SPGW Data Set Analysis 2018

Dan Ramirez, Director of Safety, XOJET
The accident statistics presented in this summary are confined to data found in the 2010-2017 Breiling Report, ICAO 2010-2017 Safety Summary, 2010-2017 NTSB data, Assure Data Set 2010-2017. Within that set of airplanes, there are two groups excluded:

- 1) Airplanes manufactured in the Former USSR are excluded because of the lack of operational data.

- 2) Military Operations

Definitions related to development of statistics in this summary are primarily based on corresponding International Civil Aviation Organization (ICAO), U.S. National Transportation Safety Board (NTSB), and Flight Safety Foundation (FSF) terms, as per all agreed taxonomies.

We like to have thank Maria Goicochea and Paula Bentren for their dedication and finally we like to thank Nova South Eastern for their support during this study.
Data Classification
Airplane Accident

- An occurrence associated with the operation of an airplane that takes place between the time any person boards the airplane with the intention of flight and such time as all such persons have disembarked, in which
- The airplane sustains substantial damage.
- The airplane is missing or is completely inaccessible. An aircraft is considered to be missing when the official search has been terminated and the wreckage has not been located.
- Death or serious injury results from being in the airplane.
- Direct contact with the airplane or anything attached thereto.
- Direct exposure to jet blast.

Excluded Events

- Fatal and nonfatal injuries from natural causes.
- Fatal and nonfatal self-inflicted injuries or injuries inflicted by other persons.
- Fatal and nonfatal injuries of stowaways hiding outside the areas normally available to the passengers and crew.
- Nonfatal injuries resulting from atmospheric turbulence, normal maneuvering, loose objects, boarding, disembarking, evacuation, and maintenance and servicing.
- Nonfatal injuries to persons not aboard the airplane.
- The following occurrences are not considered airplane accidents: those that are the result of experimental test flights or the result of a hostile action, including sabotage, hijacking, terrorism, and military action.
Data Analysis
Data Analysis – Aircraft Types Business Aircraft

<table>
<thead>
<tr>
<th>Accident by Type of Operation</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turbine Powered (Jet Only)</td>
<td>289</td>
</tr>
<tr>
<td>Turbine Powered (Turbo Propel)</td>
<td>2986</td>
</tr>
<tr>
<td>Piston</td>
<td>4200</td>
</tr>
</tbody>
</table>

Totals 7457
Event Group Data Analysis
Review data from Breiling Report, ICAO data, NTSB Data, Assure Data
Jan-17

Accident Data Set

<table>
<thead>
<tr>
<th>Accident by Type of Operation</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial/AC</td>
<td>2926</td>
</tr>
<tr>
<td>Private/Personal Business</td>
<td>1982</td>
</tr>
<tr>
<td>Training</td>
<td>2549</td>
</tr>
</tbody>
</table>

Totals 7457
Event Group Data Analysis
Review data from Breiling Report, ICAO data, NTSB Data, Assure Data
1/1/2010 - 12/1/2017

Accident Data Set

Types of Accidents

Probable Causes

Total 7457

Data Analysis – Aircraft Types Business Aircraft

Probable Causes

- ARC: Abnormal Runway Contact
- CFIT: Controlled Flight Into or Toward Terrain
- F-NI: Fire/Smoke (Non-Impact)
- LOC-I: Loss of Control—In Flight
- MAC: Midair/Near Midair Collision
- OTHR: Other
- RAMP: Runway Excursion (Takeoff or Landing)
- RI-VAP: Runway Incursion—Vehicle, Aircraft, or Person
- SCF-PP: System/Component Failure or Malfunction (Powerplant)
- UNK: Unknown or Undetermined
- USOS: Undershoot/Overshoot
- WSTRW: Wind Shear or Thunderstorm

Totals 7457

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Event Group Data Analysis
Review data from Breiling Report, ICAO data, NTSB Data, Assure Data
Jan-17

Accident Data Set

- Landing
- Taxi
- Take-off
- Cruise
- Approach
- Climb
- Manuvering

Totals 7457
Data Analysis – Aircraft Types Business Aircraft

Event Group Data Analysis
Review data from Breiling Report, ICAO data, NTSB Data, Assure Data
Jan-17

Accident Data Set

- Minor
- Substantial
- Destroyed

Accidents/Incidents

Damage Category

Totals 7457
Data Analysis – Single Pilot Business Accidents
Single Pilot / Main Business Aircraft Data Set

- Single Pilot: 27%
- All other operations: 73%

Sources: NTSB/ICAO/ASSURE/
Data Analysis – Aircraft Types Business Aircraft (SP)

Event Group Data Analysis
Review data from Breiling Report, ICAO data, NTSB Data, Assure Data
1/1/2010 - 12/1/2017

Accident Data Set

<table>
<thead>
<tr>
<th>Probable Cause</th>
<th>Types of Accidents</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCF-PP</td>
<td>182</td>
</tr>
<tr>
<td>CFIT</td>
<td>252</td>
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<tr>
<td>USOS</td>
<td>350</td>
</tr>
<tr>
<td>RE</td>
<td>505</td>
</tr>
<tr>
<td>LOC-I</td>
<td>412</td>
</tr>
<tr>
<td>RAMP</td>
<td>70</td>
</tr>
<tr>
<td>BIRD</td>
<td>50</td>
</tr>
<tr>
<td>UNK</td>
<td>54</td>
</tr>
<tr>
<td>RI-VAP</td>
<td>100</td>
</tr>
<tr>
<td>ARC</td>
<td>3</td>
</tr>
<tr>
<td>WSTRW</td>
<td>2</td>
</tr>
<tr>
<td>MAC</td>
<td>1</td>
</tr>
<tr>
<td>F-NI</td>
<td>1</td>
</tr>
</tbody>
</table>

Totals 1982

ARC Abnormal Runway Contact
CFIT Controlled Flight Into or Toward Terrain
F-NI Fire/Smoke (Non-Impact)
LOC-I Loss of Control—in Flight
MAC Midair/Near Midair Collision
OTHR Other
RAMP Ground Handling
RE Runway Excursion (Takeoff or Landing)
RI-VAP Runway Incursion—Vehicle, Aircraft, or Person
SCF-PP System/Component Failure or Malfunction (Powerplant)
UNK Unknown or Undetermined
USOS Undershoot/Overshoot
WSTRW Wind Shear or Thunderstorm
Event Group Data Analysis
Review data from Breiling Report, ICAO data, NTSB Data, Assure Data
Jan-17

Accident Data Set

Damage Category | Accidents/Incidents
--- | ---
Minor | 793
Substantial | 851
Destroyed | 338

Totals 1982

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Event Group Data Analysis
Review data from Breiling Report, ICAO data, NTSB Data, Assure Data
Jan-17

Accident Data Set

<table>
<thead>
<tr>
<th>Accident by Type of Operation</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turbine Powered (Jet Only)</td>
<td>245</td>
</tr>
<tr>
<td>Turbine Powered (Turbo Propel)</td>
<td>755</td>
</tr>
<tr>
<td>Piston</td>
<td>982</td>
</tr>
</tbody>
</table>

Totals 1982
Data Analysis – Piston Data
Event Group Data Analysis
Review data from Breiling Report, ICAO data, NTSB Data, Assure Data
Jan-17

Accident Data Set
Totals 982

Damage Category
Accidents/Incidents

Minor
Substantial
Destroyed

Data Analysis – Aircraft Types Business Aircraft (SP Piston)
Event Group Data Analysis
Review data from Breiling Report, ICAO data, NTSB Data, Assure Data
1/1/2010 - 12/1/2017

<table>
<thead>
<tr>
<th>Types of Accidents</th>
<th>Probable Causes</th>
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</thead>
<tbody>
<tr>
<td>SCF-PP</td>
<td>115</td>
</tr>
<tr>
<td>CFIT</td>
<td>80</td>
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<tr>
<td>USOS</td>
<td>275</td>
</tr>
<tr>
<td>RE</td>
<td>225</td>
</tr>
<tr>
<td>LOC-I</td>
<td>145</td>
</tr>
<tr>
<td>RAMP</td>
<td>14</td>
</tr>
<tr>
<td>BIRD</td>
<td>38</td>
</tr>
<tr>
<td>UNK</td>
<td>54</td>
</tr>
<tr>
<td>Ri-VAP</td>
<td>29</td>
</tr>
<tr>
<td>ARC</td>
<td>3</td>
</tr>
<tr>
<td>WSTRW</td>
<td>2</td>
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<td>MAC</td>
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<tr>
<td>F-NI</td>
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<tr>
<td>OTHR</td>
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<tr>
<td>ARC</td>
<td>3</td>
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<tr>
<td>CFIT</td>
<td>80</td>
</tr>
<tr>
<td>USOS</td>
<td>275</td>
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<tr>
<td>RE</td>
<td>225</td>
</tr>
<tr>
<td>LOC-I</td>
<td>145</td>
</tr>
<tr>
<td>RAMP</td>
<td>14</td>
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<tr>
<td>BIRD</td>
<td>38</td>
</tr>
<tr>
<td>UNK</td>
<td>54</td>
</tr>
<tr>
<td>Ri-VAP</td>
<td>29</td>
</tr>
<tr>
<td>ARC</td>
<td>3</td>
</tr>
<tr>
<td>WSTRW</td>
<td>2</td>
</tr>
<tr>
<td>MAC</td>
<td>1</td>
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<tr>
<td>F-NI</td>
<td>0</td>
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<tr>
<td>OTHR</td>
<td>0</td>
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</tbody>
</table>

Totals 982

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Data Analysis – Turbo Prop Data
Event Group Data Analysis
Review data from Breiling Report, ICAO data, NTSB Data, Assure Data
Jan-17

Accident Data Set

- Minor
- Substantial
- Destroyed

Totals 755
Event Group Data Analysis

Review data from Breiling Report, ICAO data, NTSB Data, Assure Data
1/1/2010 - 12/1/2017

Accident Data Set

<table>
<thead>
<tr>
<th>Probable Causes</th>
<th>Types of Accidents</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARC</td>
<td>755</td>
</tr>
<tr>
<td>CFIT</td>
<td>32</td>
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<tr>
<td>USOS</td>
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<tr>
<td>RE</td>
<td>32</td>
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<tr>
<td>LOC-I</td>
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<td>RAMP</td>
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<td>BIRD</td>
<td>43</td>
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<tr>
<td>UNK</td>
<td>68</td>
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<tr>
<td>RI-VAP</td>
<td>34</td>
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<td>MAC</td>
<td>13</td>
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<tr>
<td>WSTRW</td>
<td>6</td>
</tr>
<tr>
<td>F-NI</td>
<td>5</td>
</tr>
</tbody>
</table>

Probable Causes

- ARC: Abnormal Runway Contact
- CFIT: Controlled Flight Into or Toward Terrain
- USOS: Fire/Smoke (Non-Impact)
- RE: Loss of Control—In Flight
- LOC-I: Midair Near Midair Collision
- MAC: Other
- OTHR: Runway Incursion—Vehicle, Aircraft, or Person
- SCF-PP: System/Component Failure or Malfunction (Powerplant)
- UNK: Unknown or Undetermined
- USOS: Undershoot/Overshoot
- WSTRW: Wind Shear or Thunderstorm

Total Accidents: 755
Data Analysis – Turbine (Jet) Data
Data Analysis – Aircraft Types Business Aircraft (SP Turbine)

Event Group Data Analysis
Review data from Breiling Report, ICAO data, NTSB Data, Assure Data
Jan-17

Accident Data Set

- Minor
- Substantial
- Destroyed

Totals 245
Data Analysis – Aircraft Types Business Aircraft (SP Turbine)

Event Group Data Analysis
Review data from Breiling Report, ICAO data, NTSB Data, Assure Data
1/1/2010 - 12/1/2017

Accident Data Set

<table>
<thead>
<tr>
<th>Types of Accidents</th>
<th>Probable Causes</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCF-PP</td>
<td>10</td>
</tr>
<tr>
<td>CFIT</td>
<td>25</td>
</tr>
<tr>
<td>USOS</td>
<td>24</td>
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<tr>
<td>RE</td>
<td>28</td>
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<tr>
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<td>RAMP</td>
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<td>RI-VAP</td>
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<tr>
<td>ARC</td>
<td>22</td>
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<td>WSTRW</td>
<td>6</td>
</tr>
<tr>
<td>MAC</td>
<td>2</td>
</tr>
<tr>
<td>F-NI</td>
<td>1</td>
</tr>
</tbody>
</table>

Totals 245

Probable Causes

- SCF-PP: System/Component Failure or Malfunction (Powerplant)
- CFIT: Controlled Flight Into or Toward Terrain
- USOS: Undershoot/Overshoot
- RE: Runway Excursion (Takeoff or Landing)
- LOC-I: Loss of Control—In Flight
- RAMP: Ground Handling
- BIRD: Bird Strike
- UNK: Unknown or Undetermined
- RI-VAP: Runway Incursion—Vehicle, Aircraft, or Person
- ARC: Abnormal Runway Contact
- WSTRW: Wind Shear or Thunderstorm
- MAC: Midair/Near Midair Collision
- F-NI: Fire/Smoke (Non-Impact)

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Data Analysis – Contributing Factors (SP)
Observations

• The top 4 causes of single pilot operations accident/incident cause:

1. RE- Runway Excursions
2. LOC-I (Loss of Control In Flight)
3. USOS (Undershoot/Overshoot)
4. CFIT (Control Flight Into Terrain)
Observations

**RE (Runway Excursion)**

- **Speed Management (High Speed on Approach):** 42%
- **Speed Management (Low Speed on Approach):** 35%
- **Visualization of Runway Environment (touch down zone, width, surface):** 23%
Observations

- Terminal Area Aerodynamics: 67%
- Speed Management: 19%
- High Alt Aerodynamics: 14%
**Observations**

USOS – Undershoot/Overshoot

- Touchdown Misrepresentation: 51%
- Speed Management: 29%
- Unknown Environment: 17%
Observations

USOS – Undershoot/Overshoot

- Unknown Environment: 54%
- No GPS Signal to TAWS System: 25%
- Automation Confusion: 21%