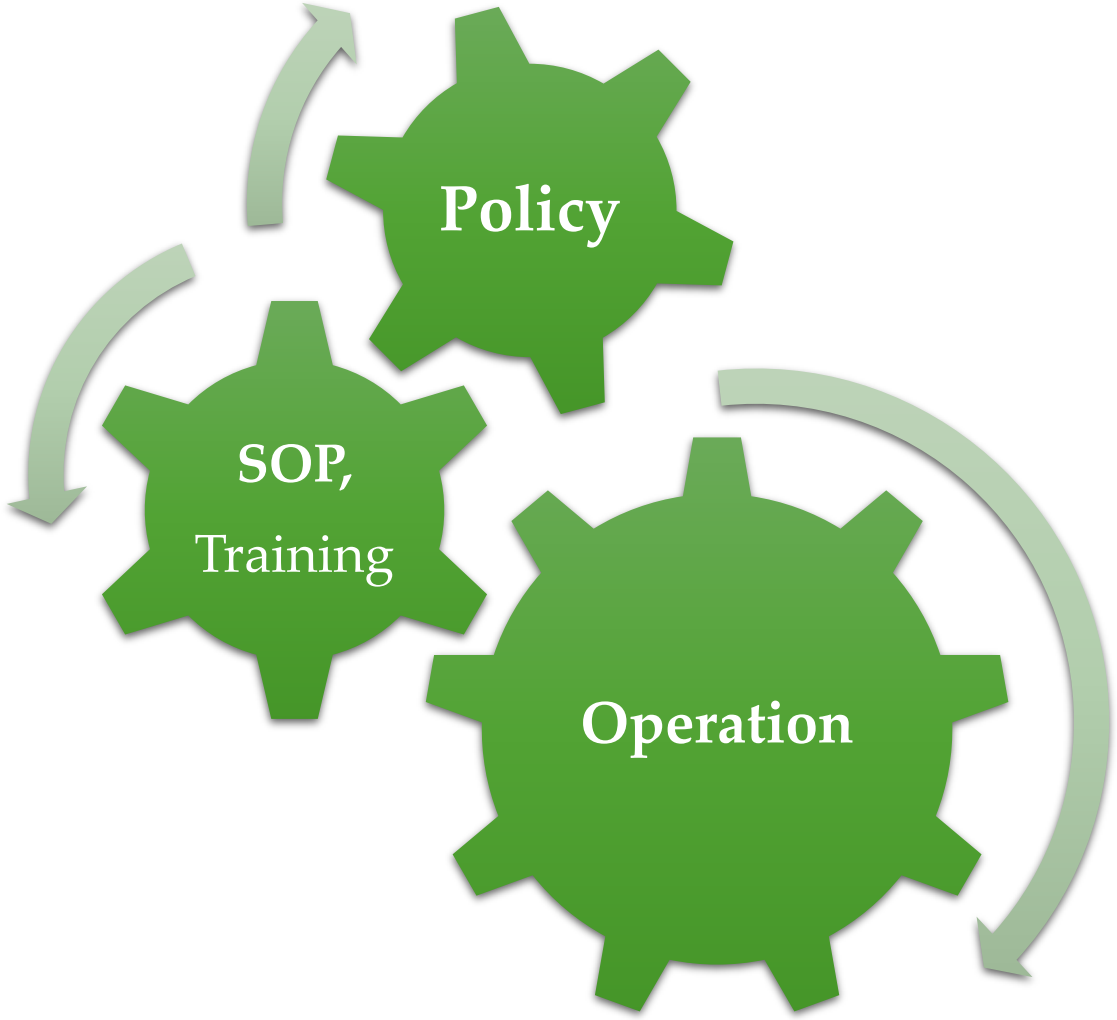
Runway Safety Training Overview

EVA AIR

劉家宏


Policy
SOP,
Training
Operation

Basic academic training focus on:

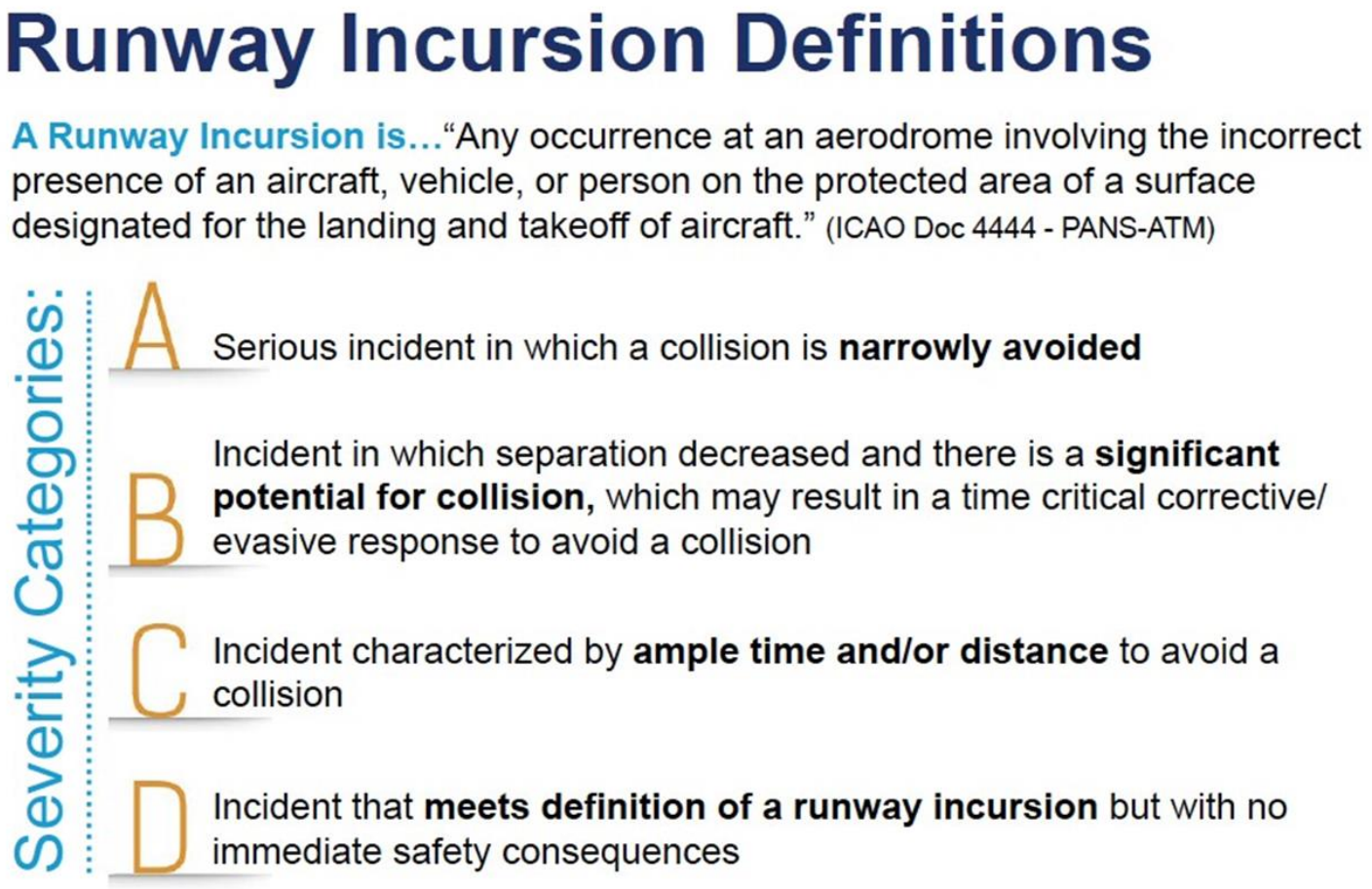
- What is “Runway Safety”?
- How it happened?
- What should we do?

Runway Safety:

- Runway Incursion
- Runway Confusion
- Runway Excursion

Runway Incursion

Runway Incursion



Major causes of runway incursion

- Miss-Communication
- Loss of Situational Awareness
- Unfamiliar airport and/or inadequate signage and marking

Breakdown in communications

- Non-standard phraseology
- Incorrect readback of instructions or misunderstanding an instruction(ATC failure to confirm understanding)
- Accepting instructions intended for another aircraft or vehicle
- Blocked or partially blocked transmission
- Overlong or complex transmission

Factors involving pilot

- Loss of situational awareness
- Pilot performing head-down tasks
- ATC issuing instructions as the aircraft rolling out
- Complicated procedure leading to pilot rushed behavior
- Last-minute change in taxi routing

Airport signage and marking

- Complicated airport design where runways have to be crossed
- Inadequate signage and marking
- Incomplete, non-standard or obsolete information about the taxi routing

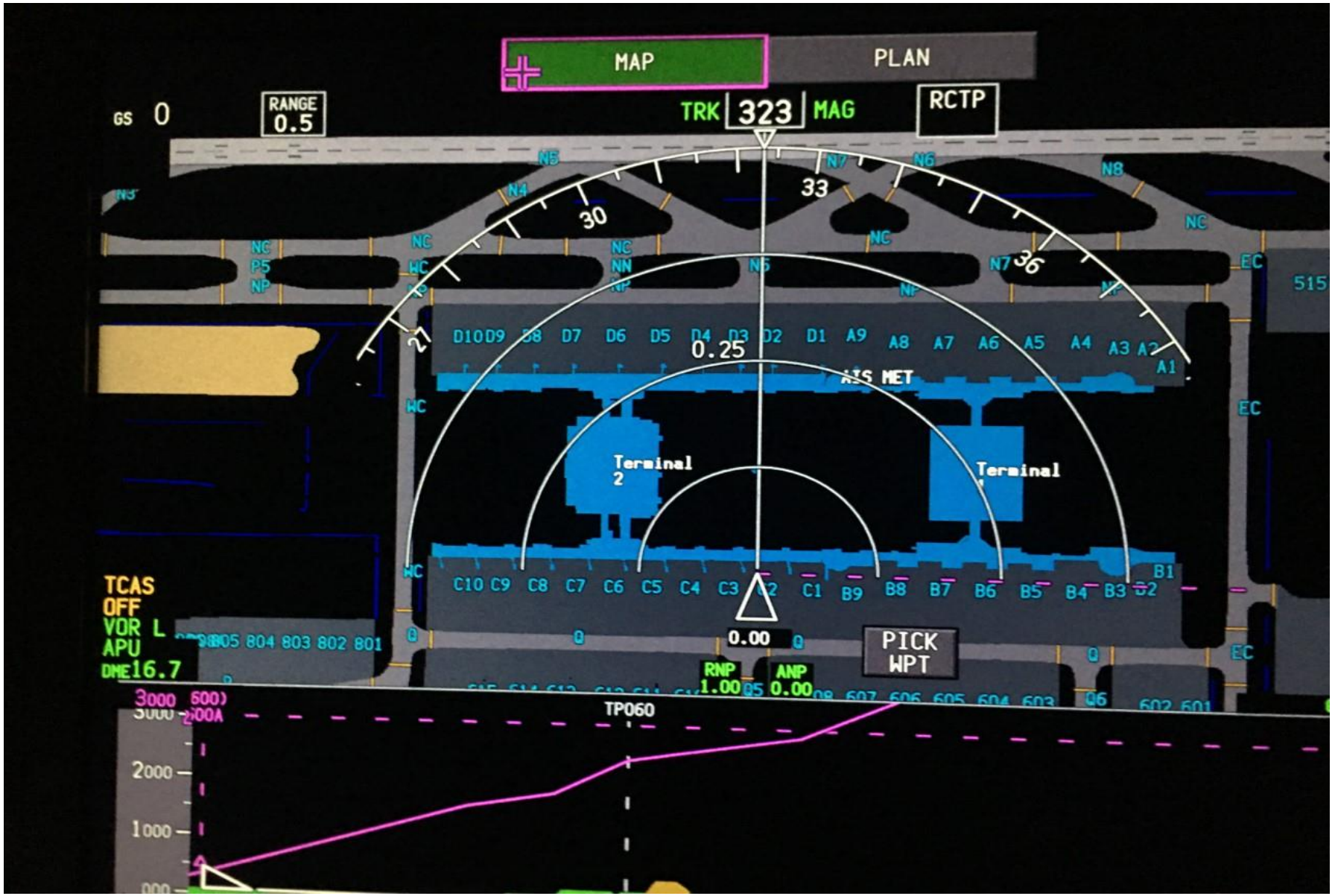
What should we do?

Communication

- Any misunderstanding and disagreement should be resolved to the satisfaction of “ALL” crewmembers
- It is not enough to assume that everyone has heard and understood, but verbal agreement should be accomplished on following:
  - taxi intersections for departure
  - identifying runway intersections
  - identifying the correct runway for takeoff and landing
  - crossing or entering the runway

Situation Awareness

- Use current airport diagrams/charts
- Monitor radio and use airport charts to assist in locating other aircraft and vehicles within the vicinity
- Avoid distractions
- Minimize “head down” activities
- Compare “What’s supposed to happen” vs “What is happening”
- Extra caution when cleared to taxi on a runway during reduced visibility

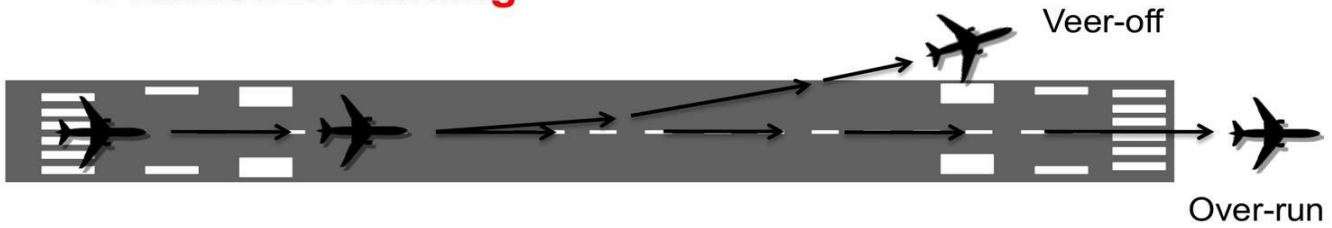

MAP
PLAN
GS 0
RANGE
0.5
TRK 323 MAG
RCTP
30
33
36
21
0.25
Terminal
2
Terminal
TCAS
OFF
VOR L
APU
DME 16.7
0.00
PICK
WPT
RNP
1.00
ANP
0.00
TP060
3000
2000
1000

Runway Excursion

Definitions

✈**Runway Excursion:** A veer off or overrun off the runway surface

✈**Takeoff or landing**



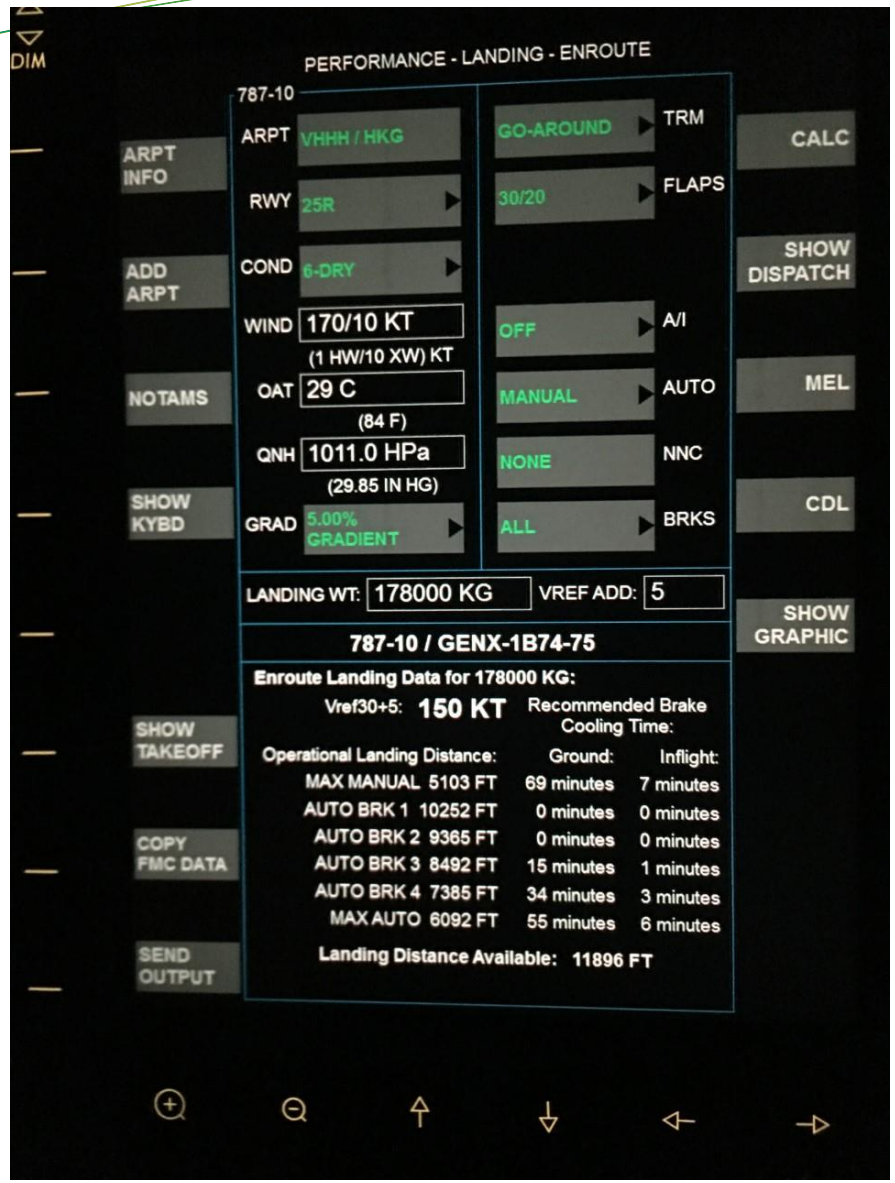
Major causes of runway excursion

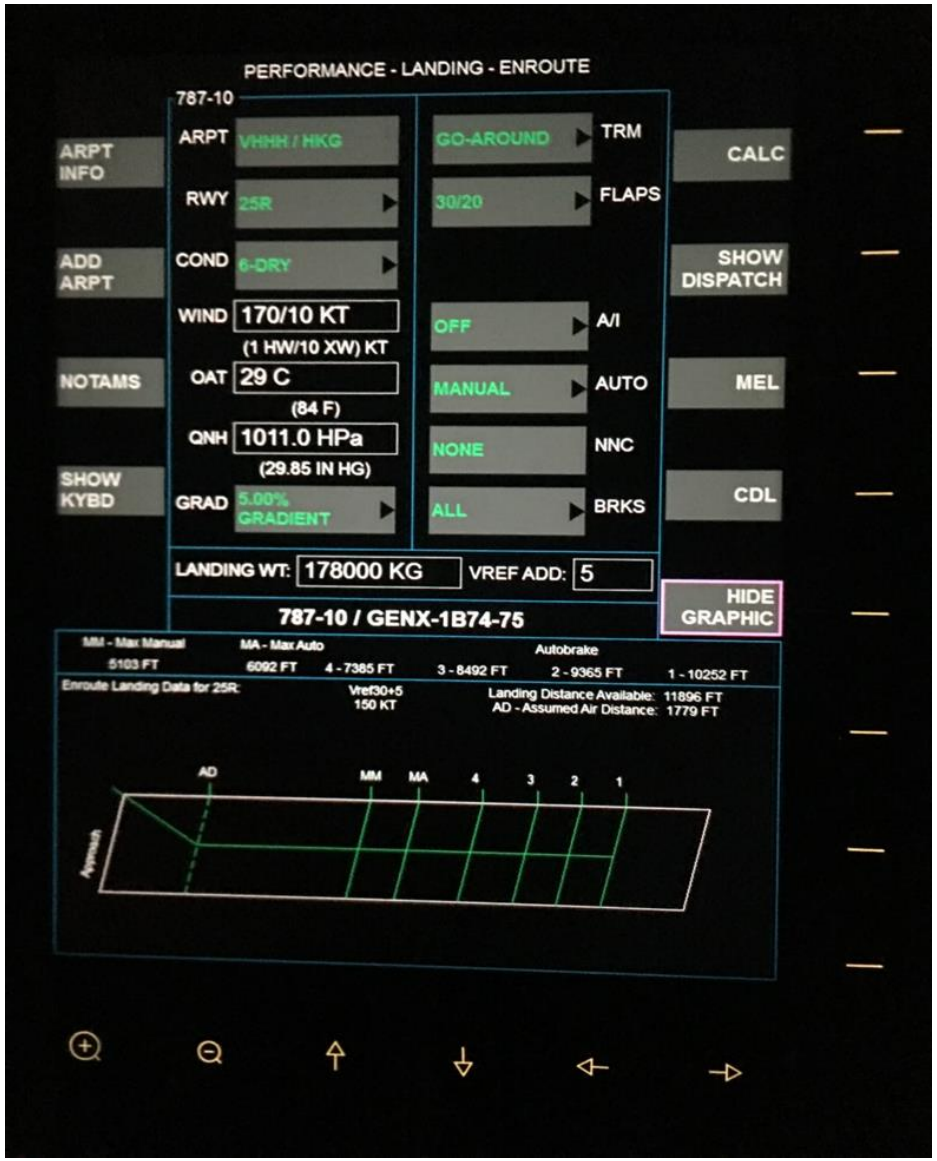
- 2012 to 2016, 83% of runway excursions occurred in the landing phase of flight
- Long, floated or bounced landings were noted in 46 percent of all runway excursion accidents during this period, while a continued landing after an unstable approach was a factor in 14 percent of the runway excursions
  - Go-around not initiated with unstable approach
  - Go-around not initiated when touch down long/fast
  - Go-around not initiated when landing on a contaminated runway
- crew executed a high-speed RTO for the INCORRECT reasons

Landing distance determining factors

- Approach Speed
- Height over threshold
- Flare height and floating

What should we do?


DIM
PERFORMANCE - LANDING - ENROUTE
787-10
ARPT INFO
ADD ARPT
NOTAMS
SHOW KYBD
ARPT VHHH / HKG
RWY 25R
COND 6-DRY
WIND 170/10 KT
(1 HW/10 XW) KT
OAT 29 C
(84 F)
QNH 1011.0 HPa
(29.85 IN HG)
GRAD 5.00% GRADIENT
GO-AROUND TRM
30/20 FLAPS
OFF A/I
MANUAL AUTO
NONE NNC
ALL BRKS
CALC
SHOW DISPATCH
MEL
CDL
SHOW GRAPHIC
LANDING WT: 178000 KG
VREF ADD: 5
787-10 / GENX-1B74-75
Enroute Landing Data for 178000 KG:
Vref30+5: 150 KT
Recommended Brake Cooling Time:
Operational Landing Distance: Ground: Inflight:
MAX MANUAL 5103 FT 69 minutes 7 minutes
AUTO BRK 1 10252 FT 0 minutes 0 minutes
AUTO BRK 2 9365 FT 0 minutes 0 minutes
AUTO BRK 3 8492 FT 15 minutes 1 minutes
AUTO BRK 4 7385 FT 34 minutes 3 minutes
MAX AUTO 6092 FT 55 minutes 6 minutes
Landing Distance Available: 11896 FT
SHOW TAKEOFF
COPY FMC DATA
SEND OUTPUT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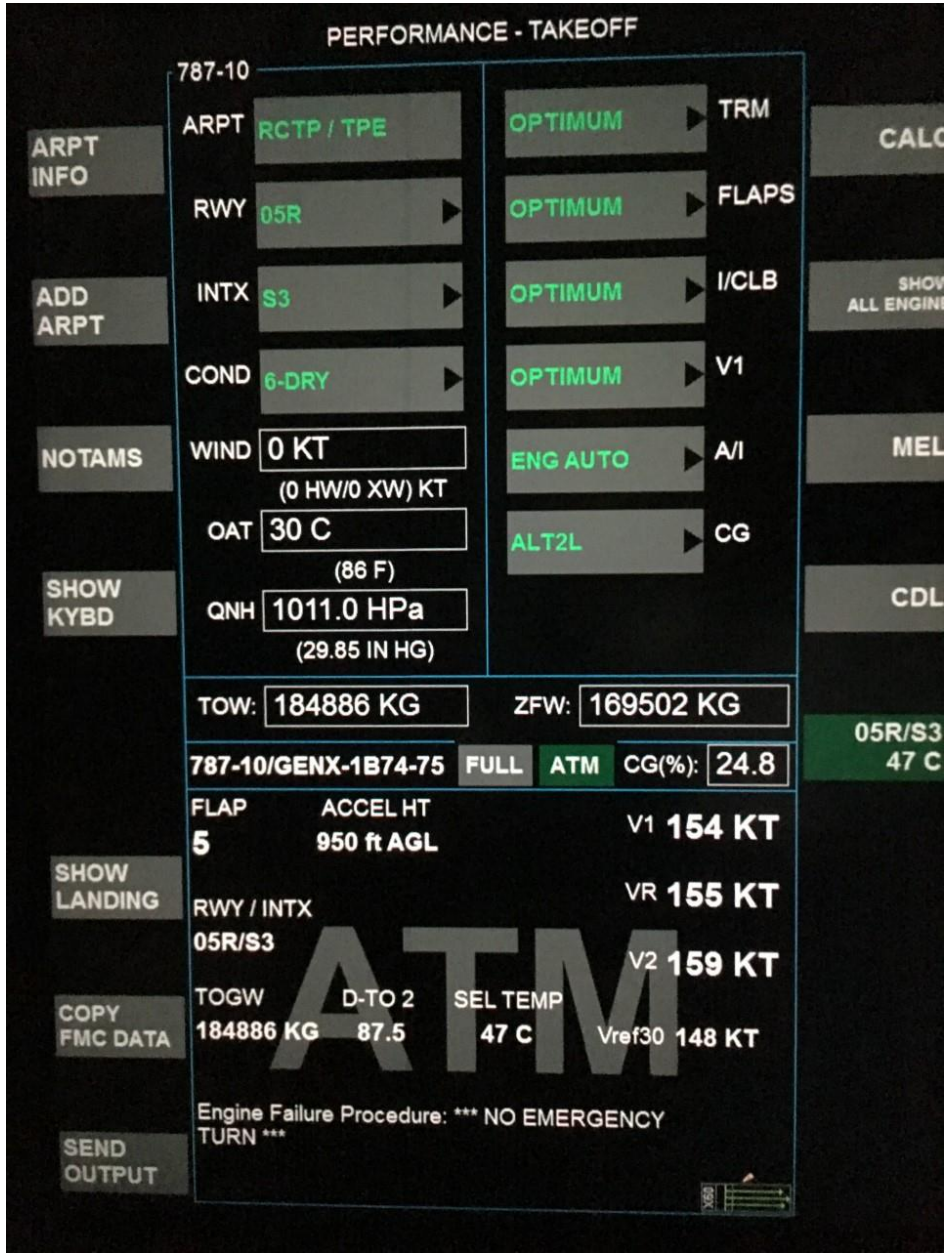
CALC
SHOW DISPATCH
MEL
CDL
HIDE GRAPHIC
LANDING WT: 178000 KG
VREF ADD: 5
787-10 / GENX-1B74-75
MM - Max Manual
5103 FT
MA - Max Auto
6092 FT
Autobrake
4 - 7385 FT
3 - 8492 FT
2 - 9365 FT
1 - 10252 FT
Enroute Landing Data for 25R:
Vref30+5
150 KT
Landing Distance Available: 11896 FT
AD - Assumed Air Distance: 1779 FT
AD
MM
MA
4
3
2
1
Approach


PERFORMANCE - TAKEOFF
787-10
ARPT INFO
ADD ARPT
NOTAMS
SHOW KYBD
SHOW LANDING
COPY FMC DATA
SEND OUTPUT
ARPT RCTP / TPE
RWY 05R
INTX S3
COND 6-DRY
WIND 0 KT
(0 HW/0 XW) KT
OAT 30 C
(86 F)
QNH 1011.0 HPa
(29.85 IN HG)
OPTIMUM TRM
OPTIMUM FLAPS
OPTIMUM I/CLB
OPTIMUM V1
ENG AUTO A/I
ALT2L CG
TOW: 184886 KG
ZFW: 169502 KG
787-10/GENX-1B74-75 FULL ATM CG(%): 24.8
FLAP 5
ACCEL HT 950 ft AGL
V1 154 KT
VR 155 KT
V2 159 KT
RWY / INTX 05R/S3
TOGW 184886 KG
D-TO 2 87.5
SEL TEMP 47 C
Vref30 148 KT
ATM
Engine Failure Procedure: *** NO EMERGENCY TURN ***
CALC
SHOW ALL ENGINE
MEL
CDL
05R/S3
47 C

Stable approach

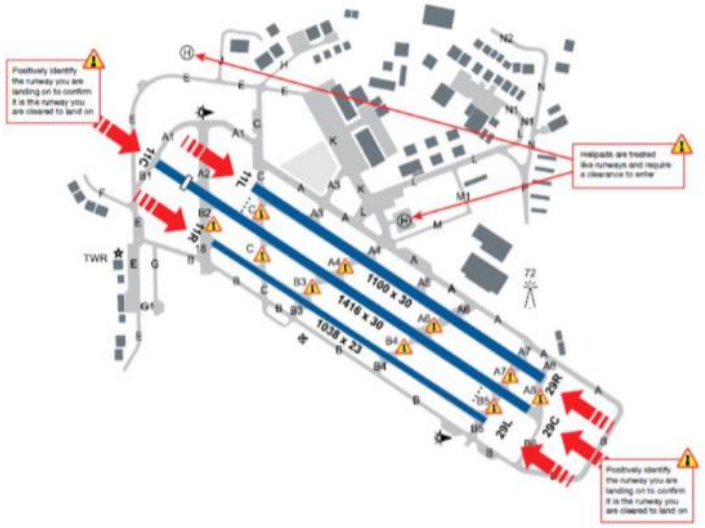
An approach is stabilized when all of the following criteria are met:

- The aircraft is on the correct flight path to land on the runway center line and within TDZ;
- Only small changes in heading/pitch are required to maintain the correct flight path;
- The aircraft speed is not more than Vapp + 15 knots indicated airspeed and no less than VREF; (for Airbus fleets, Vls to Vapp (target) + 15)
- The aircraft is in the correct landing configuration;
- Sink rate is no greater than 1,000 fpm; if an approach requires a sink rate greater than 1,000fpm, a special briefing should be conducted;
- Power setting is appropriate for the aircraft configuration and is not below the minimum powerfor approach as defined by the FCOM;
- All briefings and checklists have been conducted;
- During a circling approach, wings should be level on final when the aircraft reaches 300 feet above airport elevation;
- Unique approach procedures or abnormal conditions requiring a deviation from the above elements of a stabilized approach require a special briefing

Runway Confusion

Definitions

✈**Runway Confusion:** The unintentional use of the wrong runway, or a taxiway, for landing or take-off



Causes of runway confusion

- Runway confusion occurs when pilots enter, takeoff or land on the wrong runway. This is a particular problem at aerodromes with parallel runway systems where it is relatively easy to mistake runways by day or night.

- Runway confusion can also occur when a taxiway, usually parallel, is mistaken for a runway. This is most often a problem at night.

What should we do?

- Pay careful attention to runways in clearances
- Always read back an assigned runway in full (i.e. runway tree one left)
- If a non-precision approach, circling approach or an entirely visual approach is being flown, take sufficient time during the approach briefing to agree how positive runway identification will be accomplished
- Use Technology - Utilize published approaches such as Instrument Landing System (ILS), Localizer (LOC), Area Navigation (RNAV), (VOR), etc. as a backup reference where available

- Conducting an approach in visual conditions increases the potential for confusing visual clues such as airport lighting configuration, surrounding lights, or areas that look similar to the airport. Therefore, use of the most precise available approach or Flight Management System (FMS) RNAV navigational aids to support pilot and flight crew decisions
- Make sure of visual identification of the *correct* runway before you enter or land on it
- Pay attention to and be alert of runway lighting during takeoff and landing at night

Signage

EXAMPLE	TYPE OF SIGN	PURPOSE	LOCATION/CONVENTION
4 - 22	Mandatory: Hold position for taxiway/ runway intersection.	Denotes entrance to runway from a taxiway.	Located L side of taxiway within 10 feet of hold position markings.
22 - 4	Mandatory: Holding position for runway/runway intersection.	Denotes intersecting runway.	Located L side of rwy prior to intersection, & R side if rwy more than 150' wide, used as taxiway, or has "land & hold short" ops.
4 - APCH	Mandatory: Holding position for runway approach area.	Denotes area to be protected for aircraft approaching or departing a runway.	Located on taxiways crossing thru runway approach areas where an aircraft would enter an RSA or apch/ departure airspace.
ILS	Mandatory: Holding position for ILS critical area/precision obstacle free zone.	Denotes entrance to area to be protected for an ILS signal or approach airspace.	Located on twys where the twys enter the NAVAID critical area or where aircraft on taxiway would violate ILS apch airspace (including POFZ).
⊖	Mandatory: No entry.	Denotes aircraft entry is prohibited.	Located on paved areas that aircraft should not enter.
B	Taxiway Location.	Identifies taxiway on which the aircraft is located.	Located along taxiway by itself, as part of an array of taxiway direction signs, or combined with a runway/ taxiway hold sign.
22	Runway Location.	Identifies the runway on which the aircraft is located.	Normally located where the proximity of two rwys to one another could cause confusion.
	Runway Safety Area / OFZ and Runway Approach Area Boundary.	Identifies exit boundary for an RSA / OFZ or rwy approach.	Located on taxiways on back side of certain runway/ taxiway holding position signs or runway approach area signs.
	ILS Critical Area/POFZ Boundary.	Identifies ILS critical area exit boundary.	Located on taxiways on back side of ILS critical area signs.
J →	Direction: Taxiway.	Defines designation/direction of intersecting taxiway(s).	Located on L side, prior to intersection, with an array L to R in clockwise manner.
↖ L	Runway Exit.	Defines designation/direction of exit taxiways from the rwy.	Located on same side of runway as exit, prior to exit.
22 ↑	Outbound Destination.	Defines directions to take-off runway(s).	Located on taxi routes to runway(s). Never collocated or combined with other signs.
FBO ↘	Inbound Destination.	Defines directions to airport destinations for arriving aircraft.	Located on taxi routes to airport destinations. Never collocated or combined with other types of signs.
NOISE ABATEMENT PROCEDURES IN EFFECT 2300 - 0500	Information.	Provides procedural or other specialized information.	Located along taxi routes or aircraft parking/staging areas. May not be lighted.
	Taxiway Ending Marker.	Indicates taxiway does not continue beyond intersection.	Installed at taxiway end or far side of intersection, if visual cues are inadequate.
7	Distance Remaining.	Distance remaining info for take-off/landing.	Located along the sides of runways at 1000' increments.

EXAMPLE	TYPE OF MARKING	PURPOSE	LOCATION/CONVENTION
	Holding Position.	Denotes entrance to runway from a taxiway.	Located across centerline within 10 feet of hold sign on taxiways and on certain runways.
	ILS Critical Area/POFZ Boundary.	Denotes entrance to area to be protected for an ILS signal or approach airspace.	Located on twys where the twys enter the NAVAID critical area or where aircraft on taxiway would violate ILS apch airspace (including POFZ).
	Taxiway/Taxiway Holding Position.	Denotes location on taxiway or apron where aircraft hold short of another taxiway.	Used at ATCT airports where needed to hold traffic at a twy/twy intersection. Installed provides wing clearance.
	Non-Movement Area Boundary.	Delineates movement area under control of ATCT, from non-movement area.	Located on boundary between movement and non-movement area. Located to ensure wing clearance for taxiing aircraft.
	Taxiway Edge.	Defines edge of usable, full strength taxiway.	Located along twy edge where contiguous shoulder or other paved surface NOT intended for use by aircraft.
	Dashed Taxiway Edge.	Defines taxiway edge where adjoining pavement is usable.	Located along twy edge where contiguous paved surface or apron is intended for use by aircraft.
4 - 22 4 - 22 ↖ T B	Surface Painted Holding Position.	Denotes entrance to runway from a taxiway.	Supplements elevated holding position signs. Required where hold line exceeds 200'. Also useful at complex intersections.
	Enhanced Taxiway Centerline.	Provides visual cue to help identify location of hold position.	Taxiway centerlines are enhanced 150' prior to a runway holding position marking.
	Surface Painted Taxiway Direction.	Defines designation/direction of intersecting taxiway(s).	Located L side for turns to left. R side for turns to right. Installed prior to intersection.
	Surface Painted Taxiway Location.	Identifies taxiway on which the aircraft is located.	Located R side. Can be installed on L side if combined with surface painted hold sign.

Comments & Suggestions