

Reducing the Risk of Runway Excursions

Review of Studies by:

Flight Safety Foundation – May 2009

UK CAA - 2009

Eurocontrol – March 2010



Runway Excursion:

- An event where an aircraft veers off the side or overruns the end of the runway declared area.
- Most common type of accident in commercial aviation (24% of all accidents).
- Landing incidents most common.
- Take-off incidents more likely to be fatal.

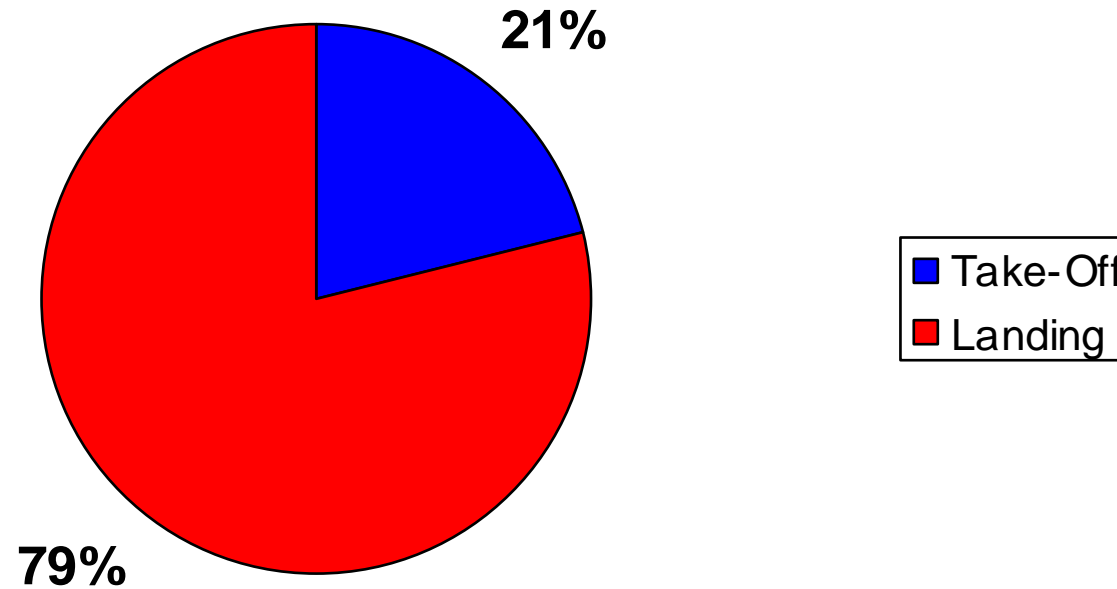
FSF Data Analysis

- World Aircraft Accident Summary 1995-2008 (14 yrs)
- 417 Excursions – more than one every 2 weeks

<i>Accident Type</i>	<i>Number of Accidents</i>	<i>% of Total Accidents</i>
Runway Incursion	10	0.6%
Runway Excursion	417	29.0%
Total	1,429	100%

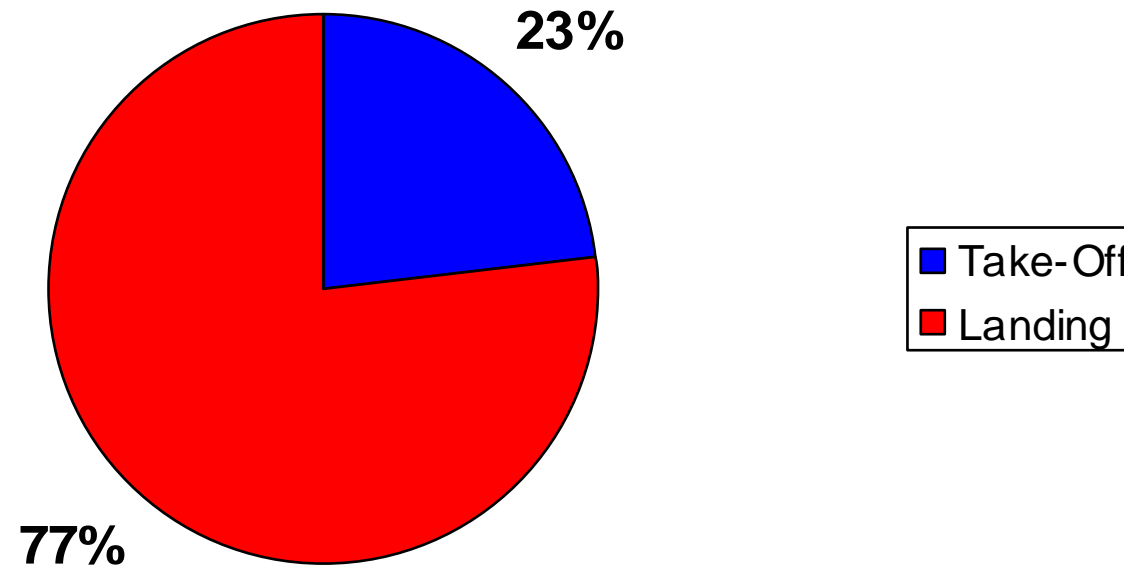
FSF Data Analysis

- Take-Off excursion rate has decreased over time
- Landing excursion more common and **INCREASING**



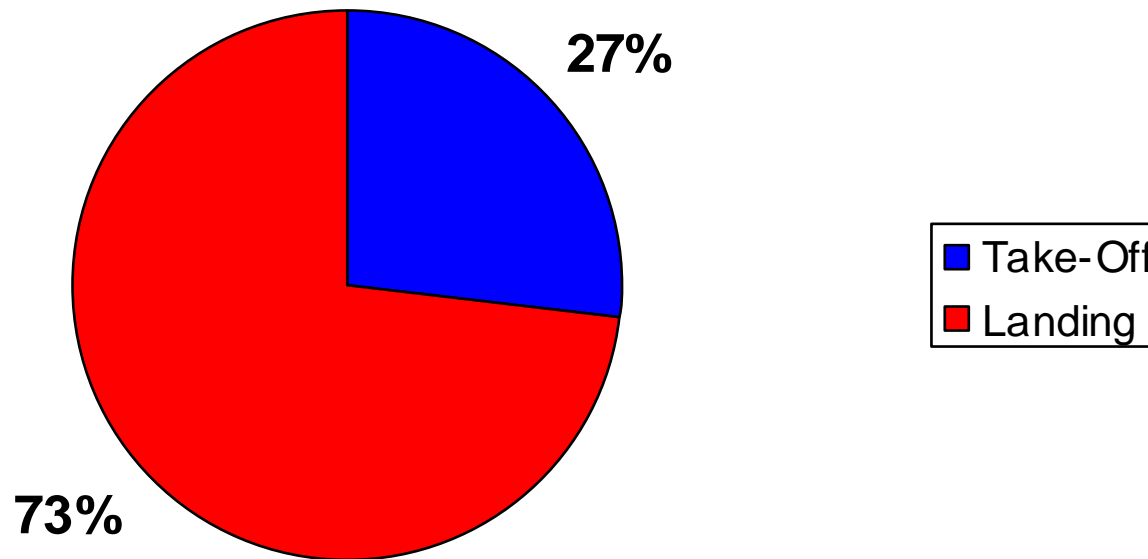
Eurocontrol Data Analysis

- NLR – ATSI worldwide database 1980–2008 (29 yrs)
- 1,732 Excursions – More than one every week



UK CAA Data Analysis

- Worldwide fatal accidents 1998 – 2007 (10 yrs)
- 22 accidents – more than 2 per year



Excursions: More frequent than you thought?

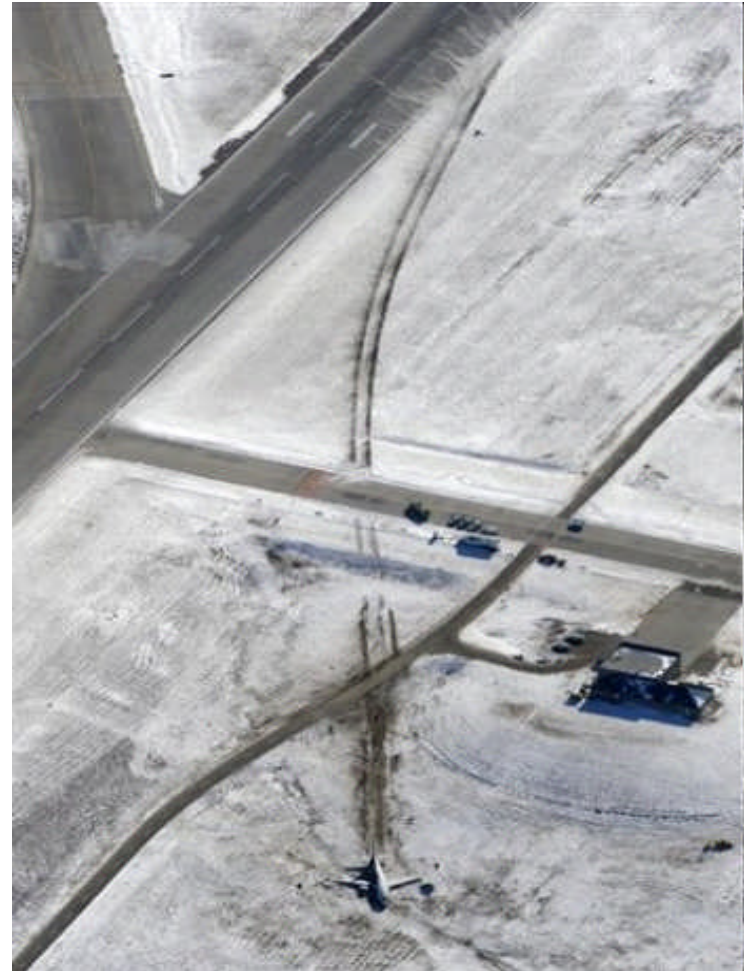


Study Conclusions

- Excursion rates have changed little in 30 years.
- Eurocontrol propose a European Action Plan – similar to EAPPRI but for Excursions.
- Principal causes are all pilot induced error.
- Runway contamination / condition features highly.
- RESA is not a preventative measure that can be relied on, purely post accident severity mitigation.
- International harmonisation on runway condition and braking action is required.

Causal Factors

- Take-Off rejected after V1
- Pilot loss of control
- Unstable approach
- Long touchdown
- Tyre failure
- Nosewheel steering failure
- **Wet / contaminated runway**
- **Crosswind / gusts**
- Incorrect take-off mass



Airport Risk Factors

- Runway construction – surface drainage & friction.
- Runway maintenance – friction level.
- Runway resurfacing – friction levels.
- **Contaminated Rwy** – accurate measuring & reports.
- Training & competence of Ops personnel - reporting.
- Operating with reduced **declared distances**.
- Clarity of runway markings and lights (inc PAPI).
- Wildlife management – potential for RTO.
- Intersection departures – **distance information**.

Airport Risk Factors - ATS

- ILS provision over non-precision Aids.
- Use of **Noise Preferential** runway selection.
- Weather conditions and timely reporting.
- **Airspace design** to allow safe descent profile.
- Correct maintenance of Landing Aids.
- **Vectoring** to comply with ICAO Doc 4444.
- Glideslope to be intercepted from beneath.

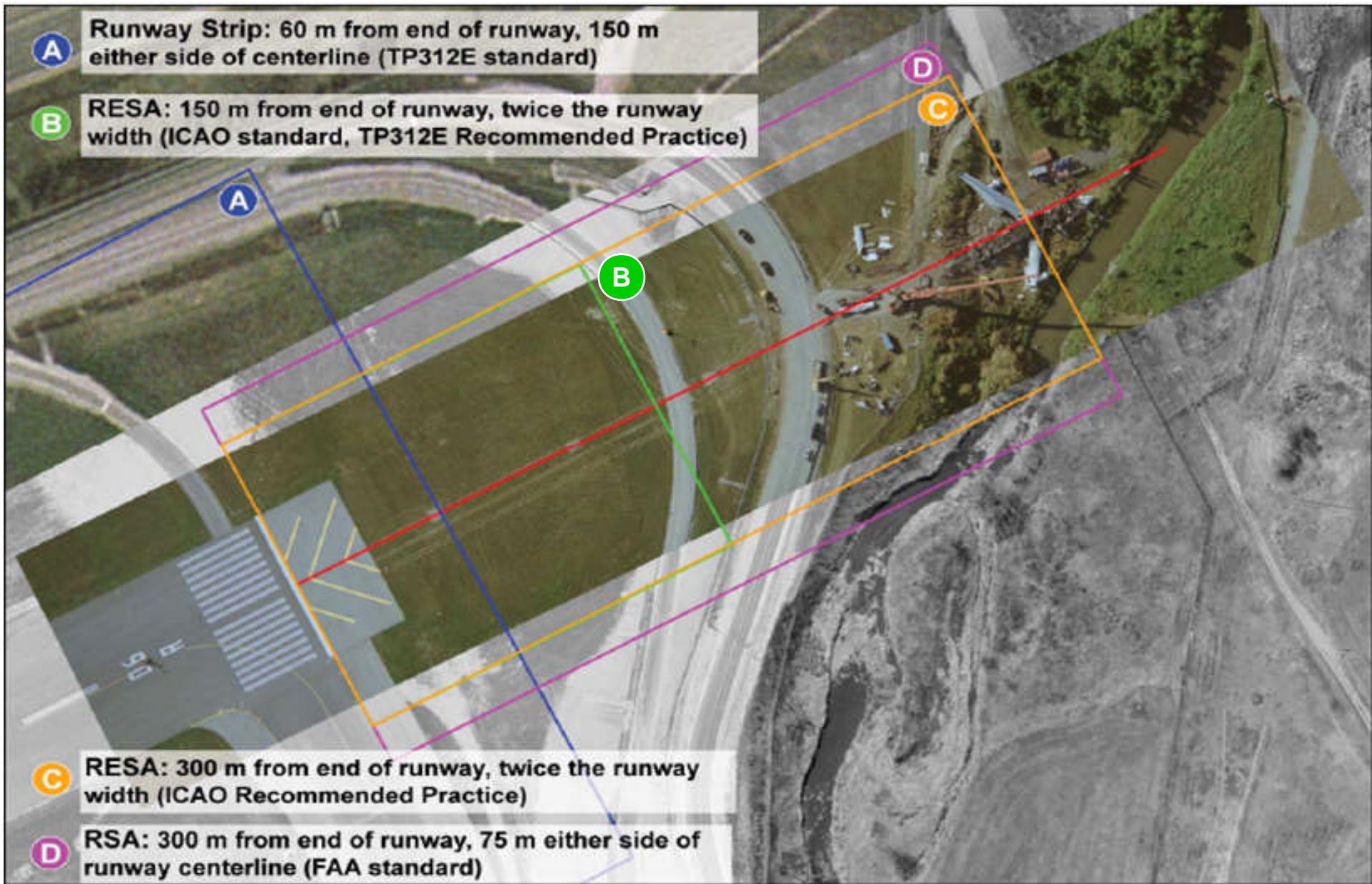
FSF Recommendations

- **RESA** to ICAO “requirements”. Standard or Rec??
- **Define criteria for not operating runway.**
- Ensure the airfield **meets ICAO** specifications.
- Ensure runways are built and maintained to achieve **effective friction** levels.
- Provide means for flight crews to visually determine runway distance remaining. *No ICAO standard exists for this yet, but common in the USA.*

Runway End Safety Area

**Is it ICAO compliant?
What will EASA specify?**







Further reading:

- Flight Safety Foundation: Reducing the Risk of Runway Excursions (May 2009)
- <http://www.skybrary.aero/bookshelf/books/900.pdf>
- Eurocontrol: A Study of Runway Excursions from a European Perspective (March 2010)
- Eurocontrol: Runway Incursion Prevention – Air / Ground Communications (Feb 2010)
- <http://www.eurocontrol.int.runway> safety

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ACI TOSC Meeting
Verona 15-16 April 2010