

Stabilized Approach, Landing and Go-Around (SALGA)

Air Canada's Experience

Background Refresher

Risk:

- Runway Excursions: The most common type of aircraft accident.
- Go-arounds: 1 in 10 go-arounds will have a problem
Go-around phase is most fatal phase of flight
(by \approx 50 times, normalized).

Go-around policy non-compliance:

Severe, chronic = Only 3% of Unstable Approaches result in a Go-Around (FSF, 2017)

“There is no other single decision that can have as much impact on accident reduction today as the decision to go-around” (Curtis 2007 IASS, former FSF IAC Chair)

FSF GADM&E Project

Multi-year science-based study
2012-2017

45 Findings

42 Recommendations

Most embedded into GAPPRE

“...(proposed for industry validation)...”

10.3 Analysis: New Stabilized Approach and Go-Around Guidelines, 2017 (proposed for industry validation)

New Stabilized Approach and Go-Around Guidelines, 2017 (proposed for industry validation)

An approach is fully stabilized when all of the following criteria are met:

Profile:

- Only small changes in heading/pitch are required to maintain the correct flight path profile.
- Specific types of approaches are stabilized if they fulfill the following:
 - CAT I ILS: within 1-dot deviation of glide path and localizer;
 - RNAV: within 1/5-scale deflection of vertical and lateral scales and within RNP requirements;
 - LOC/VOR: within 1-dot lateral deviation; and,
 - Visual: within 2.75 and 3.25 degrees of visual approach path indicators, and lined up with the runway centerline no later than 300 ft.

Configuration:

- Aircraft is in the landing configuration (gear and flaps set, speed brakes retracted).

Energy:

- Airspeed is stabilized within $V_{REF} + 10$ kt to V_{REF} (without wind adjustments).
- Thrust is stabilized to maintain the target approach airspeed.
- Sink rate is no greater than 1,000 fpm.

General:

- The stabilized approach gates should be observed, and active communication calls made during each approach.
- Normal bracketing corrections in maintaining stabilized conditions occasionally involve momentary overshoots made necessary by atmospheric conditions; such overshoots are acceptable. Frequent or sustained overshoots are not.
- Unique approach procedures or abnormal conditions requiring a deviation from the above elements require a special briefing.

Approach Gate	Objective ¹	Example of Active Communication ²
1,000 ft AGL Note: This can vary between 800 and 1,500 ft, depending on aircraft category type	The final landing configuration should be selected.	PM: "1,000; Configured/Not configured" or "Flaps" PF: "Roger"
500 feet AGL	The aircraft should be fully stable.	PM: "500; Stabilized/Not stabilized" or "Speed (parameter)" PF: "Roger"
300 feet AGL and below	Initiate a go-around without hesitation if unstable.	PM: "300; Stabilized/Go around" or "[Condition to go around]" PF: "Continue/Go around"

AGL = above ground level; CAT I = Category I; ILS = instrument landing system; LOC/VOR = localizer/VHF omnidirectional radio; PF = pilot flying; PM = pilot monitoring; RNAV = area navigation; RNP = required navigation performance; V_{REF} = reference landing speed

Notes:

1. Continuing past the related gate should only occur if meeting the objective of the next gate is achievable; otherwise, go around. Example: If the flight is not configured by 1,000 ft, it could continue if being fully stable by 500 ft is achievable.
2. If the call at the respective gate indicates an undesired state (e.g., "Not configured"; or "Flaps"), that call should be repeated at an appropriate interval until the condition is corrected. Example: "Flaps"; "Flaps" repeated every 50 ft.

Air Canada SALGA Experience - Industry Validation

Multi-year study and development (2018-2020)

Implemented as COVID developed

Paradigm Shifts Needed

1. From Stable Approach to [Stable Approach AND Stable Landing](#)
2. Separate [Stable Goal from an Unstable Limit](#)
 - ✓ Allows unstable approaches and landings to stabilize (preventing go-arounds)
(New lower go-around altitude limit, and new Performance Based Touchdown Point Limit)
3. New [tailored, psychologically based, SOPs](#) for better go-around compliance

Stable Approach Goals and Unstable Limit

Stable **Goal** remained the same

1000 Foot Configuration Gate

500 Foot Stable Gate

New unstable **Limit**

200 feet AGL

Unstable Approach Data

SPI	Trend	Year 2019 Rate	Current Rate
Unstable Approach – Continued to Land	Stable	1.10	0.36
Greater Than 1 Dot Above Glideslope 1000' – 200'	Decreasing	1.65	0.37

Unstable Approach Continue to Land reduction of 74%

Stable Landing Goals and Touchdown Point Limits

New Stable Landing Longitudinal Goals:

- Optimum Touchdown Zone Defined
- Beyond which mandatory calls outs are repeated until resolved

New Performance Based Touchdown Point Limit:

- Not constrained by runway markings
- AC maximum TPL - 4000 feet

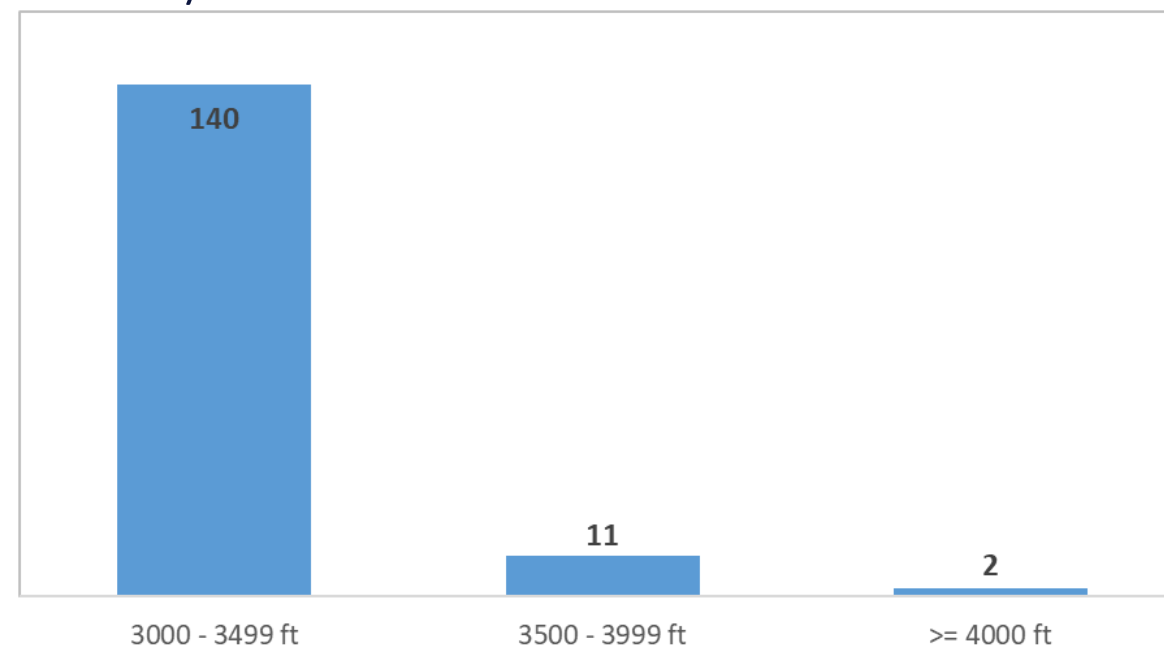
Stable Lateral Goal remained the same:

- Centerline

New Unstable Lateral Limit:

- Visually windshield based

Long Landings (2021 – 2023)
 153 landing beyond 3000 feet
 2 beyond new TPL



Go Around Exposure reduction of 99%

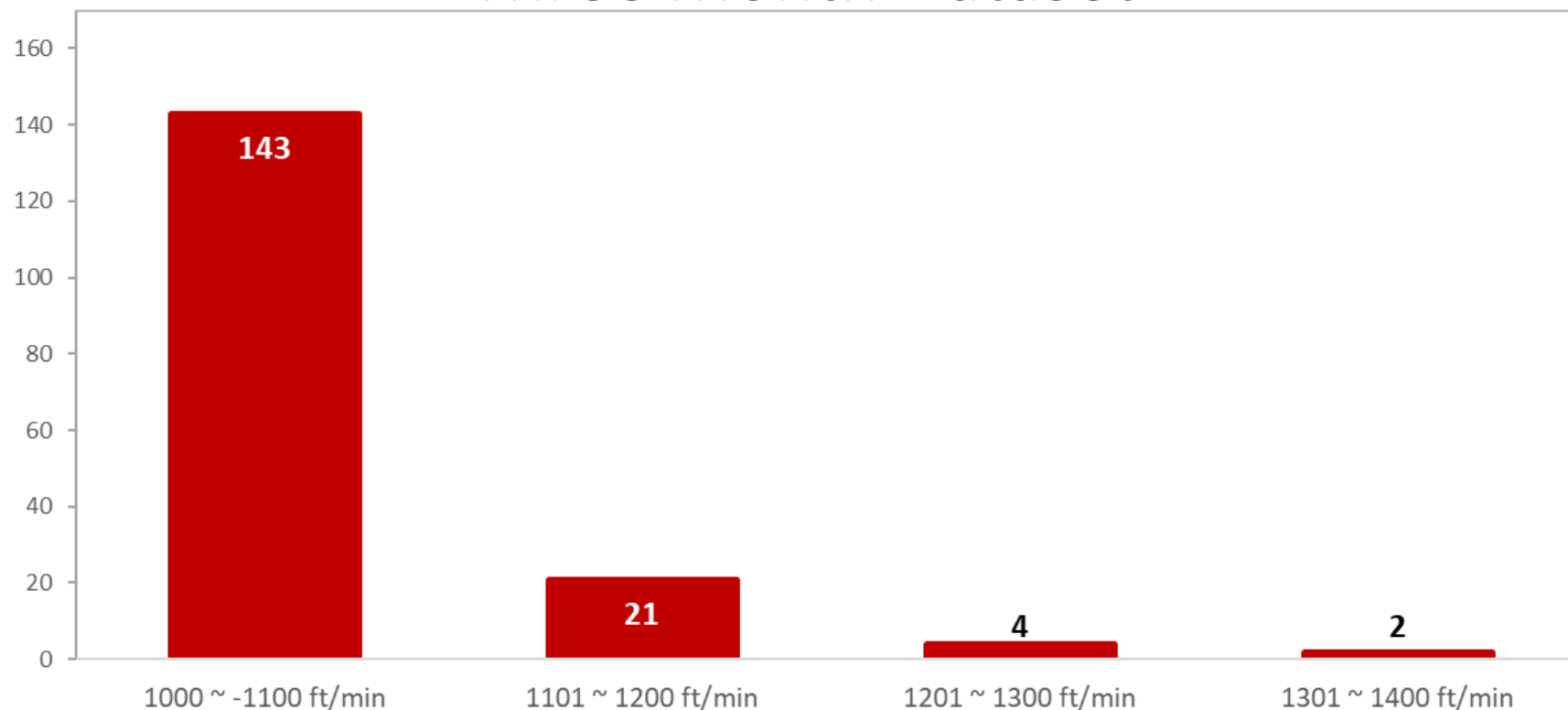
Stable Landing Goals and Touchdown Point Limits

Additional Landing Data

SPI	Trend	Year 2019 Rate**	Current Rate**
Long Flare	Decreasing	3.25	1.03
High Speed at Landing	Stable	1.58	0.31

SALGA – High Vertical Speed 200' – 50'

Three Month Dataset



Thank You