International Civil Aviation Organization

ICAO
&
ALAR

Approach & Landing Accident Reduction

Workshop

Bali, Indonesia

24 May 2012

Background

1978 – 1991

- Over 260 Controlled Flight Into Terrain (CFIT) accidents
  - 195 aircraft destroyed, 5500 fatalities

1992 - 1993

- ICAO & Flight Safety Foundation
  - CFIT Task force

Background

1995

- ✈ Task Force recommendations to ICAO
- ✈ Amendments to Annex 6
  - Requirement for Ground Proximity Warning Systems (GPWS)

ALAR in Annexes and PANS

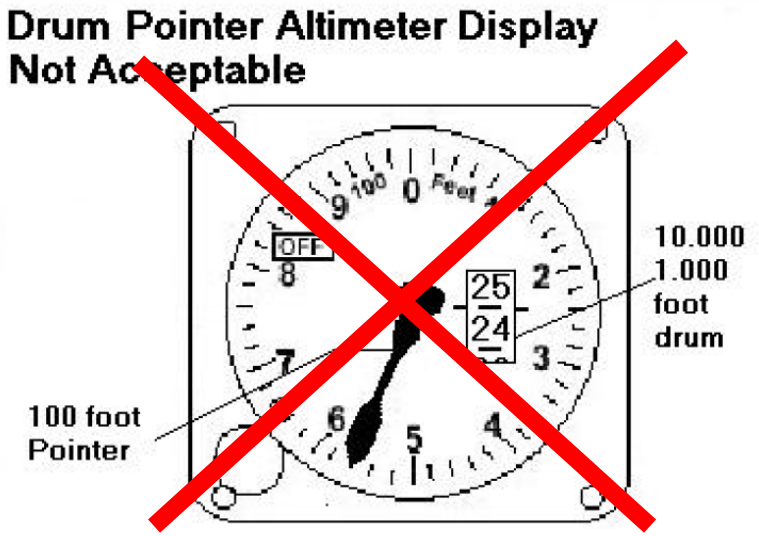
- Annex 3 – Meteorological Services
- Annex 4 – Aeronautical Charts
- Annex 6 – Operation of Aircraft
  - Part I – International Commercial Air Transport
  - Part II – International General Aviation – Aeroplanes
  - Part III – International Operations - Helicopters

ALAR in Annexes and PANS

- Annex 11 – Air Traffic Services
- Annex 13 – Accident Investigation
- PANS-OPS
  - Volume I – Flight Procedures
  - Volume II – Construction of Visual & Instrument Flight Procedures

Sensitive Altimeters

- Annex 6, Part I (1995, 1998)
  - Drum Pointer and Three Pointer Altimeters not acceptable



Ground Proximity Warning Systems

Annex 6, Parts I and II (1995, 1998, 1999, 2002)

- Ground Proximity Warning Systems (GPWS) With Forward Looking Terrain Avoidance Function
  - Commonly known as TAWS – EGPWS
- Required – all aircraft over 5,700 kg or 9 or more passengers

Operations Manual

Annex 6, Part I (1995, 1998)

- Operations Manuals must include:
  - CFIT Training
  - Use of ground proximity warning systems

Runway Visual Range

- Annex 6, Parts I, II, III (1998)
  - Approach Ban - RVR minimums for continuation
- Annex 6, Part I (2000)
  - RVR for CAT II and CAT III Approaches
- Annex 3 (2001)
  - Touchdown zone representative RVR from Recommendation to Standard
- Annex 11 (2001)
  - ATS equipment RVR readout from Recommendation to Standard

Approach Vertical Guidance Definition

- Annex 6, Part I (2001)
  - Approach with Vertical Guidance
- PANS-OPS Vol 1 (2002, 2008)
  - Constant Descent Gradient
  - Human Factors contributions to avoid CFIT
    - SOP, Checklists, Crew briefing
  - Continuous Descent Final Approach (CDFA)
    - New definition
    - Description of methods – controlling vertical flight path on non-precision approach

Instrument Approach Charts

- Annex 4 (2001)
  - Contour Lines to show relief
- PANS-OPS, Volume II (2001)
  - Depiction of Obstacles and Spot Elevations

Minimum Safe Altitude Warning System (MSAW)

PANS-ATM (1996)

✈ Minimum vectoring altitudes

- High enough to prevent GPWS warnings and provide obstacle clearance
- Provide display of minimum safe altitude warning (MSAW)

Approach Procedures

PANS-OPS, Volume I (1998 and 2001)

- Stabilized approaches
- Final Approach Alignment
- Descent gradient, Rate of descent
- Cold temperature corrections
- RNP approaches

Instrument Approaches

PANS-OPS, Volume II (1996, 1998, 2001)

- Procedure design criteria covering the procedures in Volume I

Further Developments

- Introduction of APV – approach with vertical guidance
- Introduction of CDFA – continuous descent final approach
- Quality Assurance for Procedure Design
- Improved Circling Criteria
- New standards for electronic terrain and obstacle data (Annex 15)

Further Developments

- ICAO Performance Based Navigation (PBN)
  - ICAO PBN Manual (DOC 9613)
  - Assembly Resolutions A36-23 and A37-11
- A37-11
  - **All** Instrument runways to have APV approach by 2016 (LNAV/VNAV or LPV) if possible
  - LNAV approaches at all others
- Revised basic GNSS Criteria to PBN concept
  - Point in Space (PinS) procedures for helicopters
- RNP AR APCH approach criteria

Further Developments

- Annex 19 – Safety Management
  - Provisions for SSP, SMS and safety-data protection
  - Applicable November 2013

- Safety Management Systems
  - Hazard identification & Risk Management
  - Mitigation measures such as ALAR Toolkit

Global Aviation Safety Plan (GASP - 2007)

- Worldwide Cooperative Effort towards Safety
  - Reduce the number of accidents and fatalities irrespective of the volume of air traffic
  - Achieve a significant decrease in world-wide accident rates
  - No ICAO region shall have accident rate more than twice the worldwide rate by the end of 2011

Global Aviation Safety Plan (GASP – 2012 – proposed)

- Significantly reduce the rate of runway safety related accidents and serious incidents
- Significantly reduce the rate of loss of control in-flight related accidents and serious incidents
- Continue to lower the rate of controlled flight into terrain (CFIT) related accidents and serious incidents
- Significantly reduce the rate of accidents and serious incidents associated with system component failures

Working Together

ICAO

REGIONAL AND INTERNATIONAL ORGANIZATIONS

CONTRACTING STATES

AVIATION INDUSTRY

Thank you

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