

Advisory Circular			
Subject:	Control Flight into terrain (CFIT) and Approach and Landing Accident Reduction (ALAR)		
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1.0 INTRODUCTION

This Advisory Circular (AC) is provided for information and guidance purposes. It may describe an example of an acceptable means, but not the only means, of demonstrating compliance with regulations and standards. This AC on its own does not change, create, amend or permit deviations from regulatory requirements, nor does it establish minimum standards. This AC is issued in accordance with BCAR.ORO.FC.130.

This AC may use mandatory terms such as “must”, “shall” and “is/are required” so as to convey the intent of the regulatory requirements where applicable. The term “should” is to be understood to mean that the proposed method of compliance is strongly recommended, unless an alternative method of safety protection is implemented that would meet or exceed the intent of the recommendation.

1.1 Purpose

The purpose of this AC is to provide information to operators on flight crew initial and recurrent Approach and Landing Accidents (ALA) and CFIT prevention training.

1.2 Applicability

This document is applicable to all operators as per BCAR.ORO.FC.130

1.3 Description of Changes

Not applicable.

2.0 REFERENCES AND REQUIREMENTS

2.1 Reference Documents

The following reference material may be consulted for information purposes:

- (1) Flight Safety Foundation (FSF) Approach and Landing Accident Reduction (ALAR) Tool Kit - Flight Safety Foundation – Current Safety Initiatives <http://flightsafety.org/>
- (2) Commercial Aviation Safety Team (CAST) – Safety Enhancements [http://www.skybrary.aero/index.php/Commercial_Aviation_Safety_Team_\(CAST\)](http://www.skybrary.aero/index.php/Commercial_Aviation_Safety_Team_(CAST))
- (3) [*Applicable regulatory and/or guidance material by the State*]

2.2 Cancelled Documents

Not applicable.

2.3 Definitions and Abbreviations

(1) The following **definitions** are used in this document:

- (a) **Controlled Flight into Terrain (CFIT):** occurs when an airworthy aircraft under the complete control of the pilot is inadvertently flown into terrain, water, or an obstacle. The pilots are generally unaware of the danger until it is too late.
- (b) **Operator:** means a person, organisation or enterprise engaged in or offering to engage in an aircraft operation

(2) The following **abbreviations** are used in this document:

- (a) **():** Indicates any version of the document (e.g. FAA AC 20-138() would indicate FAA AC 20-138(A), FAA AC 20-138(B), FAA AC 20-138(C) etc.)
- (b) **AC:** Advisory Circular
- (c) **ALA:** Approach and landing accidents
- (d) **ALAR:** Approach and landing accident reduction
- (e) **CANPA:** Constant Angle Non-Precision Approach
- (f) **CFIT:** Controlled Flight into Terrain
- (g) **FSF:** Flight Safety Foundation
- (h) **IATA:** International Air Transport Association
- (i) **ICAO:** International Civil Aviation Organization

3.0 BACKGROUND

- (1) Aviation industry data between 2002 and 2011 records 18 fatal Controlled Flight into Terrain (CFIT) accidents, resulting in 1078 fatalities. The initial approach, final approach and landing phase accounted for 37% of all fatal accidents and 29% of all fatalities.
- (2) ICAO/IATA accident statistics record that there were 188 runway excursion events between 2004 and 2010. Of these 22 events were accidents with fatalities with the loss of over 640 lives.
- (3) The establishment of standards and rules covering the installation and utilization of GPWS and TAWS has contributed to a reduction in these events. However, the fact that not all

aircraft are mandated to be TAWS equipped means that CFIT/ALA related accidents continue to occur.

- (3) Approach and Landing Accidents (ALA)/CFIT training is a vital component in the overall safety footprint for the industry. This would naturally encompass a range of operations, aircraft types, personnel and support structures. Contemporary ALA/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. If this is not the case, the potential for contact (impact) with terrain, water and/or obstacles increases. In situations like this an Escape Maneuver must be performed without delay to prevent an actual ALA/CFIT from occurring. Invoking this maneuver will increase the chances of escaping an ALA or CFIT

4.0 SCOPE

- (1) This AC provides information that will assist air operators in the development and conduct of Approach and Landing Accident Reduction (ALAR) and CFIT training.

5.0 CFIT TRAINING PROGRAMME

- (1) The CFIT training programme should be integrated into existing initial, transition and recurrent training and check programmes. Its importance is reinforced and its effectiveness 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 impending CFIT situations. The simulator training program is designed to apply this knowledge, as well as develop proficiency in an escape maneuver that must be used as a last resort for survival. Air operators should provide this training during initial/transition training and at least once every two years as part of recurrent training.
- (2) The objectives of the Training Programme are to provide pilots with the ability to:
 - (a) Recognize the importance of effective Situational Awareness and its importance in identifying potential CFIT situations,
 - (b) Know prevention strategies and operating practices that will mitigate CFIT threats and hazards,
 - (c) Learn an escape maneuver and associated techniques that will avoid CFIT and enhance the possibility of survival.
- (3) ICAO, State Regulators, 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.

- (4) 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 program material and a safety alert containing the ground proximity escape maneuver recommended for many of the specific airplane makes and models flown by most air operators. A generic ground proximity escape maneuver is provided for use in respect to airplanes that do not have a specific maneuver. It is recommended that air operators utilize the FSF ALAR Tool Kit as a basis for developing their training programme.

6.0 ALAR TRAINING PROGRAMME

- (1) This ALAR training programme should be a core component of flight operations and integrated into existing initial, transition, and recurrent training and check programs. 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. Air operators should provide this training during initial/transition training and at least once every two years as part of recurrent training.
- (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. SOP's, stabilized 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,
 - (d) Learn and apply risk reduction interventions to reduce the risk of approach and landing accidents.
- (3) The FSF ALAR Tool Kit includes information to help prevent approach and Landing accidents. In addition to providing training material to help prevent ALAs, there are many other tools and educational material contained in the FSF Tool Kit that air operators may wish to utilize to reduce their risk of approach and landing accidents.

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

- (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 SOP's combined with a focus on good crew communications and situational awareness should be emphasized at all times.

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 autopilots operating modes,
- (c) Intervention (Including manual Interventions) if the aircraft is not responding as intended,
- (d) SOP's that should 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 stabilized approach criteria,
- (h) Criteria for descent below MSA. This should only occur only when established on a published instrument procedure, under radar control or when visual with terrain,
- (i) Review of the primary elements of the missed approach especially when a missed approach appears likely,
- (j) Go Around and Discontinued Approach awareness,
- (k) Effective CRM and crew communications highlighting terrain issues and situational awareness.

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 maneuvers,
- (b) Non precision approaches using the CANPA (Constant Angle Non Precision Approach) 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 stabilization height,
- (e) Landings that are practiced with different crosswind conditions on dry, wet and contaminated (if these operations are envisaged) runways.

8.0 INTRODUCING ALAR/CFIT TRAINING INTO A RECURRENT TRAINING PROGRAMME

- (1) After introduction of initial ALAR/CFIT training, it is imperative to keep crews well updated and current with procedures concerning ALAR/CFIT.

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

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,
- (f) Review knowledge of enroute charts making sure those crews have a clear understanding of the charts features and their meanings (e.g. grid MORA).

A simulator training detail should include;

- (a) Line orientated flight training (LOFT) flights departing or/and 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 type specific terrain avoidance maneuvers,
- (d) Practicing visual and circling approaches, emphasizing the differences between the two approaches.
- (e) Practice of go-arounds, especially during circling approaches,
- (f) Practice of depressurization induced emergency descents over mountainous areas, highlighting escape routes.

9.0 ACTION BY OPERATORS

- (1) It is recommended that operators give high priority to incorporating ALAR/CFIT training into their flight operations and training programmes.

10.0 INFORMATION MANAGEMENT

Not applicable.

11.0 DOCUMENT HISTORY

Not applicable.

12.0 CONTACT OFFICE

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