

## SAFETY NOTICE

**SUBJECT:**

### **Controlled Flight into Terrain (CFIT) and Approach and Landing Accident Reduction (ALAR) Training**

**GENERAL:** Safety Notices (SNs) are issued by the Civil Aviation Authority – Macao, China to convey advisory information to Macao aviation entities to enhance safety. SNs contain safety-related recommendations, guidance and/or industrial best practices to specific subjects which may or may not have been addressed by established requirements and regulations.

**RELATED REGULATIONS:** AC/OPS/025 – Training and Testing Requirements for Flight Crew Member and Flight Operations Officer

**APPLICABILITY:** This SN applies to operators of Macao registered aeroplane.

**CANCELLATION:** This SN is the first SN issued on this subject.

**REFERENCES:** The following material was referred to for the development of this SN:

- ICAO Regional Aviation Safety Group – Asia and Pacific Regions (RASG-APAC) endorsed safety tools – Controlled Flight into Terrain (CFIT) and Approach and Landing Reduction (ALAR) Training Programme

#### **1. Introduction**

- 1.1 This Safety Notice is issued to provide information that will assist air operators in the development and conduct of ALAR and CFIT training.

#### **2. Background**

- 2.1 The ICAO Regional Aviation Safety Group – Asia and Pacific Regions (RASG-APAC) endorsed a safety tool which provide information in the development and conduct of ALAR and CFIT training programme to increase the flight crew's ability to recognize and avoid the impending approach and landing accidents and controlled flight into terrain situations.
- 2.2 Approach and Landing Accidents (ALA)/ Controlled Flight into Terrain (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 situation 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.

### **3. CFIT Training Programme**

- 3.1 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 programme 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.
- 3.2 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 situation;
  - (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.
- 3.3 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 (<https://flightsafety.org/toolkits-resources/past-safety-initiatives/approach-and-landing-accident-reduction-alar/>), which in addition to information concerning ALAR, includes an updated version of the Controlled Flight into Terrain Education and Training Aid.
- 3.4 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 programme material and a safety alert containing the ground proximity escape maneuver recommended for many of the specific aeroplane makes and models flown by most air operators. A generic ground proximity escape maneuver is provided for use in respect to aeroplanes 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.

#### **4. *ALAR Training Programme***

- 4.1 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 impending approach and landing accidents (ALAs) situations. Air operators should provide this training during initial/transition training and at least once every two years as part of recurrent training.
- 4.2 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. Standard Operating Procedures (SOPs), 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 ALAs.
- 4.3 The FSF ALAR Tool Kit includes information to help prevent ALAs. 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 ALAs.

#### **5. *Introducing ALAR/CFIT Training into Initial Training Programme***

- 5.1 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.

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) SOPs 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 Crew Resource Management (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 Constant Angle Non-Precision Approach (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 stabilization height;
- (e) Landings that are practiced with different crosswind conditions on dry, wet and contaminated (if these operations are envisaged) runways.

## **6. *Introducing ALAR/CFIT Training into Recurrent Training Programme***

6.1 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 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 autopilots 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 crew 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.

## **7. Recommended Actions**

- 7.1 Air operators are encouraged to note the information contained in this Safety Notice and review their policies, procedures and training to reflect the safety issues contained in this SN.

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