



## Runway Excursions

The Commercial Aviation Safety Team (CAST) began a study of runway excursions (RE) in April 2012 to review findings and recommendations from existing RE studies; categorize, organize, and prioritize recommendations using CAST's safety analysis process; and recommend mitigations using CAST's Safety Enhancement (SE) process.

Worldwide, several efforts are underway to reduce the number and severity of REs—one of the top accident and fatality risk categories. Among United States Title 14, Code of Federal Regulations part 121 operators, the category of RE had the highest number of accidents between 2000 and 2019. RE was the 9th highest fatality risk category in the United States during that period, signifying U.S. RE outcomes are generally less severe than in other parts of the world. Nonetheless, RE represents a significant precursor risk for future fatalities in the United States and worldwide.

When the study was completed, CAST adopted SEs 215–222 (see page two) in April 2014. CAST recommends air carriers adopt these SEs and consider implementing manufacturers' new/updated runway safety technology.

### Then and Now (Data Trends)

The CAST Metrics Working Group (CMWG) monitors several unstable approach (UA) parameters, such as energy state, aircraft configuration, and path conformance, to detect potential RE risks.<sup>1</sup>

The CMWG defines a UA as exceeding thresholds on at least three of the monitored parameters. When the RE study began in 2012, the UA rate below 500 feet (ft) height above touchdown (HAT) was approximately 45–65 events per 10,000 flights depending on the season. By 2017, the rate had reduced to 16–25 events per 10,000 flights, improving to 8 to 22 per 10,000 since 2019. This rate is exclusive of anomalous data during the novel coronavirus disease (COVID-19) slowdown in 2020.

Approximately 1.5 percent of flights with CMWG-defined UAs below 500 ft HAT performed a go-around in 2012. That rate improved to 4 percent by 2017 and has been between 5 and 7 percent since 2019.

The CMWG also monitors egregious UAs, requiring egregious exceedance of thresholds for at least three parameters. Flights with CMWG-defined egregious UAs improved from 1.5 per 10,000 flights in 2012 to between 0.05 and 0.4 per 10,000 flights since 2017. The go-around rate for egregious UAs improved from an average of about 10 percent between 2012 and 2015, to around 20 percent between 2016 and 2021.



Photo attribution: DNAA Final Approach Runway 22 by Sm105 is licensed under CC BY-SA 4.0.

### CAST Safety Enhancements

- SE 215: Runway Excursion - Landing Distance Assessment
- SE 216: Runway Excursion - Flight Crew Landing Training
- SE 217: Runway Excursion - Takeoff Procedures and Training
- SE 218: Runway Excursion - Overrun Awareness and Alerting Systems
- SE 219: Runway Excursion - Policies, Procedures and Training to Prevent Runway Excursions
- SE 220: Runway Excursion - Runway Distance Remaining Signs
- SE 221: Runway Excursion - Policies and Procedures to Mitigate Consequences and Severity
- SE 222: Runway Excursion - Airplane-based Runway Friction Measurement and Reporting (R-D)

The RE SEs 215–222 are available for review at [http://www.skybrary.aero/index.php/Portal:CAST\\_SE\\_Plan](http://www.skybrary.aero/index.php/Portal:CAST_SE_Plan).

<sup>1</sup> UAs also correlate to risks of Abnormal Runway Contact (ARC), Loss of Control - Inflight (LOC-I), and Controlled Flight Into or Toward Terrain (CFIT) as identified in an earlier CAST study on Approach and Landing Accident Reduction (ALAR).