Runway Safety Team

Operational Safety for Airport pavement Construction

Presented to: RST - Panama
By: Guillermo Felix, P.E
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and this pickup.
Presentation outline

• The FAA responsibilities: Regulations, external guidance (AC) and internal guidance (Orders)
• The airport operator’s responsibilities
• The consultant’s role
• The contractor’s role
• Guidance for developing a construction safety and phasing plan
• Application in the field on FAA guidance
Regulation and internal guidance

• Protection of navigable airspace
• 14 CFR Part 77: regulation for notification to FAA proposals affecting navigable airspace
• 14 CFR Part 139: applies to certificated airport where air carrier operate
• Order 7400.2 – FAA procedure for conducting the airspace study (OE/NRA)
• AIP handbook: Requirement for ADO project managers for projects funded under AIP
FAA Review Process

FAA Objectio n

Airport Sponsor

Project Manager Review

Complete/ Acceptable 7460 process

Line of Business Review

AEA-620 Review (Part 139 Inspector)

Project Manager Final Review

FAA Response

Notice to Proceed Issued
Coordinating the study - LOBs

- AT- Obstruction Evaluation Specialist (OES): Airspace – M&L
- AT –Office of System Support Group (OSG): Controllers impact (ATCT)
- Flight Procedures Office (FPO): IFR procedures
- Flight Standards (FS): Safety of people and property on the ground, site inspection
- AT- Tech-Ops: NAVAIDs, VISAIDs, Line-of Sight, Frequency Management
- Airports – AP: design standards, CSPP, Part 139
External guidance: Advisory Circulars

- Airport Design AC 150/5300-13
- Advisory Circular (AC) 150/5370-2E, *Operational Safety on Airports During Construction*, contains guidelines to develop and implement Construction safety and Phasing Plans
- Standards for Airport Marking AC 150/5340-1.
- Design and Installation Details for Airport Visual Aids, AC 150/5345-30 (lighting)
- Standards For Airport Sign Systems, AC 150/3540-18.
Airport Operator’s Responsibilities

- Ensure operational safety is not degraded by hazards or marginal conditions associated with construction activity on the airport.
- Provide and maintain safe clearances between construction activities and aircraft.
- Close affected area or pull back personnel and equipment for aircraft movement during construction.
- Get necessary coordination and permits with the FAA.
Airport Operator’s Responsibility

- Coordinate the development and approval of construction safety (phasing) plan.
- Require contractors to adhere to safety plans.
- Coordinate construction. (contacts list)
- Notify users. (NOTAM)
- Training.
- Control vehicles.
- Comply with standards
- Inspect and resolve deficiencies found
Airport Operator’s Responsibilities at certificated airports

- Compliance with FAR Part 139 Regulation and ACM during construction —
  - Part 139.341, Identifying, marking, lighting and reporting construction and other unserviceable areas
  - Underground utility protection
  - Condition of movement areas and safety areas
  - Self-inspection and airport condition reporting
  - Emergency access roads
Consultant’s role

• Develop plan for safe and efficient construction activities minimizing airport operation
• Preparing construction safety and phasing plan
• Prepare contract documents
• Provide technical advices to airport operators
Contractor’s role

• Familiarize and adhere to plan
• Recommend modification of plan if applicable. If changes are made to original coordinated plan with the FAA, the revision has to be coordinated as well
• Get all necessary training
• Coordinate with airport operations for movement on the airfield
• Work with airport operator for issuance of NOTAM
• Provide POC
Safety Plan Elements: AC Paragraph 2-2

- Scope of work
- Marking and lighting
- Safety Areas, OFA, OFZ and TSC
- Affected area on the AOA
- Barricades/fencing
- Equipments to be used
- NAVAID protection
- Visual aids
- Wildlife control
- Limits

- Stock piles
- Trenches and excavation
- communication
- ARFF
- FOD
- Hazmat
- NOTAM
- Training and Inspections
- Utility locations
- Point of contacts
- Penalties
The Air Operations Area is the portion of the airfield inside the perimeter fence where airport safety and security regulations apply.
The movement area is the portion of the airfield where aircraft operate under the control of the Air Traffic Control Tower (ATCT). The movement area includes runways and taxiways. Normally, the apron area is non-movement area, however, at some airports, a taxiway may be located adjacent to the apron area and be under the control of Air Traffic Control.
Safety Phasing Plan

Coordinates of critical points of the airfield (batch plant, stock piles, cranes, contractor staging area, etc.)
Delineate and separate construction areas from aircraft operating areas
Separate construction activities from movement and safety areas
Identify all construction access & egress routes on the airfield
HAZARDOUS CONDITIONS:

- Tall but relatively low visibility units such as cranes or drilling equipment in safety areas or approach zones.
Mounds or stockpiles of construction material, earth, temporary structures, and other materials in proximity to movement areas or approach zones.
Hazardous Condition - Excavation adjacent to runways, taxiways, and aprons.
Runway safety area dimensions are based on the size and landing speed of the aircraft using the runway. Typically, for runways used by airlines, the runway safety area extends 250 ft from runway centerline and 1000 ft off each end.
The purpose of the runway safety area is to minimize the damage to an aircraft that inadvertently leaves the runway. For this reason, it must remain “sterile” during aircraft operations.

However, during some construction projects, it is necessary for work to be conducted in a portion of the runway safety area. In these situations, construction work may be conducted no closer than 200 feet from the runway centerline. If these conditions cannot be met, the runway must be closed to air carriers.
Excavation and Open Trenches
Runway approach areas

- Existing Construction equipment should normally not penetrate a 20:1 approach surface for visual runways, or 34:1 approach surface for ILS runways. Recommend 34:1 approach surface for all carrier operations
  - Existing Runway Safety Areas should be provided during construction by temporarily relocating the runway threshold
  - Displacing landing threshold and use of declare distances is a tool that can be used
  - FAA must approved less than existing RSA
Attractions for birds such as trash, grass seeding, or ponding water on or near airport movement areas.
Signage & markings
To protect the runway and runway safety area, holding positions are installed at the boundary of the runway safety area on all taxiways that enter runways.
Runway holding positions on taxiways have both a holding position sign and holding position marking.

A “Location Sign” identifies the taxiway you are on. At this location, you are on Taxiway Charlie.
Runway holding position markings consist of two solid lines and two dashed lines. The solid lines are the holding side of the marking.
Construction personnel have become confused and exited construction areas in the wrong direction, resulting in a surface incident or runway incursion.
Barricades/Red Lights

Barricades used to mark construction areas or closed pavement must be as low as possible to the ground; low mass; easily collapsible upon contact with an aircraft or any of its components; and weighted or sturdily attached to the surface to prevent displacement from prop wash, jet blast, wing vortex, or other surface wind currents. (AC 150/5370-2E, Par 3-9 b) This particular barricade is designed to be filled with water.
Red lights for marking construction areas are required because of a problem with pilots confusing flashing yellow construction lights with in-pavement Runway Guard Lights.
This photo shows an example of a flashing red light that is visible 360 degrees. These type of red lights are recommended in situations where they need to be visible from all directions.
Another way to improve the 360 degree visibility of the flat light fixtures is to rotate one of the lights 90 degrees as shown in this photo.
Highway type barricades may be too high for use adjacent to movement areas.
Barricades are used to keep aircraft out of closed areas and to keep construction vehicles out of active movement areas. They look the same in both situations. Vehicle operators need to pay close attention when driving through or around barricades to make sure you are not entering an active movement area.
The use of concrete jersey barricades in the movement areas (adjacent to taxiways) is not acceptable. (AC 150/5370-2E, Par 3-9 b)
Special Safety Requirements

- **Temporary Runway Thresholds**
  - Lighting should be installed outboard of the runway surface, and could include threshold lights, runway end identifier lights (REILs), and other markings.
  - The extent of required lighting is directly related to construction duration and the level of aircraft activity.
Here is a temporary relocated threshold marking using white plastic material. However, white sandbags should have been used. The yellow and orange sandbags in this situation could be distracting to pilots.
Yellow X’s at each runway end are used to mark temporarily closed runways. If sand bags are used to weight down the yellow X, they should also be yellow.
Preferred visual aid to depict a temporary runway closure
NOTES
1. RUNWAY SIDE STRIPES, WHEN USED ON THE RUNWAY, EXTEND INTO THE DISPLACED AREA.
2. RUNWAY MARKINGS (EXCEPT HOLDING POSITION MARKINGS) INCLUDING THOSE IN THE DISPLACED THRESHOLD AREA ARE WHITE.
3. DIMENSIONS EXPRESSED AS FEET OR METERS.

SEE FIGURE 11, DETAIL ‘A’

STANDARD RUNWAY MARKING

80 120 100
24 36 30 20

SEE DETAIL ‘A’ FOR ARROW DIMENSIONS

RUNWAY THRESHOLD IS AT OUTBOARD EDGE OF THRESHOLD BAR

SEE DETAIL ‘A’ AND TABLE BELOW FOR ARROW WIDTH

<table>
<thead>
<tr>
<th>RUNWAY WIDTH</th>
<th># OF ARROW HEADS</th>
<th>SPACING BETWEEN ARROW HEADS</th>
<th>SPACING TO RUNWAY EDGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥ 100 (30 m)</td>
<td>4</td>
<td>1/4</td>
<td>w/8</td>
</tr>
<tr>
<td>&lt; 100 (30 m)</td>
<td>3</td>
<td>1/3</td>
<td>w/6</td>
</tr>
<tr>
<td>&lt; 60 (30 m)</td>
<td>2</td>
<td>1/2</td>
<td>w/4</td>
</tr>
</tbody>
</table>

NOTE: "W" IS THE RUNWAY WIDTH
Construction Safety and Phasing Plan
March 2, 2011

NOTE: DIMENSIONS EXPRESSED AS FEET, METERS 3, 10

Pavement Edge

Runway Holding Position Markings, Located to Protect Approach Surfaces and Runway Safety Areas

Taxiway Centerline Marking, Yellow

Taxiway Edge Stripes, Yellow

Runway Threshold Is at Outboard Edge of Threshold Bar

Standard Runway Markings

Arrowheads, See Detail 'A' and Table Below

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Note: 'w' is the runway width.
SPECIAL SAFETY REQUIREMENTS

- Temporarily closed runway/taxiway
  - Disconnect all lighting circuits.
  - Obliterate threshold, designation, and touchdown zone markings.
  - Place a temporary cross at each runway end, covering the numbers.
  - Place a cross at entrances to each closed taxiway.
  - Usually have NAVAIDs removed from service.
Foreign Object Debris (FOD)

- Significant potential for FOD.
- Monitor haul routes and crossing points.
- **Sweepers.**
- **Ops/maintenance inspections.**
- Eliminate FOD that attracts wildlife
Sweepers only work if they are used.
- Proximity to Navigation Aids

  - Construction activity in the vicinity of navigational aids requires special consideration, particularly stockpiles of materials and movement or parking of equipment that may interfere with electronic emissions and transmissions.

  - The effect of the activity will be evaluated by the FAA through the airspace review process. Recommend coordinating with local AF for input prior to submission of S/P.
Coordination with ARFF

Identify Alternative ARFF Provisions/Routes
Construction Impact on ARFF

- Develop notification procedures.
- Include in safety meetings.
- Ensure response.
- Ensure access roads remain available.
- Consider mutual aid.
SAFETY PHASING PLAN SUBMITTALS TO THE FAA

Identify Vehicle Operator & Driver Training Programs

GROUND VEHICLE -- AIRFIELD VISUAL AID SAFETY PLACARD

<table>
<thead>
<tr>
<th>COLOR AND TYPE OF SIGNAL</th>
<th>VEHICLE EQUIPMENT &amp; PERSONNEL MOVEMENT</th>
<th>AIRPORT SIGN SYSTEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>STEADY GREEN</td>
<td>CLEAR TO CROSS, PROCEED OR GO</td>
<td>TAXIWAY LOCATION: Identifies taxiway on which vehicle or aircraft is located</td>
</tr>
<tr>
<td></td>
<td>NOT APPLICABLE TO GROUND VEHICLES</td>
<td>RVY/WHY HOLD POSITION: Hold short of runway on taxiway</td>
</tr>
<tr>
<td></td>
<td>STOP</td>
<td>RVY/WHY HOLD POSITION: Hold short of intersecting runway</td>
</tr>
<tr>
<td></td>
<td>CLEAR THE TAXIWAY/RUNWAY</td>
<td>RVY/WHY HOLD POSITION: Hold short for aircraft approach</td>
</tr>
<tr>
<td></td>
<td>RETURN TO STARTING POINT ON AIRPORT</td>
<td>RVY/WHY HOLD POSITION: Hold short of ILS critical area</td>
</tr>
<tr>
<td></td>
<td>EXERCISE EXTREME CAUTION</td>
<td>VISUAL APPROACH POINT: Hold short of ILS critical area</td>
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An FAA Guide

Construction Safety and Phasing Plan
March 2, 2011

Federal Aviation Administration

58
If you are authorized to drive on the movement area, always look carefully before crossing a runway, even when cleared by ATC. Controllers, pilots and vehicle drivers can make a mistake.
Airfield construction training programs should incorporate runway incursion prevention.
Two new requirement

- Safety management System: safety Risk Assessment. It is part of the Airports Division approval process for the CSPP. It does not necessarily requires a panel.
- The Safety Plan Compliance Document (SPCD) details how the contractor will comply with the CSPP.
Any Questions?

Thank You!