

Aerodrome Safety Workshop



ICAO

Aerodrome Operations under Limited Visibility Conditions

Almaty, Kazakhstan – 18 to 22 November 2002

History



History

- When there was a requirement to implement the ICAO *Strategy for introduction and application of non-visual aids to approach and landing*, the ICAO EANPG established the **All Weather Operations Group** to manage the transition
- During the first meeting of AWOG, the following was presented:
 - Information concerning the status of low visibility procedures (LVP) in the EUR Region
 - Variations in the application of LVP at various aerodromes



History

- **As a result, the AWOG established a Project Team on Low Visibility Procedures (PT/LVP) with the task:**
 - **to review the procedures**
 - **to identify areas where further harmonization would be appropriate**
- **It was noted that existing guidance material in ECAC-CEAC Doc No. 17 was out of date in some respects**



History

- **Introduction of JAR-OPS (Subpart E) in some States has reinforced the urgent need to define such common and standardized practices within the ICAO EUR Region**
- **ECAC-CEAC Doc No. 17 covered three areas:**
 - **aeroplane and flight crew**
 - **aerodrome facilities**
 - **ATS procedures**

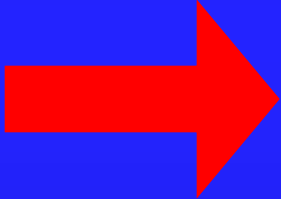


History

- ➔ **It was felt that the requirements for aeroplane and flight crew were adequately covered in current regulations**
- ➔ **The EANPG agreed that the AWOG should develop guidance material for aerodrome facilities and ATS procedures**



History



Draft
European Guidance Material
On
Aerodrome Operations under
Limited Visibility Conditions

Version 2
EANPG December 2002



Definitions



Definitions

Categories of precision approach and landing operations:

CAT I:

DH not lower than 60 m, VIS not less than 800 m or RVR not less than 550 m

CAT II:

DH lower than 60 m but not lower than 30 m, RVR not less than 350 m



Definitions

Categories of precision approach and landing operations:

CAT III A:

DH lower than 30 m or no DH, RVR not less than 200 m

CAT III B:

DH lower than 15 m or no DH
RVR less than 200 m but not less than 50 m

CAT III C:

No DH and RVR limitations



Authorization



Authorization

- **At aerodromes where LVP are established, any operation in Low Visibility Conditions is subject to authorization covering the aeroplane and the flight crew**
- **The suitability of an aerodrome for operations during low visibility conditions should be assessed by the State of the aerodrome**
- **As part of the certification process, States should ensure that the aerodrome manual will include operating procedures**
- **The general conditions under which Low Visibility Procedures are applied must be published in the AIP**



Safety Assessment



Safety Assessment

- **When a RWY is to be upgraded to make it suitable for operations during low visibility conditions, it is to be appreciated that:**
- the lower the visibility is, the less the pilot is able to recognize and take action to avoid hazardous situations**
 - in order to maintain the overall level of safety, an appropriate level of facilities and additional procedures may be required**



Safety Assessment

- In a number of States it has been found effective to form a working group, in order to ensure that all the elements in the ground environment are properly integrated into the total system
- The working group should be composed of representatives of all sections that are concerned with the issue
- This should include the aerodrome operator, ATS, MET services, aircraft operators, etc.



Safety Assessment

- The working group is tasked with:
- establishment of an appropriate process for the upgrade of the aerodrome
 - proper installation of all visual and non-visual aids
 - development of procedures required to ensure the safety of the operation



Surface Movement Guidance and Control Systems (SMGCS)



SMGCS

- **Visual aids**
- **Non-visual aids**
- **Facilities**
- **Procedures**
- **Regulations**
- **Management**
- **Information facilities**



Examples of visibility conditions definitions



Example of Visibility Conditions definitions

→ Visibility conditions 1:

- pilot able to taxi and avoid collision
- ATC able to control on visual reference

→ Visibility condition 2:

- Pilot able to taxi and avoid collision
- ATC unable to control on visual reference only

→ Visibility condition 3:

- visibility less than 550 m (LVP)



Examples of visibility conditions requirements



Example: Requirements in visibility condition 1

- **No requirements additional to the present ICAO SARPS and procedures in:**
 - **Annex 11, 14**
 - **PANS-ATM**
- **Aerodrome Design Manual, Part 4 “Visual Aids”**
- **SMGCS Manual**
- **Airport Services Manual Parts 1 and 8**
 - **Rescue and Fire Fighting**
 - **Airport Operational Services**



Example: Requirements in visibility condition 2

- Measures dependent on dimensions of manoeuvring area and position of control tower
- Procedures and visual aids should enable pilot to determine position and follow route (signs, marking, lights)
- Lower visibility ranges: may limit movement rate (airport lay-out, availability of SMR)
- Measures against undetected RWY intrusion (limited routes, procedures, SMR, stop bars)



Example: Requirements visibility condition 2 (cont)

- **Visibility < 1000 m RVR**
 - **withdrawal of vehicles and personnel involved in non essential activities on the manoeuvring area (construction/maintenance)**
 - **ILS sensitive area should be clear of all traffic**
- **At RVR ≤ 550 m, measures shall be completed**



Example: Requirements in visibility condition 3

- ATC ensures ILS sensitive area clear before issuing landing clearance
- At RVR 550 m all measures to protect RWY and ground movement should be completed
- ATC responsible for movement of ground vehicles in the entire movement area
- RVR < 350 m:
 - Further restrictions for vehicles and persons on the manoeuvring area
 - ATC assists fire and rescue services



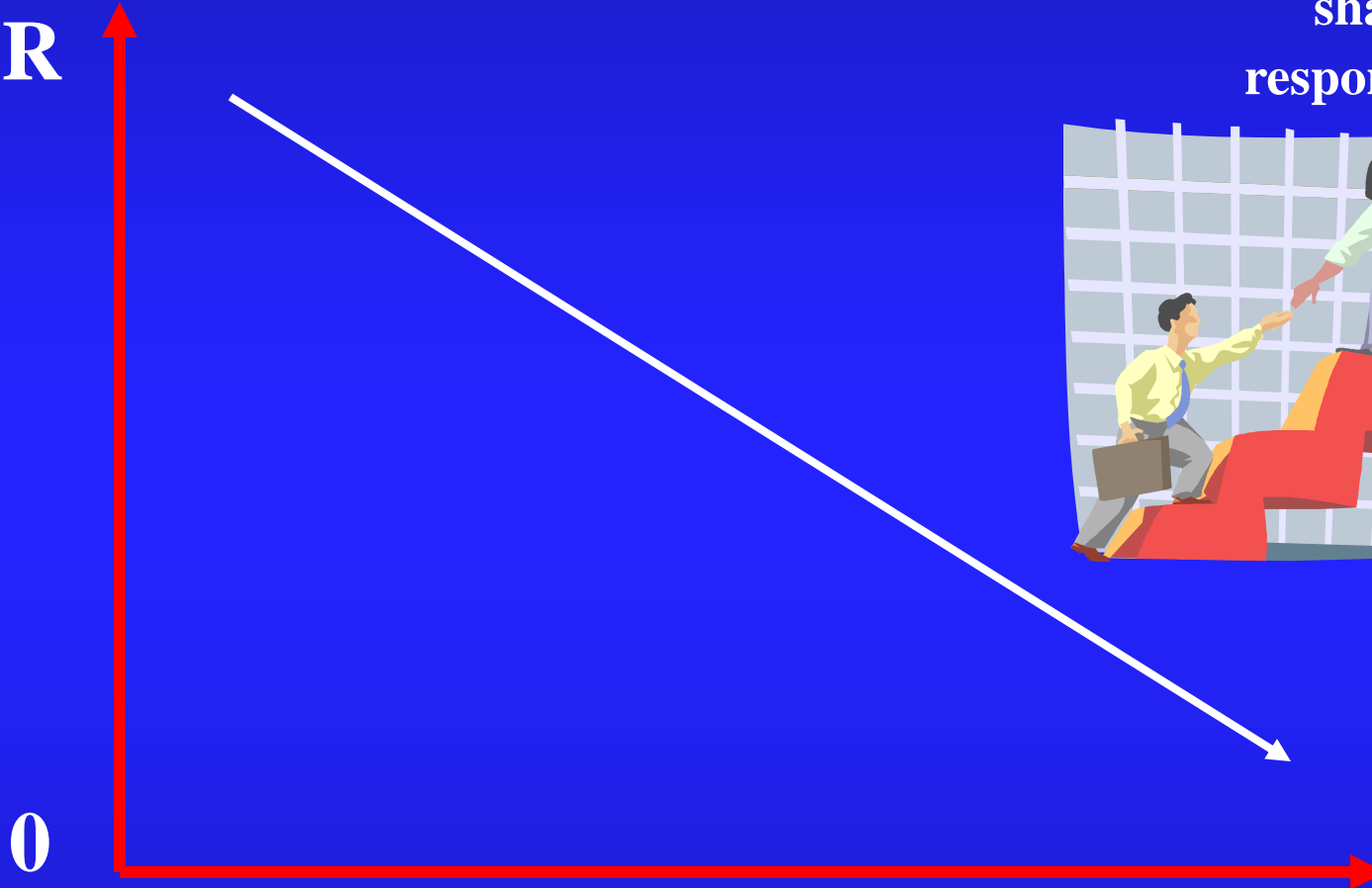
Example: Requirements visibility condition 3 (cont)

- **RVR < 200m:**
 - **ATC increasingly responsible for collision avoidance (shared responsibility)**
 - **Procedures and equipment should be compatible to meet this requirement**
- **Aircraft should be required to manoeuvre down to 100 m RVR; the following facilities should be adequate to enable the pilot to taxi:**
 - **TWY lights**
 - **TWY markings**
 - **route/information signs (location system)**



Responsibilities

RVR



shared
responsibility



responsibility
pilot

responsibility
ATC



Example of Aerodrome Procedures



Example: Aerodrome Procedures

→ **TDZ RVR < 1500 m and/or CB < 300 ft. Sensitive area operational RWY:**

- free of obstacles/ vehicles

- no construction/maintenance activities

→ **Any RVR < 1000 m and/or CB < 200 ft**

Movement area:

- all construction/maintenance activities will be terminated

→ **RVR < 1500 m**

Aircraft towing:

- permission ground control



Examples of phases in low visibility operations



Example: Phases low visibility operations

- **Phase A:**
550 m < RVR < 1500 m
any RVR or CB between 300 ft and 200 ft
- **Phase B:**
350 m < RVR < 550 m
any RVR of operational RWY or CB < 200 ft
- **Phase C:**
200 m < RVR < 350 m
any RVR of operational RWY
- **Phase D:**
RVR < 200 m
any RVR of RWY 24 or 27



Initiation of low visibility procedures



Initiation of low vis. procedures

- ➔ **Senior controller at TWR responsible for:**
 - **initiation**
 - **change**
 - **cancellation**
 - **exemptions****of the low visibility operations phases**
- ➔ **Information from TWR to:**
 - **ACC**
 - **Airport operator**
 - **MET office**
 - **FIO**



Example: Restrictions Phase A

→ Feeder/arrival:

- preferential RWY 06/19R/27 01R
- no opposite use of RWY's
- minimum separation on final approach 6 nm

→ Ground control:

- no clearance for aircraft to RWY intersections
- change to TWR frequency at holding points in departure sequence
- monitor ground traffic



Example: Restrictions Phase A

→ Start-up control:

- minimum RETD interval 3 minutes

→ Tower:

- No opposite use of RWY's
- No intersection take-offs
- no take-off RWY 19 L
- Co-ordinate take-off with departure control
- No take-off RWY 27 when approaching aircraft < 6 nm from TDZ
- No landing clearance when traffic in sensitive area
- Monitor ground traffic by SMR



Example: Restrictions Phase B

- Different from / in addition to phase A
- Feeder/Arrival:
 - preferential RWY 06/19R/27
 - Minimum separation on final approach 8 nm (landing interval 3,5 min)
- Tower:
 - Take-off RWY 24/09/01L/27
- Start-up control:
 - minimum RETD interval 4 minutes



Example: Restrictions Phase B

→ Ground control:

- Monitor ground traffic on SMR and give instructions for the taxi route when required
- In conflict situations give traffic info and positive instructions for actions
- Vehicles and towed aircraft in the manoeuvring area after permission of the control tower. Exempted are “follow me” vehicles on some isolated aprons



Example: Restrictions Phase C

- **Different from / in addition to phase B**
- **Feeder/arrival:**
 - **minimum separation on final approach 12 nm (min. landing interval 5 min.)**
- **Start-up control**
 - **minimum RETD interval 5 minutes**
 - **no start-up when RVR for applicable aircraft is below take-off limits**



Example: Restrictions Phase C

- ✈ **Ground control:**
 - **No power back**
 - **Permission to taxi; after push back team reported free**
 - **Monitor ground traffic: instruct pilots on taxi route (ATC/pilots shared responsibility)**
 - **Only positive instructions to pilot**
 - **Limited possibilities for vehicles to cross TWY's to isolated ramps (controlled)**
 - **fire fighting vehicles: ground control**
 - **No vehicles and towing of aircraft (exemptions at ground control discretion)**



Example: Contingency procedures

Stop bar(s) of one RWY U/S

→ **Phase A:**

No additional requirements

→ **Phase B:**

No landing or take-off from this RWY

→ **Phase C:**

No landing or take-off from this RWY



Example: Contingency procedures

Stop bars of more than one RWY U/S

- **Phase A:**
 - No additional requirements**
- **Phase B:**
 - Landing RWY 19R unrestricted**
 - Landing RWY 27 and 06 with minimum final separation 15 nm; minimum landing interval 6 nm**
 - Take-off RWY 01L or 24**
- **Phase C:**
 - Landing on RWY 19 R only; separation on final 15 nm and minimum landing interval 6 min**
 - Take-off RWY 24 only**



Example: Contingency procedures

Surface Movement Radar U/S

- **RVR \geq 550 m**
 - **decision of senior ATC controller**
- **200 m < RVR < 550 m**
 - **Landing RWY 19R only**
 - **Landing interval > 10 min**
 - **Take-off RWY 24 only**
 - **Minimum RETD interval 10 min**
 - **report on ATIS**
 - **Start-up at gate only**



Example: Contingency procedures

Surface Movement Radar U/S

→ **RVR < 200 m**

- **No air traffic control for departing/arriving traffic**
- **ATIS: “ground radar U/S, aerodrome is below operational limits”**

