

FLIGHT SAFETY



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Using Data to Reduce The Risk of Runway Excursions

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Participants

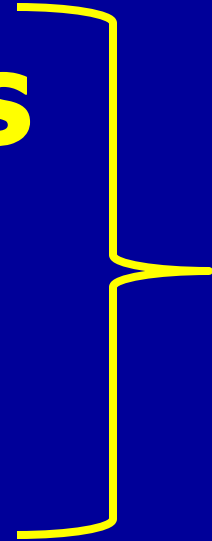
- **EASA**
- **CANSO**
- **IFALPA**
- **FAA/CAST**
- **LVNL**
- **Boeing**
- **DGAC France**
- **Flight Safety Foundation**
- **IFATCA**
- **NLR**
- **ALTA**
- **Airbus**
- **Embraer**
- **ACI**
- **IATA**
- **ERA**
- **Eurocontrol**
- **AAPA**
- **US NTSB**
- **AEA**
- **Honeywell**
- **ALPA**

Runway Safety Issues

- **Runway Incursions**

- **Runway Confusion**

- **Runway Excursion**



Runway Excursion:

When the wheels of an aircraft on the runway surface depart the end or the side of the runway surface.

Runway excursions can occur on **takeoff** or on **landing**.

They consist of two types of events:

Veer-Off: Excursion in which an aircraft departs the side of a runway

Overrun: A runway excursion in which an aircraft departs the end of a runway



The Players

- **Aircraft Manufacturers**
- **Operators**
 - **Aircrews**
 - **Management**
- **Airports**
- **ATC**
- **Regulators**



Runway

Confusion



Data

Safety

Incursion



Excursion





Runway Safety Accident Data

1995–2009

1,508 Total Accidents

	<u>Number</u>	<u>Percent of Total</u>
Incursions:	10 (.7/year)	.6%
Confusion:	5 (.3/year)	
	1.0/year	.3%
Excursions:	442 (29.8/year)	29%

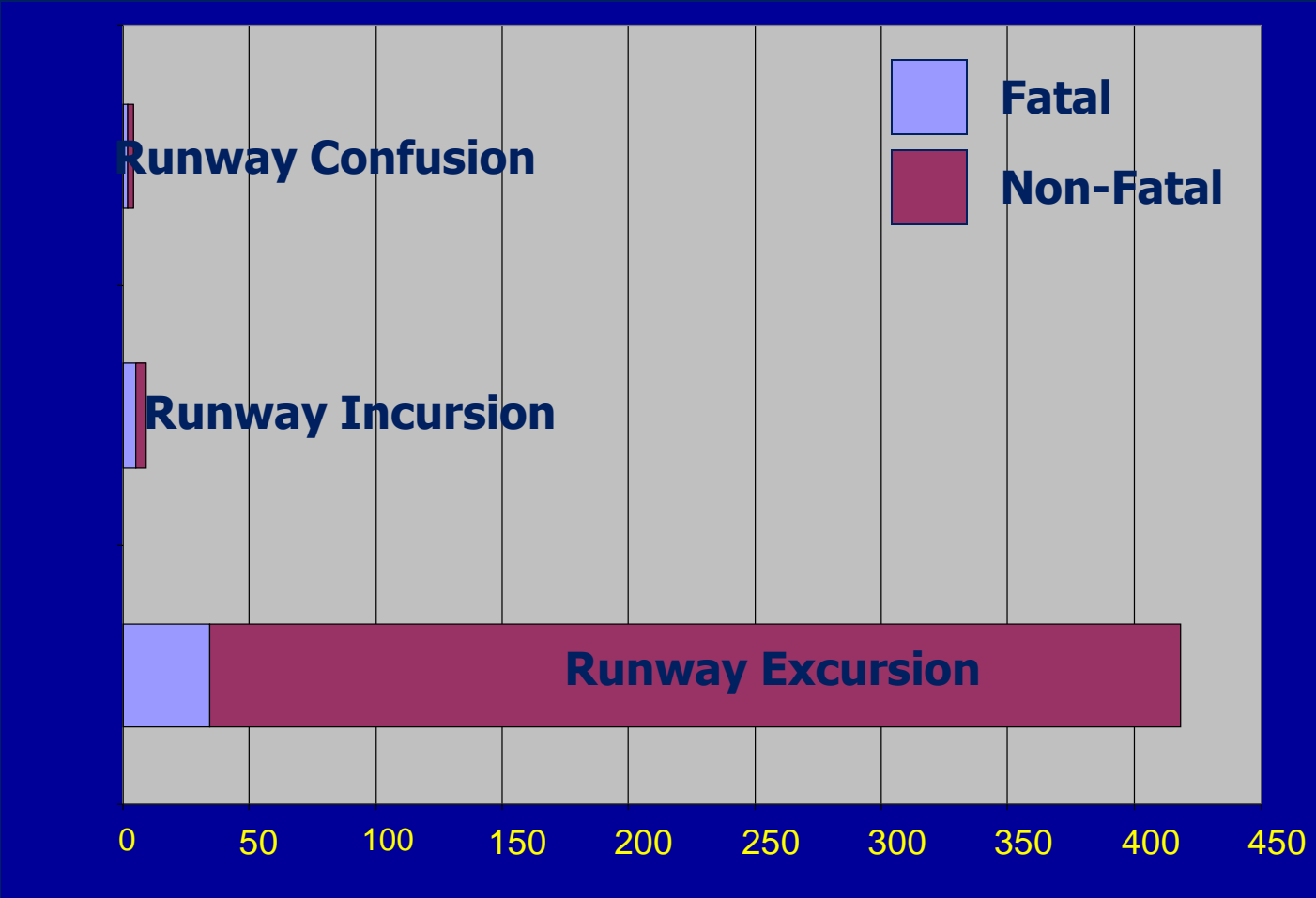
Runway Safety Data

1995–2009

Runway Excursion Data

- 36% of jet accidents**
- 24% of turboprop accidents**

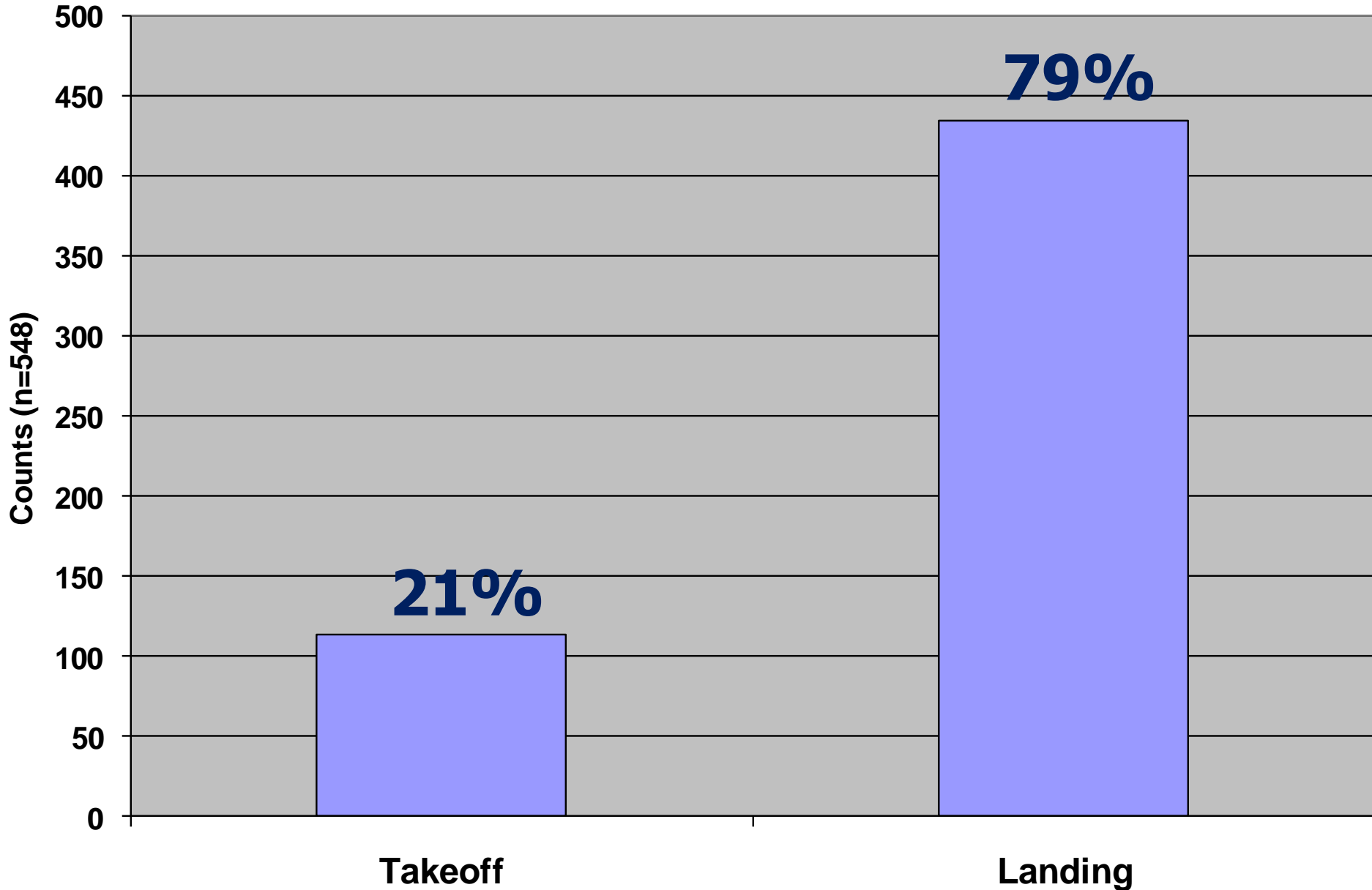
Fatal and Non-Fatal Runway Accidents by Type, 1995 Through 2009



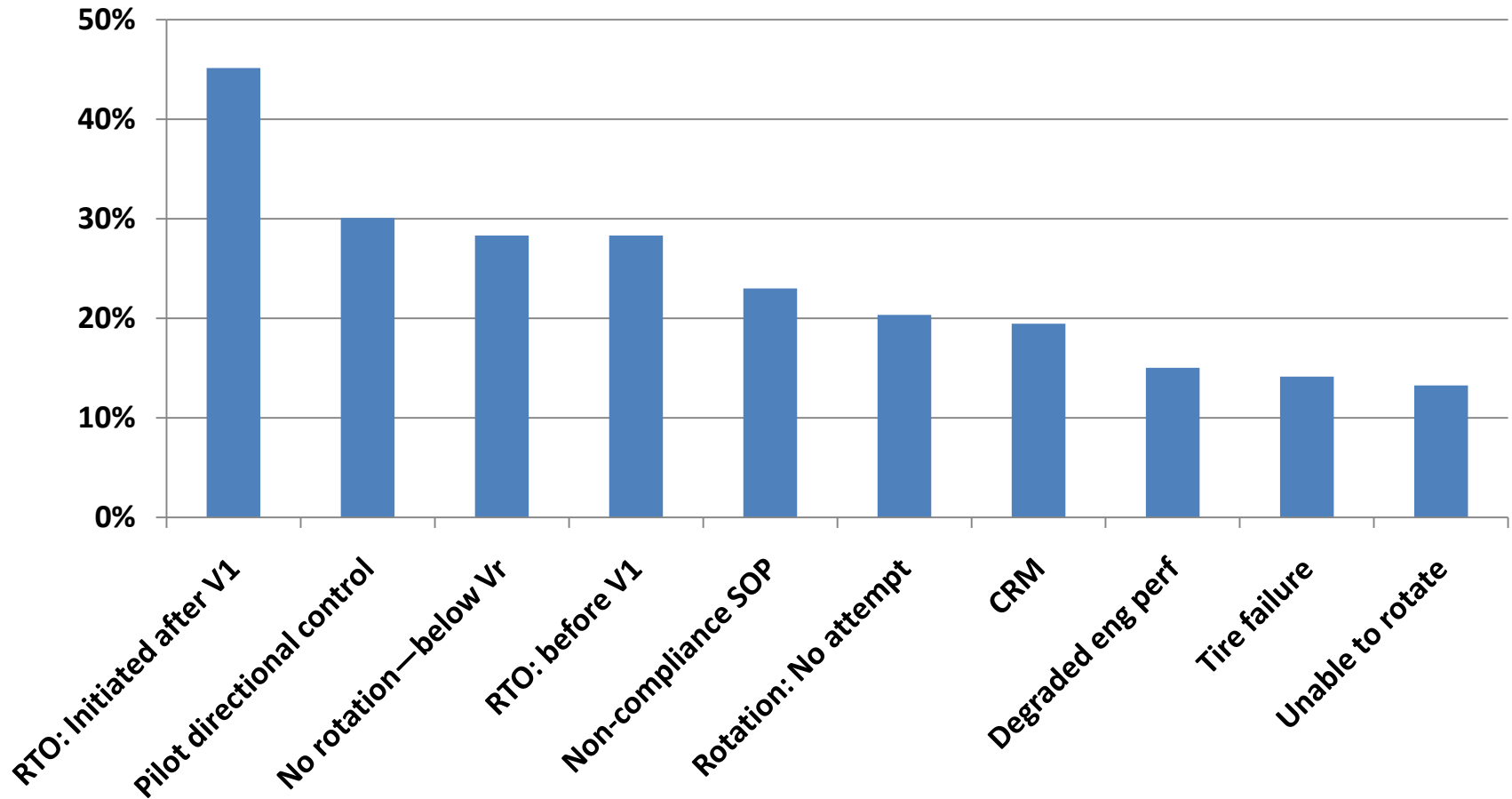
Number of Accidents



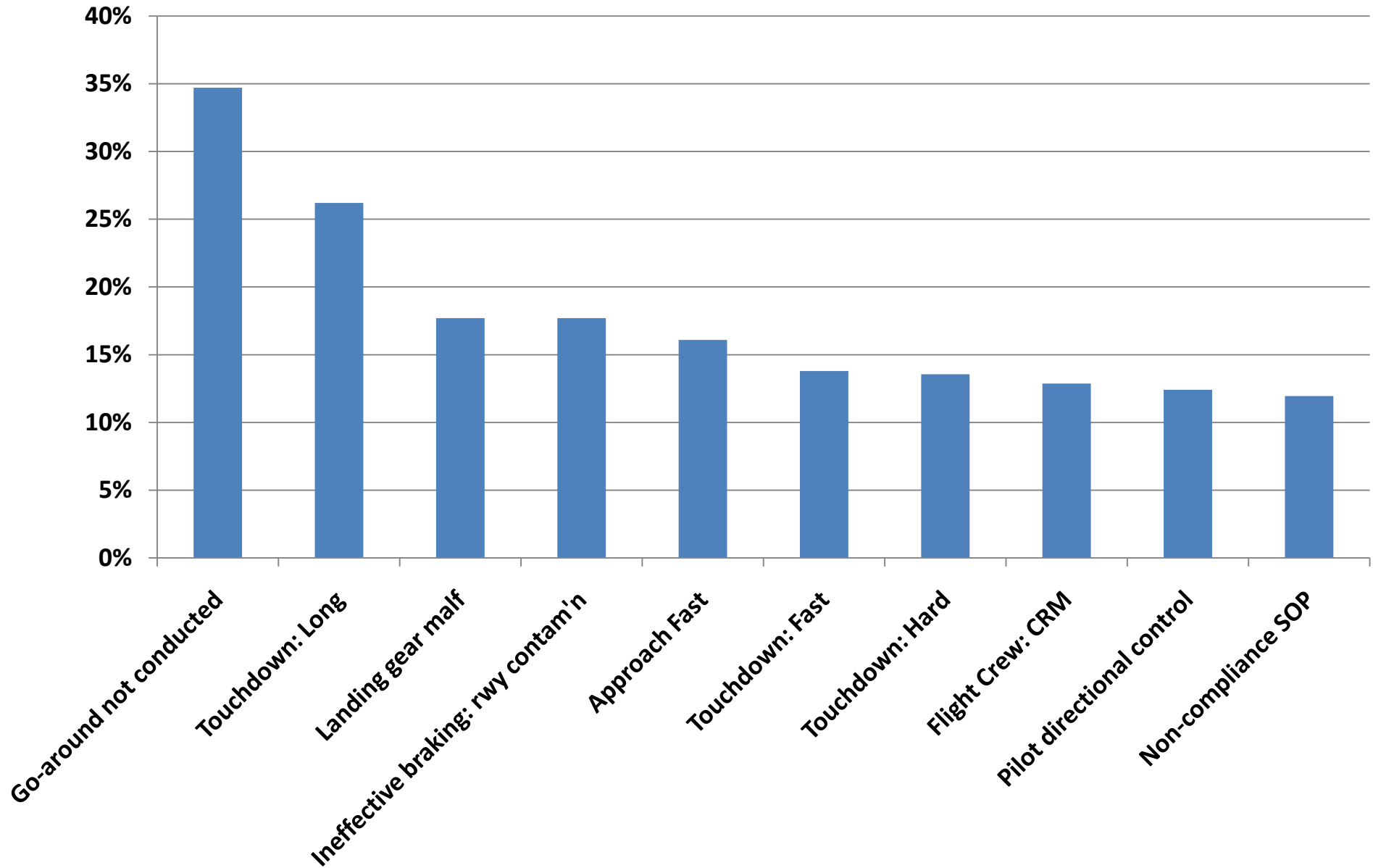
Runway Excursions - Type



Takeoff Excursions – Top 10 Factors



Landing Excursions – Top 10 Factors



The Go-Around

- Lack of go-arounds is the leading risk factor in approach and landing accidents
- Lack of go-arounds is the #1 cause of landing runway excursions

---However---

- Many approach and landing accidents result from poorly executed go-arounds
- When is it appropriate **NOT** to go around:
 - Wheels on the runway
 - Deceleration devices activated
(e.g. brakes, spoilers, thrust reversers)

Data Study

- Over 1 million flights analyzed
- 3.5% of approaches were unstable (35,000)
- Only **1.4%** of them lead to a Go-Around (490)

- Landings with High Risk events
 - **Unstable Approach** **8.0 %** (80,000)
 - **Stable Approach** **6.2%** (62,000)

- This was not the expected result ---- **or was it**

The keys to minimizing the risk of a landing runway excursion accident

- **Stabilized Approaches**
- **Go arounds (properly conducted)**
- **Stabilized Landings**

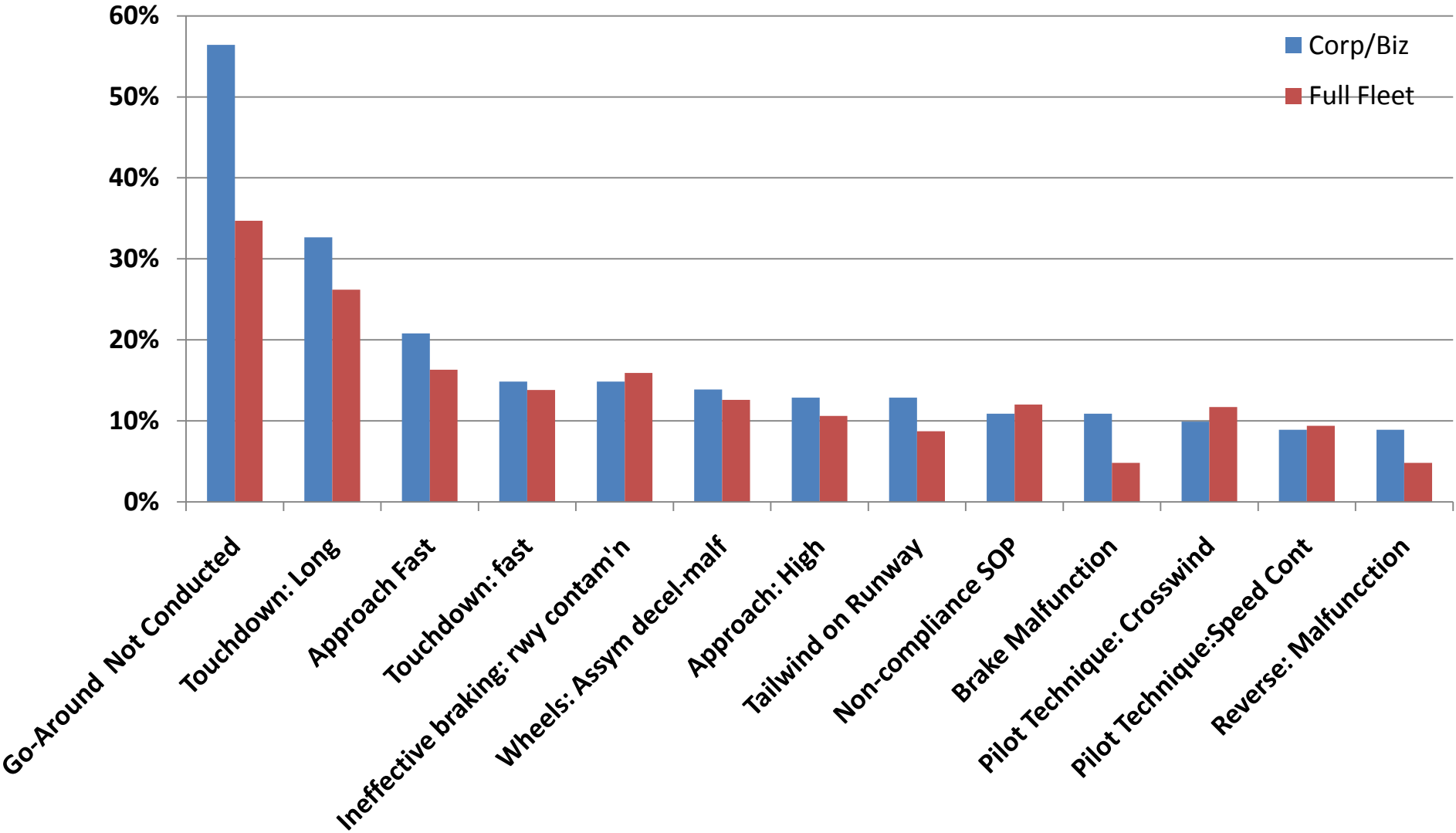
Stabilized Landing Concept

- **An adjunct to stabilized approach criteria**
- **Influenced by stabilized approach criteria, but a separate risk area**

Stabilized Landing Guidelines

- **A landing is stabilized when all of the following criteria are met:**
 - **The runway conditions are properly assessed and accounted for**
 - **The aircraft achieves a threshold crossing height of 50 feet plus or minus 10 feet**
 - **The aircraft speed at the threshold is not more than $V_{ref} + 5$**
 - **Tailwind conditions not more than 10 knots for a dry runway, and nil for a wet or contaminated runway**
 - **The aircraft touches down in the landing zone and is promptly transitioned to the desired deceleration condition (brakes, spoilers, thrust reverse)**

Corp/Biz Aircraft vs. Full Fleet - Landing Excursions



Runway Safety Observations

- Data shows we are being effective in preventing runway incursion accidents, but the number of incidents and severity still indicates a very high risk
- Data shows runway excursions are the most common type of runway safety accident (96%) and the most common type of fatal runway safety accident (80%)
- Severity of runway excursions dependent on:
 - Energy of aircraft when departing the runway
 - Airport layout, geography, and rescue capability

Conclusions

- **Unstable approaches increase the risk of landing runway excursions**
- **Failure to recognize the need for and to execute a go-around is a major cause of landing runway excursions**
- **Contaminated runways increase the risk of runway excursions**
- **Combinations of risk factors have a synergistic effect on the risk of an excursion**
- **Universal standards related to runway condition measurement and reporting would assist in reducing the risk of runway excursions**

Basic Plan

3 Critical Items for Success:

- 1. Identify high risk areas (with data)**
- 2. Develop interventions to reduce the risk in the highest risk areas**
- 3. Get information out internationally in a user friendly format to the people who can use it**

Reducing the Risk of RUNWAY EXCURSIONS

REPORT OF THE RUNWAY SAFETY INITIATIVE





FSF Goal:

Make aviation safer by reducing the risk of an accident

