

Advisory Circular

TRAINING ON APPROACH AND LANDING ACCIDENTS REDUCTION (ALAR) AND CONTROLLED FLIGHT INTO TERRAIN (CFIT) PREVENTION

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GENERAL

Advisory Circulars (ACs) are issued by the Director-General of Civil Aviation (DGCA) from time to time to provide practical guidance or certainty in respect of the statutory requirements for aviation safety. ACs contain information about standards, practices and procedures acceptable to CAAS. An AC may be used, in accordance with section 3C of the Air Navigation Act (Cap. 6) (ANA), to demonstrate compliance with a statutory requirement. The revision number of the AC is indicated in parenthesis in the suffix of the AC number.

PURPOSE

This AC provides guidance to demonstrate compliance with, and information related to, requirements regarding the development of initial and recurrent ALAR and CFIT prevention training for flight crew.

APPLICABILITY

This AC is applicable to an AOC holder operating in accordance with ANR-121.

RELATED REGULATIONS

This AC relates specifically to Regulations 143, 148, 151 and the Fourth Schedule of ANR-121.

RELATED ADVISORY CIRCULARS

- AC 121-2-2 Approach and Landing Accident and Reduction Measures
- AC 121-2-3 Standard Operating Procedures for Flight Deck Crew Members
- AC 121-2-6 Mode Awareness and Energy State Management Aspects of Flight Deck Automation
- AC 121-6-2 Effectiveness of TAWS/EGPWS equipment
- AC 121-9-2 Flight Crew Training for ANR-121 Operations

CANCELLATION

This AC supersedes AC AOC-33.

EFFECTIVE DATE

This AC is effective from 1 October 2018.

OTHER REFERENCES

- Flight Safety Foundation (FSF) Approach and Landing Accident Reduction (ALAR) Tool Kit
- Commercial Aviation Safety Team (CAST) – Safety Enhancements
- Asia Pacific Regional Aviation Safety Team (APRAST) - Safety Enhancements Initiative (SEI) CFIT/6.

1 BACKGROUND

- 1.1 CFIT refers to an accident in which the aircraft collided with terrain, water, or obstacle while in flight without indication of loss of control. Although few in number (47 cases from 2008 to 2017), CFIT accidents are almost always catastrophic; 89 percent of the CFIT accidents involve fatalities to passengers or flight crew. CFIT is the second largest fatal accident category (after Loss of Control In-flight).¹
- 1.2 IATA accident statistics record that out of 407 commercial aircraft accidents from 2011 to 2015, 267 or 65% occurred during the approach and landing phase and 31 of these involved fatalities.
- 1.3 ALAR/CFIT prevention training remains a vital component in the overall safety footprint for the industry. This would encompass a range of operations, aircraft types, personnel and support structures. Contemporary ALAR/CFIT training continues to hinge on two key aspects: avoidance and escape. The establishment (and continued maintenance) of correct and accurate situational awareness by flight crews in both the horizontal and vertical planes is critical. The potential for contact (impact) with terrain, water and/or obstacles increases when the flight crew loses situational awareness of the aircraft flight plane. In situations like this an escape manoeuvre must be performed without delay to prevent an actual Approach and Landing Accident (ALA) or CFIT from occurring.

2 CFIT TRAINING PROGRAMME

- 2.1 Regulation 182 and the Fourth Schedule of the ANR-121 requires an AOC holder to have in place instructions, training and awareness programmes as appropriate, to prevent CFIT and policy for the use of the ground proximity warning system (GPWS).
- 2.2 A CFIT training programme should be integrated into initial, transition and recurrent training and check programmes. Its importance is reinforced and its effectiveness is improved when the subject is a core element in all training and checking programmes. It can also be structured as a stand-alone programme. The ground training programme is designed to improve awareness by increasing the flight crew's ability to recognize and avoid getting into CFIT situations. The simulator training program is designed to apply this knowledge, have a close-to real-world appreciation of situation where an aircraft may be in CFIT situation and, develop proficiency in an escape manoeuvre that must be applied to prevent a CFIT accident. An AOC holder should provide this training during initial and transition training and, at least once every two years as part of recurrent training.
- 2.3 The objectives of the CFIT training programme are to provide pilots with the ability to:
 - (a) recognise the importance of effective situational awareness and its importance in identifying potential CFIT situations;
 - (b) know prevention strategies and operating practices that mitigates CFIT threats and hazards; and
 - (c) learn and apply the escape manoeuvre(s) and its associated techniques that will avoid CFIT and enhance the possibility of survival.

¹ IATA Controlled Flight into Terrain Accident Analysis Report 2008-2017 Data 2018 Edition

- 2.4 ICAO, State regulators including CAAS, manufacturers and other industry groups have been actively promoting CFIT awareness and training programmes in a continued effort to reduce CFIT accidents and incidents. The Flight Safety Foundations (FSF) has produced the ALAR Tool Kit, which in addition to information concerning ALAR, includes an updated version of the Controlled Flight into Terrain Education and Training Aid.
- 2.5 The CFIT training material contained in the FSF ALAR Tool Kit includes detailed information concerning CFIT, information for the avoidance of CFIT, and CFIT training programme material and a safety alert containing the ground proximity escape manoeuvre recommended for many of the specific airplane makes and models flown by most air operators. A generic ground proximity escape manoeuvre is provided for use in respect to airplanes that do not have a specific manoeuvre. It is recommended that the AOC holder utilises the FSF ALAR Tool Kit as a basis for developing its training programme.

3 ALAR TRAINING PROGRAMME

- 3.1 This ALAR training programme should be a core component of flight operations and integrated into existing initial, transition, and recurrent training and check programmes. The ground training programme is designed to improve awareness by increasing the flight crew's ability to recognize and avoid situations to help prevent ALAs. The AOC holder should provide this training during initial and transition training and at least once every two years as part of recurrent training.
- 3.2 The objectives of the training programme are to provide the pilot with the ability to:
- (a) be aware of the high risk involved in the approach and landing phase of flight;
 - (b) know the available interventions to address this risk (e.g. SOPs, stabilised approach criteria, no fault go-around policy, Constant Angle Non-Precision Approach (CANPA) descent profiles, Runway aligned approaches, etc.);
 - (c) increase awareness of ALA pre-cursors; and
 - (d) learn and apply risk reduction interventions to reduce the risk of approach and landing accidents.
- 3.3 The FSF ALAR Tool Kit includes information to help prevent approach and Landing accidents. In addition to providing training material, there are many other tools and educational materials contained in the FSF Tool Kit that an AOC holder may utilise to reduce the risk of approach and landing accidents.

4 INTRODUCING ALAR/CFIT TRAINING INTO AN INITIAL (TYPE) ENDORSEMENT TRAINING PROGRAMME

- 4.1 Strategies that address terrain awareness and the causes of CFIT events should be discussed at initial training. Continuous reinforcement and the practice of sound SOPs combined with a focus on good crew communications and situational awareness should be emphasized at all times.

4.2 Items to be discussed should include:

- (a) awareness of the aircraft energy state at all times – avoidance of excessive rates of descent and too low or too fast airspeeds at low levels;
- (b) understanding the autopilot operating modes;
- (c) intervention (including manual interventions) if the aircraft is not responding as intended;
- (d) SOPs that include standard callouts that alert crew to Flight Mode Annunciator (FMA) and/or Flight Management Systems (FMS) changes;
- (e) SOP usage to highlight any undesirable aircraft energy states;
- (f) barometric and radio altimetry issues and procedures;
- (g) observance of stabilised approach criteria;
- (h) criteria for descent below MSA – this should only occur when established on a published instrument procedure, under radar control or when visual with terrain;
- (i) review the primary elements of the missed approach especially when a missed approach appears likely;
- (j) go-around and discontinued approach awareness; and
- (k) effective CRM and crew communications highlighting terrain issues and situational awareness.

4.3 Additionally, a programme dedicated to CFIT recovery techniques should be included in simulator training detail(s). This training should include:

- (a) the type specific GPWS escape manoeuvres;
- (b) non-precision approaches using the CANPA descent profile;
- (c) the appropriate use of automation and manual flying during an approach;
- (d) the practice of discontinuing an approach any time that the aircraft becomes unstable below stabilisation height; and
- (e) landings that are practised with different crosswind conditions on dry, wet and contaminated (if these operations are envisaged) runways.

5 INTRODUCING ALAR/CFIT TRAINING INTO A RECURRENT TRAINING PROGRAMME

5.1 After initial ALAR/CFIT training is introduced, it is imperative to keep the flight crew updated and current with procedures concerning ALAR/CFIT.

5.2 It is important to reinforce, refresh and practice the concepts and manoeuvres that were covered in the initial type training programme. This can be done by the use of instructor-led discussion as well as training in an appropriate flight training device.

5.3 Items to be discussed should include:

- (a) usage and understanding of EGPWS warnings;
- (b) understanding the autopilot operating modes and its use;
- (c) crew briefings that include threat and error management;
- (d) understanding approach charts;
- (e) effective crew resource management techniques; and
- (f) review knowledge of en-route charts making sure that the crew have a clear understanding of the charts features and their meanings (e.g. grid MORA).

5.4 A simulator training detail should include:

- (a) Line orientated flight training (LOFT) flights departing and/or landing into airports with high terrain in the vicinity, reviewing what crew can anticipate in these situations;
- (b) non-precision approach procedures (NDB/VOR using CANPA and circling approaches);
- (c) practice of aircraft type specific terrain avoidance manoeuvres;
- (d) practising visual and circling approaches, emphasising the differences between the two approaches;
- (e) practice of go-arounds, especially during circling approaches; and
- (f) practice of depressurisation induced emergency descents over mountainous areas, highlighting escape routes.

6 OTHER GUIDANCE

6.1 The AOC holder may refer to the following ACs for guidance on procedures on CFIT/ALAR matters that may be incorporated related to the training described in this AC.

- AC 121-2-2 Approach and Landing Accident and Reduction Measures
- AC 121-2-3 Standard Operating Procedures for Flight Deck Crew Members
- AC 121-2-6 Mode Awareness and Energy State Management Aspects of Flight Deck Automation
- AC 121-6-2 Effectiveness of TAWS/EGPWS equipment
- AC 121-9-2 Flight Crew Training for ANR-121 Operations