Operational Liaison Meeting FBW aircraft

Circle to land at high and hot airports
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Introduction

- Airbus has been asked by some operators to study the case of a circling approach at high altitude airports with one engine failed.

- This study has shown that the published procedure may not be adequate at high altitude, but also at high temperature.
Published circling approach procedure

INITIAL CONFIGURATION:
- Flaps 3
- L/G down
- Spoilers armed

RUNWAY IN SIGHT:
- Level off
- Proceed to downwind leg
- Fly 45° for 30 sec
- Maintain visual contact with runway

TURNING BASE

ABEAM THRESHOLD:
- Start time

Minimum circling approach height

F SPEED

40 sec for 1000 ft

30 sec

Vapp

FLAPS FULL

END OF TURN 400 FT MINI

STABILIZED

Published circling approach procedure
Circling approach with one engine failed
**Circling approach with one engine failed**

- “Cold conditions”: 

![Thermometer with cold condition illustration](image)
Circling approach with one engine failed

In "cold" conditions, with one engine failed, in CONF3 with L/G down, level flight can be maintained whatever the weight.

INITIAL CONFIGURATION:
- Flaps 3
- L/G down
- Spoilers armed
Circling approach with one engine failed

- “Hot conditions”: 
In “hot“ conditions, with one engine failed, in CONF3 with L/G down, the Airbus twin-engine aircraft cannot fly level above a given weight.
Limit external conditions

- The following temperatures are the maximum conditions under which level flight during the downwind leg can be maintained at maximum landing weight, with one engine out:
  - For the A320-233:
    * 31°C at 2000ft
    * 6°C at 10000ft and above
  - For the A319-132:
    * 26°C at 2000ft
    * 11°C at 7000ft and above
  - For the A330-243:
    * 31°C at 7000ft
    * 0°C at 13000ft
  - For the A340, the failure of one engine does not prevent to maintain the level flight during a circling approach.
**Limit external conditions**

- These conditions are marginal for the A330. A specific procedure should be established for very specific airports at high altitude, such as Lhassa or La Paz. To our knowledge, presently no A330 is operated at such airports.

- These conditions are not unusual ones for the A320 family: They are usual at high altitude airports such as La Paz, Quito, Lhassa, Kathmandu, but also at lower altitudes such as Sanaa, Tehran, and at many airfields at sea level in hot countries (Dubai, Bahrein, …).
For the A320 family, the circle to land procedure in case of engine inoperative must then be revised.

It must be emphasised that extending the flaps to flaps2 instead of 3 would not solve the problem, as both configurations are not very different.
A320F circling approach with one engine failed

INITIAL CONFIGURATION:
- Flaps 3
- Spoilers armed

RUNWAY IN SIGHT:
- Level off
- Proceed to downwind leg
- Fly 45° for 30sec
- Maintain visual contact with runway

ABEAM THRESHOLD:
Start time

F SPEED
1000 ft or MDA, depending on meteorological conditions

TURNING BASE
40 sec for 1000 ft

F SPEED
Vapp

-L/G down
- Flaps FULL
A320F circling approach with one engine failed

- If the circling approach is flown at less than 750ft RA, the warning “L/G NOT DOWN” will be triggered. This warning is to be disregarded and cleared.

- The gear must be extended as soon as possible in final approach to avoid triggering the “TOO LOW GEAR” warning, which appears at 500ft RA if the landing gear is not downlocked.
Conclusion

- The FCOM 3.02.10 “Approach with one engine inoperative” will be revised to introduce the following pattern:
Conclusion

Proposed procedure:

**INITIAL CONFIGURATION:**
- Flaps 3
- Spoilers armed

**RUNWAY IN SIGHT:**
- Level off
- Proceed to downwind leg
- Fly 45° for 30 sec
- Maintain visual contact with runway

**ABEAM THRESHOLD:**
- Start time
- 40 sec for 1000 ft
- 1000 ft or MDA, depending on meteorological conditions
- Maintain visual contact with runway

**TURNING BASE**
- F SPEED
- 30 sec
- L/G down
- Flaps FULL

**Vapp**
- 45°
Thank you for your attention.