II.B. Runway Incursion Avoidance

References: AC 91-73

Objectives  The student should develop knowledge of the elements related to proper incursion avoidance.

Key Elements  1. Read back all clearances
2. Head down activities only when stopped
3. Always have current Airport Diagram (AD)

Elements  1. Challenges Unique to Taxiing
2. Appropriate Cockpit Activities
3. Steering, Maneuvering, Maintaining Taxiway, Runway Position, and Situational Awareness
4. Hold Lines
5. Landing and Rollout
6. Airports with a Control Tower
7. Airports without a Control Tower
8. Exterior Lighting and Night Operations

Schedule  1. Discuss Objectives
2. Review material
3. Development
4. Conclusion

Equipment  1. White board and markers
2. References

IP’s Actions  1. Discuss lesson objectives
2. Present Lecture
3. Ask and Answer Questions
4. Assign homework

SP’s Actions  1. Participate in discussion
2. Take notes
3. Ask and respond to questions

Completion Standards  The student can safely and competently navigate towered and nontowered airports while effectively avoiding runway incursions.
Instructors Notes:

Introduction:
  Attention
Runway incursions have led to serious accidents with significant loss of life...

Overview
Review Objectives and Elements/Key ideas

What
Runway incursion avoidance provides practical guidance with the goal of increasing safety and efficiency of aircraft movement on the airport surface while reducing the risk of runway incursions.

Why
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.

How:
1. Challenges Unique to Taxiing
   A. With increasing air traffic, runway incursions have been on the rise
      i. One of the biggest safety concerns in aviation is the surface movement accident
   B. Increased traffic and expansion at many airports creates complex runway and taxiway layouts
      i. Surface operation are more difficult & the potential for incursions more hazardous than before
2. Appropriate Cockpit Activities
   A. For safety reasons the pilot’s workload should be at a minimum during taxi operations
      i. This can be accomplished through SOPs that direct attention to essential tasks while taxiing
      ii. Complete pretaxi checklists and data entry prior to taxi
      iii. All heads down activities should be done only when the aircraft is stopped
   B. A ‘sterile cockpit’ should be implemented from taxi through climb to keep focus on taxiing/ATC
      i. No cell phones, conversations with others, texting, or anything unnecessary to the duties of flight
   C. Planning, Review and Briefing
      i. Route Planning
         a. Have a current copy of the AD
         b. Large airports often have pre-designated taxi routes, review these for familiarity
         c. Otherwise, based on the runway in use & usable taxiways review the expected/possible routes
      ii. Review
         a. Always write down ATC taxi instructions to prevent mistakes
            • This will also ensure you follow the given ATC instructions, rather than the expected or planned instructions
         b. Review the route given by ATC, ask for help in case on confusion
            • Progressive taxi is a safe option
      iii. Briefing
         a. Always review and brief hot spots
            • Stay alert in these areas –they are the most common accident areas
         b. Brief the route given
D. Taxiing Near Other Aircraft
   i. Pilots should use a “continuous loop” process to monitor and update their progress and location
      a. This means: know your present location and mentally calculate the next location on the route
         that will require increased attention
         • Crossing traffic, hot spot, etc
   ii. Awareness is enhanced by understanding the clearance issued to pilots, other aircraft, and vehicles
   iii. Be especially vigilant if another aircraft that has a similar call sign is on frequency
      a. Care should be taken to avoid inadvertently executing a clearance for another aircraft

3. Steering, Maneuvering, Maintaining Taxiway, Runway Position, and Situational Awareness
   A. Steering
      i. Use rudders to maintain the centerline
      a. To maintain the centerline keep it aligned between your legs with your feet on the rudders
   B. Maintaining Position
      i. Always have a current AD on hand, monitor your location and route
      ii. If uncertain of location, stop and ask for help
      a. Don’t stop on a runway
   C. In low visibility situations, use everything available
      i. AD, heading indicator, airport signs, markings and lighting, etc
      ii. Before taxi brief the requirements and special considerations such as the low visibility taxi chart, if
         published for the airport, and be alert if ATC states to hold short of the ILS critical area line

4. Hold Lines
   A. Indicate where an aircraft is supposed to stop when approaching a runway
   B. Unauthorized crossing of hold lines could result in an incursion with a aircraft taking off or landing
      i. At speeds associated with TO/LDG incursions are much more hazardous
   C. During taxi:
      i. If approaching hold lines from the dashed side, cross (no clearance necessary) and stop once fully
         passed the solid lines
      ii. If approaching hold lines from the solid side, do not cross without a clearance

5. Landing and Rollout
   A. When landing and rolling out on a taxiway that will cross/approach another runway, brief the situation
      i. Understand where you will stop, what taxiways are appropriate, hot spots
      ii. Taxi slow, don’t exit at high speeds
   B. If stopped between parallel runways, only cross when cleared to
      i. Never cross the solid side of hold short lines without a clearance
   C. After landing, ensure that the entire aircraft, including the tail section, has crossed over the respective
      landing runway’s hold short line
      i. This will ensure that the entire aircraft is clear of the runway safety area
      ii. If you are constrained from clearing the landing runway by an adjacent parallel runway hold short
          line, stop and immediately advise ATC
   D. After landing, nonessential communications and nonessential pilot actions should not be initiated until
      clear of all runways

6. Airports with a Control Tower
   A. Perform all the above (planning, briefing, review, etc)
   B. Communicating with ATC
      i. Use standard ATC phraseology at all times to facilitate clear and concise communication
ii. When making initial contact with any controller, regardless of whether you previously stated your position to the previous controller, state who you are, where you are on the airport, what you want

iii. Focus on the ATC clearance
   a. Don’t perform any nonessential tasks while communicating with ATC
C. Read back all clearances

7. **Airports without a Control Tower**
   A. Planning
      i. Be familiar with the local traffic pattern direction and pattern altitude
         a. During calm wind conditions, be aware that flight operations may occur at more than one runway at the airport
      ii. Aircraft may be using an IAP to runways other than the runway in use for VFR operations
      iii. Be alert, communicate your intentions on the common traffic advisory frequency (CTAF), and listen for other aircraft operating on, to, and from the airport
   B. Maintain situational awareness
      i. Be aware of the route and know where you are at all times
   C. Departing
      i. Remember not all aircraft are radio-equipped; therefore, before entering or crossing a runway, listen on the CTAF for inbound aircraft information
         a. Scan the full length of the runway, including the final approach and departure paths of the runways you intend to enter or cross
   D. Communication
      i. Monitor/communicate on the CTAF from engine start, taxi, and until 10 miles from the airport

8. **Exterior Lighting and Night Operations**
   A. Exterior aircraft lights may be used to make an aircraft on the airport surface more conspicuous
      i. Engines Running: Turn on the rotating beacon whenever an engine is running
      ii. Taxiing: Prior to commencing taxi, turn on navigation, position, anti-collision
         a. Turn on the taxi light when moving or intending to move on the ground
         b. Turn it off when stopped or yielding or as a consideration to other pilots or ground personnel
         c. Strobe lights should not be illuminated during taxi if they will adversely affect the vision of other pilots or ground personnel
      iii. Crossing a Runway: All exterior lights should be illuminated when crossing a runway
      iv. Entering the Departure Runway for Takeoff or LUAW: Pilots should make their aircraft more conspicuous to aircraft on final and to ATC by turning on all lights except for landing lights
         a. Strobe lights should not be illuminated if they will adversely affect the vision of other pilots
      v. At Night, and When Cleared to LUAW: Line up slightly (approx 3”) off the CL to enable a landing aircraft to differentiate you from the runway lights
      vi. Takeoff: Landing lights should be turned on when takeoff clearance is received, or when commencing takeoff roll at an airport without an operating control tower
   B. Be more cautious at night
      i. Reduced visibility creates makes taxiing more difficult
         a. Ensure you remain on the assigned taxi route, it is easier to get confused/miss a turn at night
         b. Taxi slower, allow yourself ample time to stop if something suddenly appears in range of sight
            • Not necessarily another airplane (animal, debris, FOD, etc)
         c. Look closely for taxiway markings (especially hold short lines)
            • Some airports have lights in the ground along with hold short lines, some don’t
            • Use lights/lighted sings along taxiway edges to maintain position
Conclusion:
Brief review of the main points
One of the biggest safety concerns in aviation is the surface movement accident. By focusing resources to attack this problem head-on, the FAA hopes to reduce and eventually eliminate surface movement accidents.

PTS Requirements:
To determine that the applicant exhibits instructional knowledge of the elements of runway incursion avoidance by describing:

1. Distinct challenges and requirements during taxi operations not found in other phases of flight operations.
2. Procedures for appropriate cockpit activities during taxiing including taxi route planning, briefing the location of hot spots, (can be found in AFD) communicating and coordinating with ATC.
4. The relevance/importance of hold lines.
5. Procedures for ensuring the pilot maintains strict focus on the movement of the aircraft and ATC communications, including the elimination of all distractive activities (i.e. cell phone, texting, conversations with passengers) during aircraft taxi, takeoff and climb out to cruise altitude.
6. Procedures for holding the pilot’s workload to a minimum during taxi operations.
7. Taxi operation planning procedures, such as recording taxi instructions, reading back taxi clearances, and reviewing taxi routes on the airport diagram.
8. Procedures for ensuring that clearance or instructions that are actually received are adhered to rather than the ones expected to be received.
9. Procedures for maintaining/enhancing situational awareness when conducting taxi operations in relation to other aircraft operations in the vicinity as well as to other vehicles moving on the airport.
10. Procedures for briefing if a landing rollout to a taxiway exit will place the pilot in close proximity to another runway which can result in a runway incursion.
11. Appropriate after landing/taxi procedures in the event the aircraft is on a taxiway that is between parallel runways.
12. Specific procedures for operations at an airport with an operating air traffic control tower, with emphasis on ATC communications and runway entry/crossing authorizations.
13. ATC communications and pilot actions before takeoff, before landing, and after landing at towered and nontowered airports.
14. Procedures unique to night operations.
15. Operations at non-towered airports.
16. Use of aircraft exterior lighting.
17. Low visibility operations.