Runway Safety Issues

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Introduction:

- Aviation safety programmes have a common goal — to reduce hazards, mitigate and manage residual risk in air transportation. Runway operations are an integral part of aviation;
- the hazards and risks associated with runway operations need to be managed in order to prevent runway incursions that may lead to accidents.

This new way of thinking is reflected in the following Annexes:

- ☐ Annex 6 Operation of Aircraft requires operators to establish and maintain an accident prevention and flight safety programme.
- \square Annex 11 Air Traffic Services requires States to implement safety programmes and ATS providers, to implement safety management systems (SMS).

- ☐ Annex 13-Aircraft Accident and Incident Investigation
- ☐ Annex 14 Aerodromes requires aerodrome operators to implement SMS, as a part of the certification process of an aerodrome, and recommends the same for already certified aerodromes.

Runway safety issue:

A runway safety issue is any safety issue that deals with runway environment (or any surface being used as runway) or the areas immediately adjacent to it (e.g. Over-runs, high speed taxiways)

Runway safety issue:

- □ Runway incursion
- □ Runway excursion
- Runway confusion.

What is Runway incursion:

□ "Any occurrence at an aerodrome involving the incorrect presence of an aircraft, vehicle or person on the protected area of a surface designated for the landing and take-off of aircraft"

- Runway incursions have sometimes led to serious accidents with significant loss of life.
- ☐ Although they are not a new problem, with increasing air traffic, runway incursions have been on the rise.



What is Runway excursion:

Runway excursion " is an incident involving only a single aircraft where it makes an inappropriate exit from the runway". This can happen because of pilot error, poor weather, emergency, or a fault with the aircraft.

What is Runway confusion:

□ Runway confusion involves a single aircraft, and is used to describe the error when the aircraft makes "the unintentional use of the wrong runway, or a taxiway, for landing or take-off".

Common scenarios of Runway incursions:

- an aircraft or vehicle crossing in front of a landing aircraft;
- an aircraft or vehicle crossing in front of an aircraft taking off;
- an aircraft or vehicle crossing the runwayholding position marking;

- an aircraft or vehicle unsure of its position and inadvertently entering an active runway;
- a breakdown in communications leading to failure to follow an air traffic control instruction; and
- an aircraft passing behind an aircraft or vehicle that has not vacated the runway.

Factors contributing to runway incursion:

- Weather factors
- □ Airport factors
- ☐ ATC factors
- Crew technique factors
- Communications

Weather factors:

All factors affecting the crew visibility can be considered as potential contributing factors for runway incursions:

- Low visibility conditions;
- Visibility on taxiway lower than expected RVR;
- Position of the sun versus pilot's eyes;
- Snow and/or icing over surfaces covering airport surface markings,
- □ Night time operations.

Airport factors:

Various airport factors may affect pilot situational awareness, distract the crew, or lead to crew confusion:

- Congested airports with many different-sized aircraft, with many vehicles, and pedestrians moving on the airport surface,
- Close-spaced parallel runways, crossing runways, high speed turn-off, complex and confusing intersections, etc ...

ATC factors:

The most common controller-related factors identified in several studies are:

- Momentarily forgetting about:
 - > An aircraft;
 - > The closure of a runway;
 - > A vehicle on the runway;
 - > A clearance that have been issued;

- Failure to anticipate the required separation, or miscalculation of the impending separation;
- □ Inadequate coordination between controllers;
- A crossing clearance issued by a ground controller instead of a tower controller;
- □ Use of non standard phraseologies;

- Misidentification of an aircraft or its location;
- □ Failure of the controller to provide a correct read back of another controller's instruction;
- Failure of the controller to ensure that the read back by the pilot or the vehicle driver conforms with the clearance issued;
- Reduced reaction time due to on-the job training.

Crew factors:

- Pilot factors that may result in a runway incursion include inadvertent non-compliance with ATC clearances.
- Often these cases result from:
 - > a breakdown in communications;
 - > loss of situational awareness; or
 - they believe that the clearance issued was to enter the runway, when in fact it was not.

Continued:

Other common factors include:

- inadequate signage and markings (particularly the inability to see the runway-holding position lines);
- controllers issuing instructions as the aircraft is rolling out after landing (when pilot workload and cockpit noise are both very high);
- pilots performing mandatory head-down tasks, which reduces situational awareness;

Continued:

- pilots being pressed by complicated and/or capacity enhancement procedures, leading to rushed behavior;
- a complicated airport design where runways have to be crossed;
- incomplete, non-standard or obsolete information about the taxi routing to expect; and
- last-minute changes by ATC in taxi or departure routings.

Communications factors:

A breakdown in communications between controllers and pilots, or airside vehicle drivers is a common factor in runway incursions.

Air side vehicle driver factors:

- Failure to obtain clearance to enter the runway;
- Failure to comply with ATC instructions;
- Inaccurate position report to ATC;
- Inadequate training of airside vehicle drivers;
- Lack of familiarization with the aerodrome;
- Lack of knowledge of aerodrome signs and markings etc.

PREVENTION OF RUNWAY INCURSIONS:

The following recommendations, known as best practices, will enhance the safety of runway operations through the consistent and uniform application of existing ICAO provisions, leading to predictability and greater situational awareness.

Best practices -pilots:

- Encourage use of correct terminology and proper voice cadence;
- Eliminate distractions in the operational area;
- Obtain and use airport diagrams;
- Conduct "Clearing Turns" prior to entering any runway;
- Maintain a sterile cockpit when taxiing.

- Maintain appropriate Taxi speed;
- Encourage pilots to have their "eyes out" when taxiing;
- Encourage pilots to have a "heads up" policy when taxiing;
- Improve safety by teaching, advocating, stressing and understanding situational awareness.

- Realize that every airport is unique and presents its own set of RUNWAY SAFETY challenges;
- Stay alert, stay alive;
- Declare war on errors, make it everyone's responsibility.

Best practices - Air Traffic Controllers:

- Encourage use of correct terminology and proper voice cadence;
- Recommend controller usage of the electronic RID (Runway Incursion Device) and the IDS (Information Display System) as an aid to prevent runway incursions. Use the electronic RID with red lamps for runways and amber lights for adjacent areas (mowing, equipment, etc.);

- Encourage air traffic controllers to tour the airfield, including the runway, taxiway and ramps, during the day, at night and under IMC (instrument meteorological conditions);
- Encourage locally based organizations to provide familiarization flights for air traffic controllers;

- Safety management systems that are in accordance with ICAO provisions should be implemented;
- ATC should always use a clear and unambiguous method on the operating console to indicate that a runway is temporarily obstructed;
- ATC should, whenever practical, give ATC en-route clearance prior to taxi;

- Routinely check airport diagrams for accuracy and update as necessary;
- Know who has access to the airfield;
- Stop bars should be switched on to indicate that all traffic shall stop and switched off to indicate that traffic may proceed.;

- Update the airport remarks section in the Airport Facility Directory with all applicable data including runway safety information;
- Determine and publish "line-of-sight" restrictions — can aircraft at opposite ends of the runway see each other?
- Controllers should be "head-up" for a continuous watch on aerodrome operations;

- Use Hot Spot brochures;
- Distribute RUNWAY SAFETY materials to every aviation entity;
- Realize that every airport is unique and presents its own set of RUNWAY SAFETY challenges;
- Stay alert, stay alive;
- Declare war on errors; make it everyone's responsibility.

Best practices - Airport Personnel:

- Eliminate distractions in the operational area;
- Air traffic and airport operations should meet following each snow removal day and/or any other unusual event to discuss lessons learned;
- Eliminate confusing call signs for vehicles operating in the airport operations area;
- Maintain a well defined mowing plan and procedures, including specific area "Designations";

- Use high visibility vehicles to increase conspicuity for pilots, controllers and other drivers operating on the AOA (airport operations area);
- All vehicle lights (high beams, flashers, beacons, and strobes) should be turned on when crossing or operating on runways, taxiways or the AOA;

- Re-designate confusing taxiways;
- Eliminate problem runways;
- Use current diagrams in all AOA access vehicles;
- Carry a current airport diagram with all AOA personnel badges;
- Obtain and use airport diagrams;
- Vehicle flashers and beacons help ATC, aircrews and other vehicle operators see vehicles in the AOA — especially during periods of reduced visibility and at night;

- Place signs and marking placards in all AOA access vehicles;
- Know who has access to the airfield;
- Maximize controlled access to the airfield, including wildlife;
- Conduct "Clearing Turns" prior to entering ANY runway.

ESTABLISHING A RUNWAY INCURSION

PREVENTION ROGRAMME:

A runway incursion prevention programme should start with the establishment of runway safety teams at individual aerodromes.

Role of a local runway safety team:

The primary role of a local runway safety team, which may be coordinated by a central authority, should be to:

- develop an action plan for runway safety, advise management as appropriate on potential runway incursion issues;
- recommend strategies for hazard removal;
- mitigation of the residual risk.

Composition of team:

☐ The team should comprise representatives from aerodrome operations, air traffic service providers, airlines or aircraft operators, pilot and air traffic controller associations, and any other groups with a direct involvement in runway operations.

Objective of the team:

- to improve runway safety data collection, analysis and dissemination;
- to check that signage and markings are ICAO-compliant and visible to pilots and drivers;
- to develop initiatives for improving the standard of communications;

- to identify potential new technologies that may reduce the possibility of a runway incursion;
- □ to ensure that procedures are compliant with ICAO Standards and Recommended Practices (SARPs); and

- to initiate local awareness by developing and distributing runway safety education;
- training material to controllers, pilots and personnel driving vehicles on the aerodrome;

Generic Terms of Reference:

- determining the number, type and, if available, the severity of runway incursions;
- considering the outcome of investigation reports in order to establish local hot spots or problem areas at the aerodrome;

working as a cohesive team to better understand the operating difficulties of personnel working in other areas and recommending areas for improvement; ensuring that the recommendations contained in the Manual on the Prevention of Runway Incursions (Doc 9870) are implemented;

identifying any local problem areas and suggesting improvements;

conducting a runway safety awareness campaign that focuses on local issues, for example, producing and distributing local hot spot maps or other guidance material as considered necessary; and

regularly reviewing the airfield to ensure its adequacy and compliance with ICAO SARPs.

Hot Spots:

□ "A location on an aerodrome movement area with a history or potential risk of collision or runway incursion, and where heightened attention by pilots/drivers is necessary."

Note: The criteria used to establish and chart a hot spot are contained in the PANS-ATM.

Once hot spots have been identified, suitable strategies should be implemented to remove the hazard and, when this is not immediately possible, to manage and mitigate the risk.

These strategies may include:

- awareness campaigns;
- □ additional visual aids (signs, markings and lighting);
- □ use of alternative routings;
- construction of new taxiways; and
- the mitigation of blind spots in the aerodrome control tower.

More Information:

Best practices mentioned in the previous slides are a few.

For more details the following may be consulted:

- 1. ICAO Doc 9870, AN463 (Manual on the prevention of Runway Incursions).
- 2. Web pages of:
 - a) Airports Council International.
 - b) Federal Aviation Authority.
 - c) Flight Safety Foundation.
 - d) Euro Control etc.

Make Aviation Safer by reducing the Risk of an Accident

Thank you