The air traffic controller’s perspective on runway incursion hazards and mitigation options

Session 3
Presentation 3
Communication Hazards

- Unclear communication from the pilot to the ATC
- Ambiguous communication
- Lack of standard phraseology, including: speed of delivery, accents, # of instructions per transmission
- Low level of aviation language proficiency
- Frequency congestion
- Call sign confusion
- Read back errors
- Assumption that flight crews and airport personnel have certain familiarity with airport
- Simultaneous communication required for coordination between local, ground and radar controllers
- Multiple tower / ground frequencies becoming commonplace at many large airports
- Instances where 1 controller is responsible for traffic on multiple frequencies
Communication Mitigation

- Provide awareness and refresher training, that includes
  - Situations requiring mandatory read back
  - Ensuring what is said or heard is really what is said or heard not what you or the pilot expected to hear
  - Clarifying/avoiding similar sounding call-signs
  - Not assuming that pilots are familiar with local operations

- Establish outreach programs that include
  - Providing runway safety materials to foster collaboration
  - Encouraging the use of standard phraseology between controllers and pilots
  - Airfield vehicular tours to familiarize controllers with aerodrome signage, markings and taxiway/runway layout from a pilot’s perspective

- Minimize single controller communication coordination between local, ground and radar controllers
- Manage the use of multiple tower / ground frequencies
- Minimize the occurrences where 1 controller is responsible for traffic on multiple frequencies
Construction Hazards

*Hazards appear when part of the airport becomes non-operational*

- Potential capacity constraints that increase controller workload
- Potential need to manage and coordinate increased number of runway crossings
  - The more crossing possibilities, the higher the incursion risk
- Added vehicular traffic on runway and taxiway surfaces
- Possible increased use of intersection takeoffs
- Potential impact on RFF procedures
Construction Mitigations

• Manage movement numbers during capacity constraints
• Manage and coordinate increased number of runway crossings
• Develop SOPs for use during airport works including
  • Using intersection departures
  • RFF procedures
  • Providing information to pilots on available runway lengths
• Develop memory aids to prevent departures and landings on closed or shortened runways
Airport Design Hazards

• Operations to closely spaced parallel runways
  • Monitoring adherence to hold short clearances, particularly for high-speed turnoffs after landing
  • Potential for separation issues related to runway confusion

• Simultaneous operations to intersecting runways
  • Increased coordination required when multiple tower / ground frequencies are in use
Airport Design Mitigation

- Identify and publish hotspots
  - Develop controller awareness of high risk areas
- Intersecting runway operations
  - Land and Hold Short Operations
  - Timing (when runway occupancy time is contrary to controller expectations)
- Runway Crossings
  - There is a correlation between the number of runway crossings and runway incursions consider increasing the use of end around taxiways.
Airport Design Mitigation

- Blind spots/low visibility
  - Reports clear of runway
  - Use of Surface surveillance equipment including CCTV if needed

- Closely spaced parallel runways operations
  - Monitoring adherence to hold short clearances, particularly for high-speed turnoffs after landing
  - Awareness of separation issues related to runway confusion

- Simultaneous operations to intersecting runways
  - Implement coordination procedures when multiple tower/ground frequencies are in use
Visibility Hazards

Not only due to fog, but also glare/snow/reflection/water/sand

Certain movement areas are “blind spots” and are not visible from the control tower
Visibility Mitigation

• Identify “blind spots” and their hazards
  • Develop mitigation procedures
• Utilize low visibility procedures
• Manage traffic levels
  • To maintain situation awareness
  • To avoid frequency overload
Operational Hazards

• “Hub” route networks create peaks in controller workload
• Managing contingencies related to:
  • Runway / taxiway closures
  • Inoperative approach aids
  • Technical issues experienced by flight crews
  • Weather phenomena
• Environmental factors:
  • Cab design,
  • Cab noise,
  • Distractions, false/nuisance alerts
  • Sight lines
• Complex airport operations and configuration changes
• Traffic volume
• Shift work and fatigue-related performance effects
• Use of complex/non-standard taxi instructions
• Inadequate airport diagrams
Operational Mitigation

- Options to enhance situational awareness
  - Implement CRM training
    - Foster a culture of teamwork. Awareness of other controllers’ activities.
  - Develop memory aids
    - Visual indicators for runway closures, intersection departures, etc.
    - Position Relief Procedures and Checklists to highlight any high risk situations
- Staffing
  - Provide adequate numbers to manage traffic surges
  - Prevent split attention/multi-tasking particularly during periods of low-level traffic
- Re-Current training
  - Focus on local operations and runway safety issues
  - Tower cab & equipment configuration
    - Perform human factors assessment of cab environment
- Foster a Safety Culture
  - Implement SMS
Signage

• Report unserviceable signage
• Advise flight crews of unserviceable signage
• Amend affected procedures when signage is unserviceable
THANK YOU