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# AIR PILOTS - COMMERCIAL AIR TRANSPORT SAFETY BRIEFING NOTE 09

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## FLYING CIRCLING APPROACHES SAFELY

### The Context

A Circling Approach is only applicable to fixed wing aircraft. It is a visual reference procedure used to reach an intended landing runway which, either permanently or temporarily, does not have an available instrument approach procedure and has a centreline more than 30° from that of any instrument approach initially used. The required visual conditions may or may not be apparent from the METAR. Such procedures will begin with a level turn left or right towards downwind not later than reaching the circling MDA/MDH. The circling manoeuvre may involve up to a 180° track reversal and, if the airspace involved is especially constrained by terrain, restricted airspace or noise abatement considerations, an explicit flight track (with a dedicated chart) may be published which will be within a specific "circling area" calculated by reference to the distance from the initial approach and landing runway thresholds. Notes on the instrument approach chart used for the initial approach will specify the limiting radius of the 'protected area' within which circling must take place and any airspace sectors excluded from use during circling. The initial instrument approach used to reach visual circling altitude/height may be based on ground-based navigational aids or be an RNP APCH procedure.

Where a prescribed circling flight track is defined, the missed approach will also be specified but in other cases when circling without a prescribed track has been commenced, if transition to a missed approach becomes necessary, it should, in the absence of contrary instructions and subject to awareness of terrain/obstacle considerations (which cannot be assured because the position from which it might begin is unknown) be commenced with a climbing turn the shortest way to join the missed approach procedure of the instrument approach.

Prescribed circling approach tracks which can be flown by day should be defined by unmistakable natural track points and/or by prominent visual markers and if such approaches may also be flown at night then appropriately lit markers must be provided to ensure equivalent guidance.

### Some examples of improperly flown Circling Procedures

- A Boeing 737-800 performing prescribed track circling by day at Busan, South Korea in 2019 did not follow the procedure and after flying too close to the runway downwind then commenced the base turn prematurely which made it difficult to complete the continuous 180° turn onto an already very short final approach. Touchdown occurred on the wrong parallel runway which was fortuitously unobstructed. The First Officer monitoring the Captain's flying failed to alert them accordingly.<sup>1</sup>
- An Airbus A340-600 making a daylight circling approach to Quito, Ecuador in 2007 for which there was no prescribed track and for which there was "no evidence that the aircraft operator had planned in any detail" despite significant adverse terrain in the circling area, became unstabilised on final approach and a high descent rate touchdown with uncorrected drift followed, resulting in significant landing gear damage which disabled the aircraft on the runway<sup>2</sup>.
- A number of fatal accidents have occurred after circling was continued when flight by visual reference was no longer possible or after the manoeuvre had become unstabilised. In 2009/2010, two fatal accidents of this type in which of over 300 people died occurred, one to an Airbus A310 at Moroni, Comores at night<sup>3</sup> and the other to an Airbus A321 at Islamabad, Pakistan in daylight<sup>4</sup>. Both

<sup>1</sup> see: [http://araib.molit.go.kr/LCMS/DWN.jsp?fold=/eaib0401/&fileName=%28AIR1905%29\\_Aircraft\\_Serious\\_Incident\\_Report\\_07\\_September\\_2019.pdf](http://araib.molit.go.kr/LCMS/DWN.jsp?fold=/eaib0401/&fileName=%28AIR1905%29_Aircraft_Serious_Incident_Report_07_September_2019.pdf)

<sup>2</sup> see: <https://www.aviacioncivil.gob.ec/wp-content/uploads/downloads/2013/10/07-AIRBUS-A-340-600-2.pdf>

<sup>3</sup> see: <https://bea.aero/docspa/2009/7o-j090629/pdf/7o-j090629.pdf> [only available in French]

<sup>4</sup> see: <https://caapakistan.com.pk/Upload/SIBReports/SIB-337.pdf>

flights failed to remain within the circling area or follow, respectively, the AIP-prescribed or the company-recommended circling procedures.

## **Discussion**

Circling approaches represent a demanding departure from the straight-in approaches normally flown and should be very carefully pre-briefed and flown within the specified airspace and in strict accordance with a prescribed circuit track where required. This is especially so where an operator allows their use by wide body aircraft which should only occur after thorough training in a suitable full flight simulator followed by some line flight check process. It will be particularly important to completely disconnect the autopilot before turning base leg if its response to commands in basic mode will be constrained to a cruise-like status since this is incompatible with the final stages of visual circling. Unless familiar with a potential circling approach, diversion to an alternate may be the better option. Note that the size of a circling area and the corresponding maximum manoeuvring speed by aircraft category differs according to whether it is defined in accordance with ICAO PANS-OPS or FAA TERPS standards with the latter sometimes used outside the USA as well as within it. TERPS uses a significantly smaller circling area and a correspondingly slower maximum speed within it than PANS-OPS. For example, TERPS gives a Category 'C' aircraft a 2.68nm radius area at 145 KIAS maximum speed whereas in PANS-OPS gives a 4.2 nm radius area at 180 KIAS maximum speed.

For most pilots, circling approaches will be an infrequent experience and some aircraft operators will not permit them to be flown on some or all of their aircraft types on the basis of the cost/benefit of the additional training required to maintain safety standards. Those operators who do will usually require explicit authorisation for circling approaches which have prescribed track charts based on appropriate training for pilots who will act as Pilot Flying and some may also consider that permitting any circling approach requires specific initial/recurrent training for one or both pilots. The judgement of when to begin the descent from circling altitude/height in order to maintain stabilised flight during the final approach is extremely important, especially when descent from circling altitude/height is required during a continuous turn from the downwind leg to finals. Finally, the safe completion of circling approaches is also especially reliant on effective monitoring of the Pilot Flying by the Pilot Monitoring which requires them to have a full understanding of such approaches despite the fact that they may not be approved to act as Pilot Flying on such an approach themselves.

## **Safety Recommendations**

### To Aircraft Operators

- The Operations Manual should make it clear whether individual pilots are permitted to fly or monitor circling approaches which do not require a prescribed track to be flown and if so appropriate guidance and full flight simulator time should be provided as part of both type conversion and recurrent training. It is strongly recommended that a standard generic procedure for this sort of circling approach is included in the aircraft type volume of the Operations Manual.
- If the Operations Manual permits pilots to fly prescribed track circling approaches then airports where these exist should be categorised and require (whether mandated by regulation, the airport or ATC) an appropriate level of practical training/recency for any pilot acting as Pilot Flying.
- It may be appropriate to require that all non-training circling approaches are flown by the aircraft commander, although it is in principle preferable for the handling pilot to have landing runway in sight throughout the downwind leg. It is vital that any Pilot Monitoring who is not authorised to act as Pilot Flying should have received a prior opportunity to experience the corresponding type of circling approach before being rostered to operate to an airport where it may be required. This experience could be provided either in the simulator or as an observer on a flight to the destination involved.
- Where circling approaches are permitted at night, this should require simulator or on-aircraft training/familiarisation in such conditions.
- Where there are a relatively large number of pilots on type and the exposure of individual pilots to circling approaches is therefore likely to be low, consideration should be given to forming a sub-group of pilots authorised for such approaches.

### To Pilots

- If a circling approach may be necessary at the conclusion of a short haul destination, it is strongly recommended that a pre-departure review should be undertaken so that only tactical aspects specific to the prevailing conditions will require en-route briefing. A pilot who may have to monitor a circling approach which they are not authorised to fly should, unless their operator covers this situation in type training, self brief in advance on such approaches (including prescribed track ones if these may be encountered) so as to be able to effectively perform their important role.
- The performance of a stabilised circling manoeuvre in accordance with all applicable aircraft operator procedures and in strict accordance with any prescribed track is essential.