

Approach-and-Landing Briefing Note

5.1 - Approach Hazards Awareness - General

Introduction

Factors that may contribute to approach-and-landing accidents include flight over hilly terrain, reduced visibility, visual illusions, adverse winds, contaminated runways and/or limited approach aids.

Flight crews should be aware of the compounding nature of these hazards during approach and landing.

Statistical data

Approach-and-landing is the most hazardous phase of any flight, as illustrated by the following data:

- Over the past 40 years, approach-and-landing accidents accounted for 55 % of total hull losses.

This statistic does not show a downward trend.

- The flight segment from the outer marker to the runway threshold averages only 4 % of flight time, but accounts for 45 % of hull losses.

Table 1, **Table 2** and **Table 3** illustrate the respective contributions of the factors involved in:

- All approach-and-landing accidents;
- CFIT events; and,
- Runway excursions and overruns.

(Source: Flight Safety Foundation – ALAR Task Force)

Factor	% of Events
Night time	75 %
IMC	59 %
Darkness or twilight	53 %
Non-precision approach or visual approach	53 %
Precipitation (rain or snow)	50 %
Absence of radar service	50 %
Adverse wind (high crosswind, tail wind or wind shear)	33 %
Absence of GPWS or radio altimeter	29 %
Absence of letdown navaid, approach/runway lighting or VASI / PAPI	21 %
Spatial disorientation or visual illusions	21 %
Runway contamination (standing water, slush, snow or ice)	18 %

Table 1

All Approach-and-Landing Events

Factor	% of Events
Low visibility	71 %
Hilly or mountainous terrain	67 %

Table 2
CFIT Events

Factor	% of Events
Low visibility	73 %
Adverse wind conditions	67 %

Table 3
Runway Excursions and Overruns

Awareness Program Outline

A company awareness program on approach-and-landing hazards should review and discuss the following factors that may contribute to approach-and-landing accidents.

When preparing and briefing an approach, these factors may be either:

- Known from the crew (by means of NOTAMs, dispatcher's briefing, ATIS, etc) and, thus, may be briefed and accounted for; or,
- Unknown and, thus, be discovered as the approach-and-landing progresses

Aircraft Equipment

- Use (or absence) of the following safety-enhancing equipment:
 - GPWS;
 - TAWS;
 - TCAS;
 - Wind shear warning and guidance; and/or,
 - Predictive windshear system.

Flight Crew

- Fatigue – reduced awareness:
 - Long duty time:
 - Long-haul operation; or,
 - Short-haul or medium-haul / multiple-legs operation;
- Unfamiliar airport; and/or,
- Unfamiliar instrument or visual approach procedure.

Expected Approach

- Step-down non-precision approach or circling approach with no VASI / PAPI;
- Visual approach in darkness; and/or,
- Anticipated last-minute runway change.

Approach Charts

- Absence of a published STAR;
- Missed-approach possible conflict with takeoff on intersecting runways; and/or,
- Incorrect or missing information.

Airport Information Services

- Inaccurate TAF information;
- Absence of current weather reports;
- Absence of VOLMET;
- Absence of ATIS (or of English version of ATIS message); and/or,
- Inaccurate or outdated ATIS information (absence of regular ATIS update, when required).

Airport Air Traffic Control Services

- Absence or primary and/or secondary surveillance radar;
- Inadequate or ineffective radar vectoring practices;

- Inadequate or non-standard air traffic control procedures;
- Inadequate air traffic flow management;
- Mixing of IFR and VFR traffics;
- Frequent uncontrolled VFR traffics in airport vicinity;
- Frequency congestion / controller overload caused by high density traffic or by a single controller operating tower and ground frequencies;
- Absence of adequate VHF coverage in known FIR or TMA sectors;
- Inadequate coordination between international and domestic FIRs;
- Absence of or failure to use landline communications between two close airports; and/or,
- Absence of English language proficiency in ATC communications and/or use of non-standard phraseology.

Airport Equipment

- Absence of / limited / low intensity approach and runway lighting (or part of it);
- Non-standard runway-edge lights spacing;
- Absence of ILS;
- ILS unusable beyond a specific point (because of obstacles) or below a specific altitude (because of approach over water);
- ILS without OM;
- ILS without VASI/PAPI to support the visual segment ;
- Offset VOR/DME approach;
- VOR/DME with inoperative DME;
- VOR incorrect calibration;
- NDB known as unreliable in adverse weather conditions;
- Non-precision or circling approach with absence of VASI / PAPI;
- VASI/PAPI being incorrectly calibrated or inoperative;

- Unsecured airport (i.e., absence of airport perimeter fences, allowing vehicles, persons or animals to access to runway or maneuvering areas);
- No illumination of wind sock or wind “T”; and/or,
- Faded painting of runway and/or taxiways markings.

Terrain

- Trees or man-made obstacles (antennas, ...) penetrating the obstacle clearance level;
- Topographical features requiring unusual procedures and reduced safety margins; and/or,
- Terrain features resulting in GPWS activation during approach.

Refer to Briefing Note [5.2 - Terrain Awareness](#) for expanded information.

Visual Illusions

- Airport environment (black hole, ...);
- Runway environment; and/or,
- Weather conditions.

Refer to Briefing Note [5.3 - Visual Illusions Awareness](#) for expanded information.

Visibility

- Darkness, low visibility (rain, fog, mist, haze, low lighting, smoke).

Wind conditions

- Shifting or gusty wind, crosswind or tail wind; and/or,
- Known frequent wind shear on final approach of specific runway under adverse weather and / or wind conditions.

Refer to Briefing Note [5.4 - Wind Shear Awareness](#) for expanded information.

Runway condition

- Wet, but known as slippery-when-wet;
- Contaminated with standing water, slush, snow or ice;
- Heavy rubber deposit in touchdown zone;
- Reduced braking action;
- Insufficient water drainage or runway surface condition leaving water puddles after rain; and/or,
- Undulated surface in touchdown zone area.

Taxiways

- Absence of high-speed-exit taxiways;
- Absence of parallel taxiway, thus requiring back track on the active runway; and/or,
- Non-standard taxiway marking and/or non-standard signs.

Low temperature operation

- Absence of a defined OAT threshold below which, a temperature correction on published altitudes is required.

Bird Strike Hazard

- Permanent or seasonal bird activity, without available bird control program and squad.

Decision-making and Countermeasures

A company awareness program on approach-and-landing hazards should stress the following elements of effective crew coordination and decision-making:

- Comply with standard operating procedures (SOPs), published limitations, specific operational recommendations and flying techniques;
- Adjust and use the approach and go-around briefings to heighten the flight crew awareness of the specific hazards of the approach; and,
- Anticipate and be prepared for the worst case (i.e., “expecting the unexpected” by adopting a “What if ?” attitude);

Prepare options to counter approach-and-landing hazards, for example:

- Request a precision approach into the wind, whenever available;
- Define next targets and an approach gate that must be met for the approach to be continued;
- Wait for better conditions (fuel permitting); or,
- Divert to an airport with better weather conditions, wind conditions and/or runway conditions.

Associated Briefing Notes

Dedicated Briefing Notes provide specific and expanded information on the following approach hazards:

- *5.2 - Terrain Awareness,*
- *5.3 - Visual Illusions Awareness,*
- *5.4 - Windshear Awareness,*
- *6.1 - Being Prepared to Go-around,*
- *6.3 - Terrain Avoidance (Pullup) Maneuver.*

Associated Documents

The following documents published by the Flight Safety Foundation should be considered also when developing a company awareness program on approach-and-landing hazards:

- **Approach and Landing Risk Awareness Tool/Checklist;** and,
- **Approach and Landing Risk Reduction Planning Guide.**