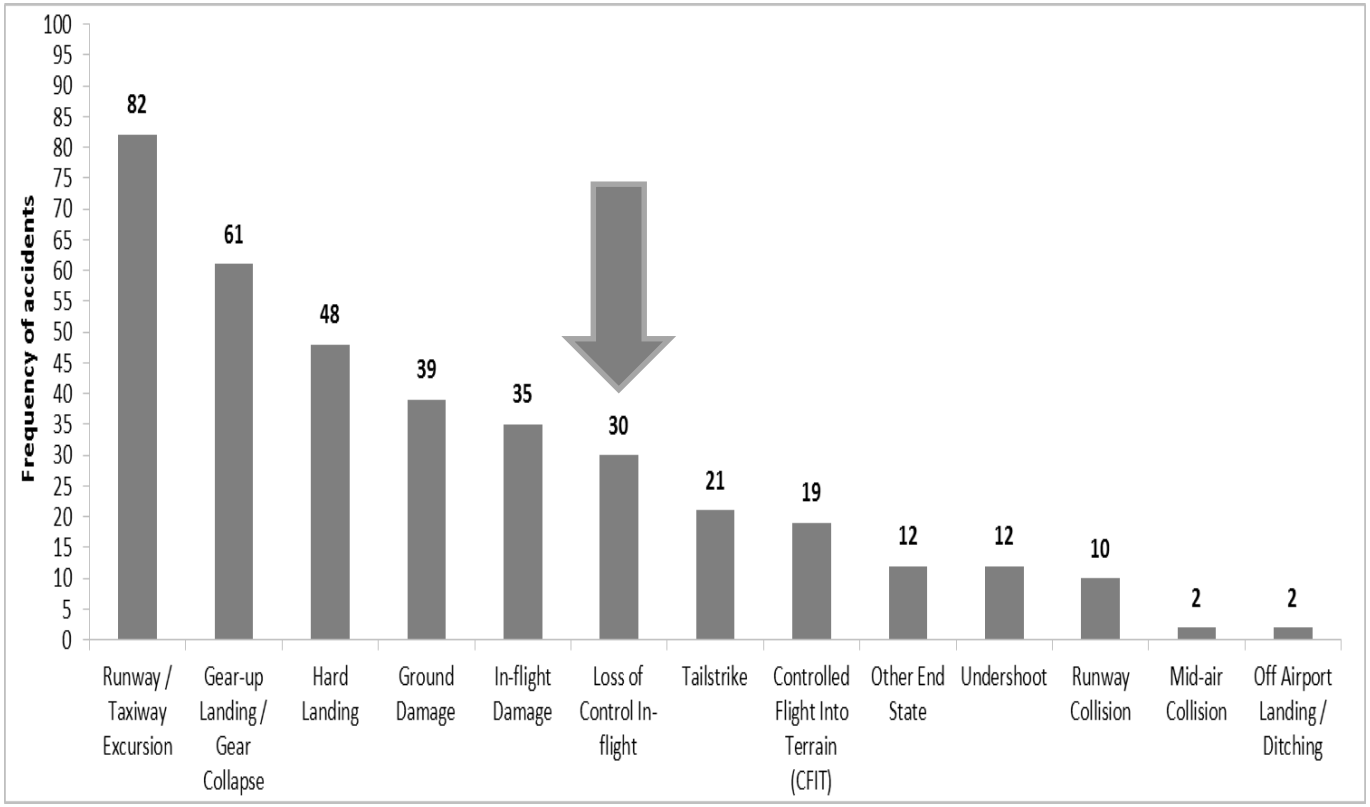
- This presentation covers data GADM accident Database using data from January 2012 through December 2016.

- There were a total of 375 commercial accidents during this period:
  - Of which, 373 could be assigned an accident category or End State
- 55 Fatal Accidents
  - of which, 54 could be assigned an accident category or End State
- 1,634 total fatalities

IATA Safety Data

- Out of the 375 commercial accidents during this period:
  - 30 of these accidents were loss of control inflight
  - 27 of which were fatal accidents and resulted in 949 fatalities

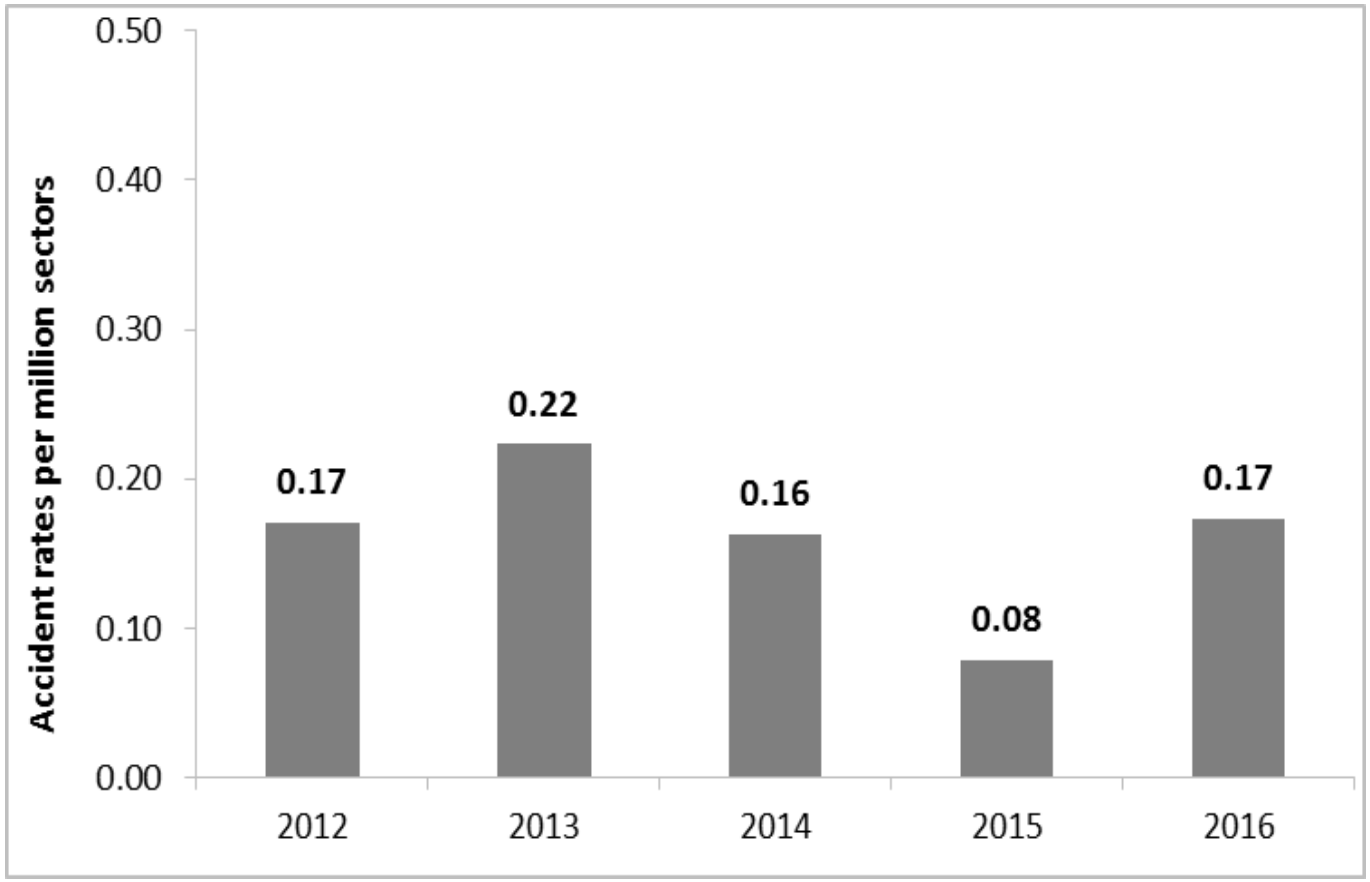
Frequency of Accident Categories



Top Fatal Accident Categories

Accident Category	Number of Accidents	Fatal Accidents	Number of Fatalities
Loss of Control In-flight (LOC-I)	30	27	949
Controlled Flight Into Terrain (CFIT)	19	16	259
Other End State	12	4	318
Inflight Damage	35	3	86
Runway / Taxiway Excursion	82	3	14
Undershoot	12	1	7

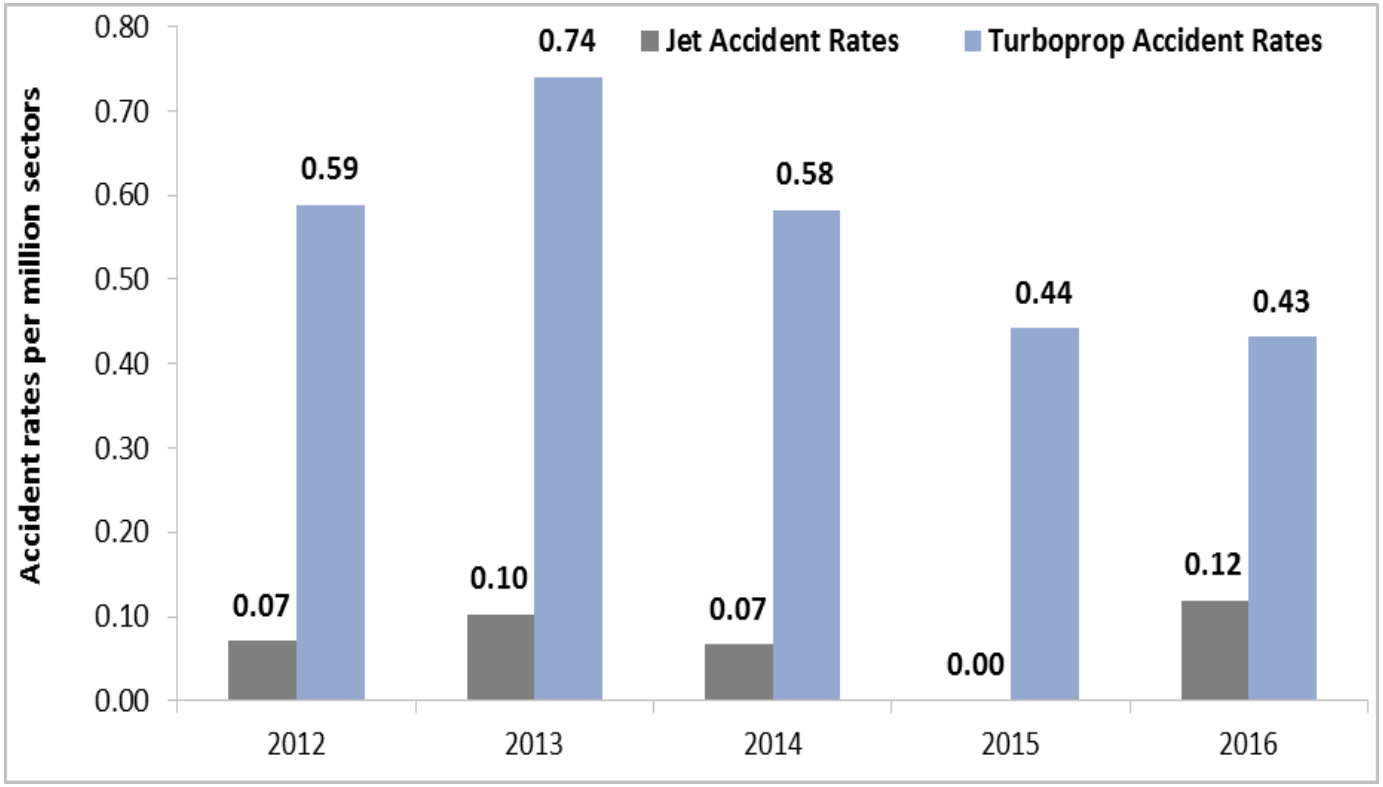
LOC-I Accident Rates per Million sectors per Year



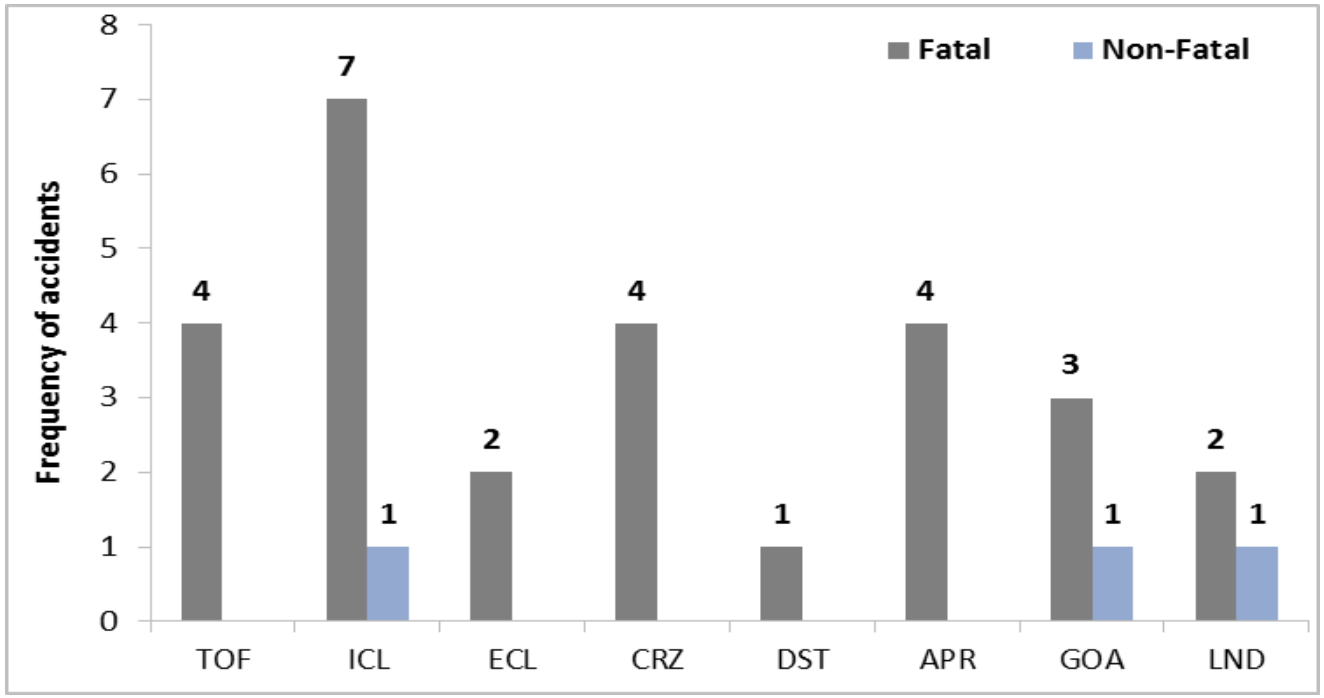
IOSA vs. Non-IOSA Accident Rates

Category	2012	2013	2014	2015	2016	Average 2012-2016
All LOC-I Accident Rate	0.17	0.22	0.16	0.08	0.17	0.16
IOSA	0.08	0.09	0.04	0.04	0.07	0.06
Non-IOSA	0.35	0.48	0.40	0.16	0.38	0.35

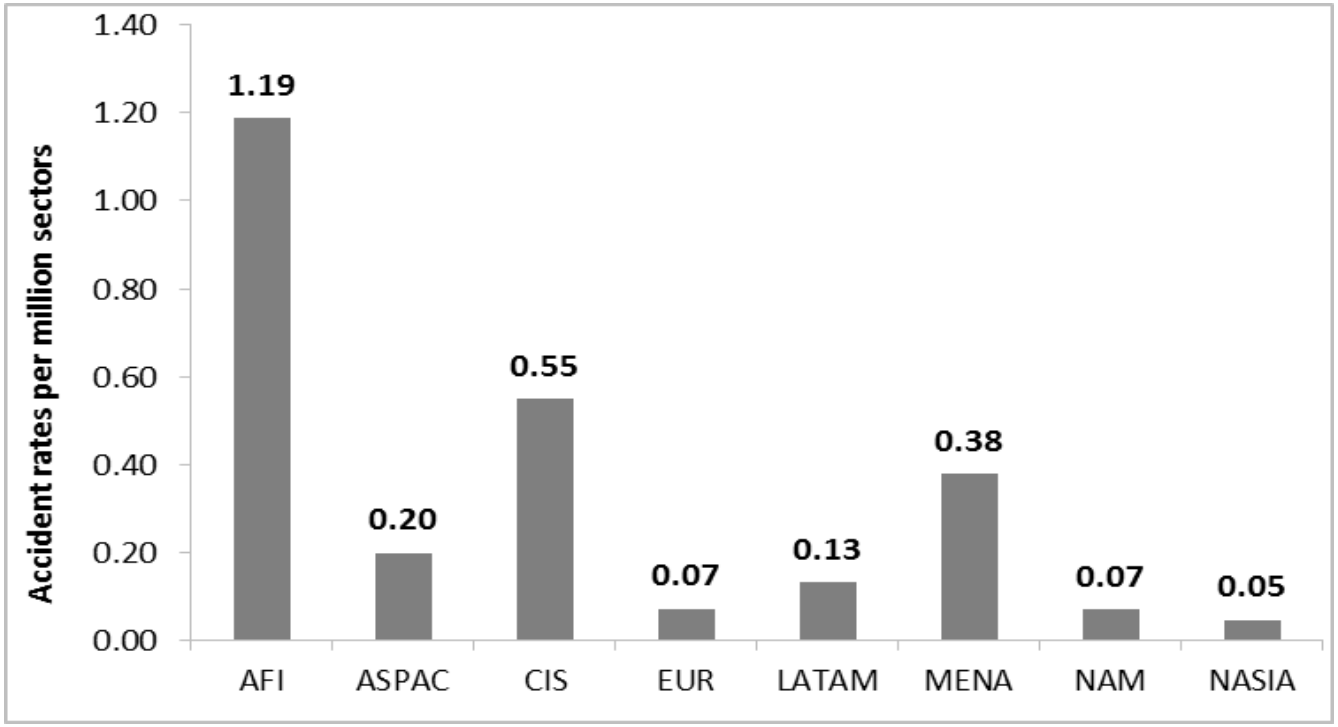
Distribution of jet / turboprop LOC-I accident rates



Frequency of fatal vs. non-fatal LOC-I Accidents by Phase of Flight



LOC-I Accident Rates by IATA region of operator



LOC-I Contributing Factors

Latent Conditions (deficiencies in...)	
Flight Operations	32%
Safety Management	32%
Regulatory Oversight	27%
Flight Ops: SOPs & Checking	23%
Selection Systems	18%
Environmental Threats	
Meteorology	36%
Lack of Visual Reference	18%
Thunderstorms	14%
Wind/Windshear/Gusty wind	14%
Poor Visibility / IMC	14%
Airline Threats	
Aircraft Malfunction	45%
Avionics / Flight Instruments	5%
Contained Engine Failure/Powerplant Malfunction	23%
Operational Pressure	9%
Other	18%

Errors (related to...)	
SOP Adherence / SOP Cross-verification	41%
Manual Handling / Flight Controls	36%
Pilot-to-Pilot Communication	27%
Callouts	23%
Intentional	23%
Undesired Aircraft States	
Operation Outside Aircraft Limitations	32%
Vertical / Lateral / Speed Deviation	27%
Unnecessary Weather Penetration	18%
Flight Controls / Automation	14%
Abrupt Aircraft Control	14%
Countermeasures	
Overall Crew Performance	36%
Monitor / Cross-check	27%
Leadership	27%
Captain should show leadership	27%
Communication Environment	18%

LOC-I: Mitigation strategies for Pilots

- recognize conditions that increase the likelihood of a stall, and to apply appropriate recovery techniques before stall onset
- manage distractions and high-workload so that they do not interfere with situational awareness
- be aware that stall can occur at a lower AOA in icing conditions
- use effective aeronautical decision-making techniques
- perform a flight risk assessment prior to each flight

LOC-I: Mitigation strategies for Pilots

- practice better CRM behavior and cockpit monitoring
- adherence to established SOPs.

LOC-I: Mitigation strategies for Operators

- training should not rely too much on certain aircraft flight control protections. Increased focus on training scenarios under degraded flight control protection should be considered
- efforts to restore and maintain manual flying skills must be comprehensive and ongoing
- periodic simulator training should include unusual attitude exercises that are realistic to include extremes of center of gravity, weight, altitude, and control status

LOC-I: Mitigation strategies for Operators

- consider installing of new technology, such as an AOA indicator, which, when coupled with pilot understanding and training on how best to use it, can assist pilots during critical or high-workload phases of flight
- produce set of standardized FDM safety measures and precursors related to potential LOC-I accidents; such as pitch high during climb, pitch rate high, dual input, thrust asymmetry, early configuration change, and others
- publish and enforce clear, concise and accurate Standard Operating Procedures (SOPs).

LOC-I: Mitigation strategies

- Preventative and recovery risk control measures should also be encouraged and implemented by regulators, and manufacturers to help mitigate or avoid the serious consequences of LOC-I.

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