

The pilot and airline operator's perspective on runway incursion hazards and mitigation options

Session 2 Presentation 2







Operational Hazards

- Workload issues during taxi that can result in a loss of situational awareness:
 - Completion of pre-departure checklists
 - Second engine start requirements
 - Coordinating amended ATC clearances
 - Complex taxi routing
- All have the potential to contribute to incursion risks

Operational Hazards

- Receiving departure clearance on taxi as a norm at airport or with a runway change, non standard clearances
- Weather
- Performing non-standard or unusual procedures before departure
- Dealing with aircraft snags
- Time pressure

Operational Mitigations

→ Establish SOPs to minimize the number of tasks to be performed when aircraft is moving during taxiing, these include:

- FMS input**
- Delayed engine start**
- Briefings**
- Weight & balance calculations**

→ To maintain situational awareness on the ground:

- Use all available technologies (e.g. Airbus ROPS, Boeing ROMM)**
- Use individual aerodrome charts**
- Develop SOPs for ground navigation**

Operational Mitigations

- Work with ATC on operational issues
- Have a Local Runway Safety Team
- Program and check departure before taxi
- Have eyes outside cockpit during taxi
- Sterile cockpit philosophy

Operational Mitigations

- Cross check and monitor CRM philosophy
- Threat and Error Management
- LOSA
- Hazard reporting
- Having a functional SMS

Communication Hazards

- Task overload of pilot attempting to communicate
 - Flight deck: checklists and briefings
 - Cabin crew: passenger safety or technical issues
 - Dispatch, AIRINC or other services related to operational issues
- Both pilots are focused on the communication issue
 - Frequency congestion – an increasing factor at many airports

Communication Mitigations

→ To achieve required standards

- Use standard phraseology
- Listen before speaking
- Speak slowly
- When in doubt, seek clarification
- Ask open questions

→ To avoid non essential communication

- Adopt sterile cockpit concept

→ To avoid communication impediments in multi-crew cockpit

- Define the role of each pilot
- CRM training on communication techniques
- Manage the cockpit workload

Communication Mitigations

- Correct ICAO Annex 14 signage. Also consider recommended practices like not using X, O, I as taxi designators
- Red stop bars
- Don't talk on PA whilst taxiing or before crossing a runway
- Use of lights before crossing or entering a runway
- Training with regards to signage and procedures

What does this Marking mean?
Which Side is the Runway?



Report signage deficiencies



Comment?



Train pilots on markings and signage



Signage may be complex,
inadequate or not correctly placed



Report airfield deficiencies





Comment?



Lighting mitigations

- Red stop bars
- Wig-wag runway guard lights
- Green centerline lighting
- Blue taxiway edge lighting
- Signage lighting
- Runway exit lighting
- Use all aircraft lighting when crossing a runway, lighting on finals and when lining up

Airport Design Hazards



Boston, 14 July 2011

- Factors that contribute to positional uncertainty
 - Multiple runway and taxiway intersections
 - Converging intersections at various angles
 - Closely spaced parallel runways
 - Failure to hold short after landing
 - Runway confusion risk, especially for low visibility landing operations
 - Runways in close proximity to terminal aprons
- **Conduct briefing prior to all operations**
- **Use individual airport charts**
- **Identify high risk locations**
- **Implement SOPs for operations at airports with known design hazards**

Design Mitigations

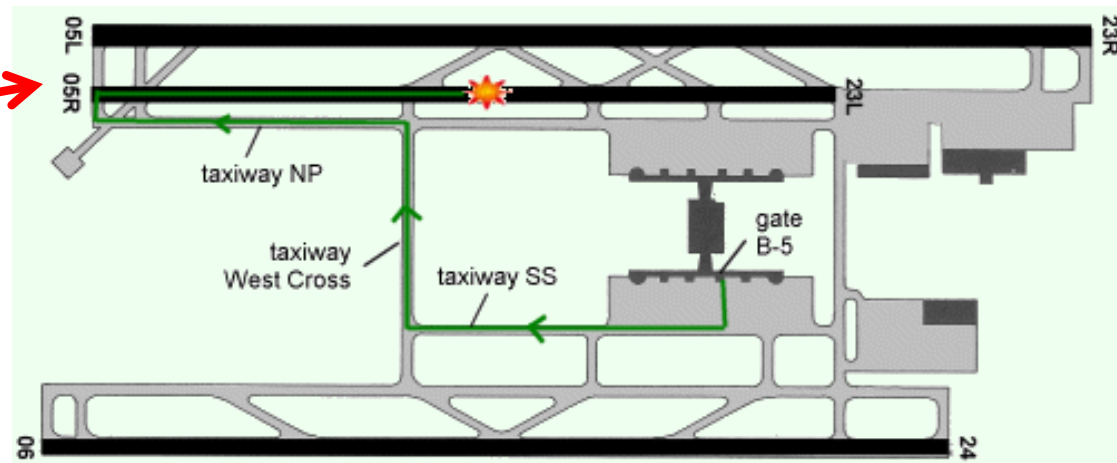
- Airfield design
- Hot spots identified and put on charts
- Avoid runway crossing if possible
- Cross at 90 degrees to runway
- Line up at 90 degrees to runway
- Pre-hold double yellow line
- Standards according to ICAO Annex 14

Construction Hazards and Mitigation

- **Runway confusion**
 - Operations on closed runways
 - Runways as taxiways
 - Use of non-standard taxiways
- **Airline operators establish comprehensive guidance for operations during airport works**
- **Conduct comprehensive pre-taxi briefing**
- **Cross-check all performance data before using**

Hazards appear when part of the airport becomes non-operational

SQ 006 in Taipei – October 2000



Visibility Hazards

- Factors that can result in a crew being unsure of their position:
 - Not only due to fog or other “low visibility” phenomena
 - Visibility may be an issue in clear weather due to glare or reflection (snow or water) – potential for confusion issues when landing on closely spaced parallel runways
- Visibility hazards generally increase pilot workload and increase incursion risk

Visibility Mitigations

→ Use all available technologies to maintain situational awareness on the ground

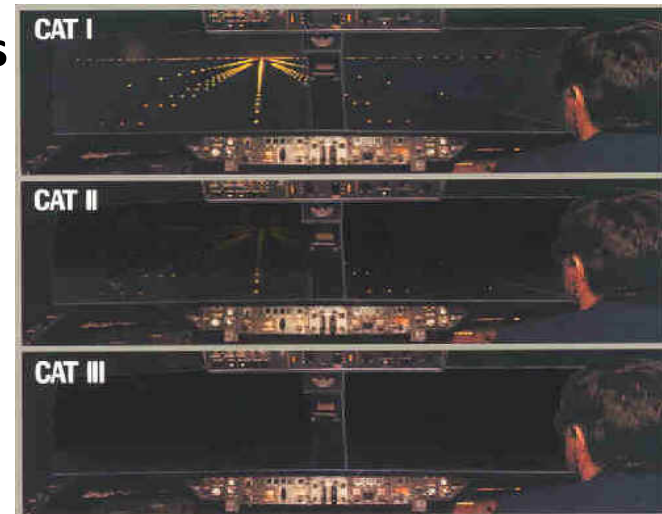
- CAT III landings have become routine, but the aircraft must still be taxied manually in low visibility operations

→ Establish low visibility procedures, including enhanced crew coordination, when conditions require

- Inability to see other aircraft on runway

→ Use full runway length operations especially in marginal conditions

→ Realistic training for all low visibility operations



THANK YOU

