



FAA
Air Traffic Organization

What's on your runway?

Airport Construction Advisory Council

Mitigating Hazards Associated
with Airport Construction



Executive Summary

Airport construction is prevalent worldwide as countries increase airport traffic throughput and conform with new safety requirements. While the work is under way, airports must continue to provide services to the flying public despite the impact of construction on their air traffic operations. Airport construction has been a causal factor in numerous safety events throughout the United States and in many other countries.

Recognizing that airport construction introduces additional risk to air traffic operations, the Federal Aviation Administration's (FAA) Air Traffic Organization (ATO) created the Airport Construction Advisory Council (ACAC) in April 2010. The ACAC was tasked with ensuring safety during airport construction activities. The ACAC consists of FAA and U.S. aviation industry professionals with diverse backgrounds and experience. It has grown to 15 core and associate members strategically positioned across the United States. Their theme is "managers working with managers," a concept that establishes credibility and facilitates their reception at U.S. air traffic facilities and airport offices. The council was founded by Jim Krieger, Dave Siewert and Peter Trapp. It is made up of a core group and an associate group, and has a chairperson from the ATO. ACAC members do not change their organization alignment, and ACAC membership is considered part-time non-essential unless designated separately.

The ACAC takes a multifaceted approach to mitigating the hazards associated with airport construction. Initial efforts targeted operations on runways shortened due to construction, situations where the combination of aircraft, construction vehicles, workers, broken pavement and sometimes other substantial activities can create significant risk. Working with subject matter experts in the U.S. aviation industry, the International Civil Aviation Organization (ICAO), and domestic and international aviation labor and professional organizations, the ACAC has developed a portfolio of initiatives designed to ensure that safety is maintained during airport construction. The history of the ACAC and its initiatives are described in this document.

Benefits to the Aviation Community

The overall ACAC concepts and specific initiatives outlined in this document offer the following benefits to organizations concerned about aviation safety during airport construction projects:

- Organizations can learn about common airport construction threats and hazards and employ proven methods to avoid such safety incidents and events.
- Pilots are better informed about what is open and closed at the airports where they operate; rapidly changing configurations often do not allow sufficient lead time to permit training on each of the construction induced patterns.
- The global sharing of airport construction hazards, events and mitigations will benefit aviation safety worldwide and will encourage the development of international safety standards.
- The initiatives are easily transferable to other countries and air navigation service providers.

Safety Events Related to Airport Construction Worldwide

Airport construction has been identified as a causal factor in numerous global safety events. For example:

Chicago O'Hare International Airport: In 2009, runway 10-28 was shortened by approximately 3,700 feet and a frangible barrier was placed on the closed portion of the runway to protect a localizer antenna array (see photo below).



Runway 10-28, Chicago O'Hare, 2009

During the brief time that this construction project required, five serious safety events occurred. Two aircraft overran into the closed portion of the runway, one aircraft touched down and then went around after seeing chevrons in the same area, and two heavy aircraft departed toward the barrier not knowing of its existence or how much runway was actually available.

Blue Grass Airport, Lexington, Kentucky: In 2006, a CRJ-100ER attempted to take off on a different and much shorter runway than the one actually intended for departure. Unknown to the crew, the airport signage was inconsistent with current airport diagram charts of construction at the airport. Various taxiway and runway lighting systems were also out of operation and the crew did not have information about all the changes. The aircraft struggled to get airborne before colliding with terrain.

Taipei Chiang Kai Shek International Airport, Taiwan: In October 2000, a B747-400 attempted to depart on runway 5R which had been closed for repairs. On takeoff, the aircraft struck concrete barriers, excavators and other equipment on the runway. The aircraft crashed back onto the runway, breaking up while sliding down the runway and hitting other equipment.

Vienna International Airport, Vienna, Austria: In 1997, both thresholds of runway 11-29 were temporarily displaced by 527 meters and 1,150 meters respectively (see illustration below). There were 10 safety incidents involving this runway during the construction period including nine landings in the closed areas of the runway and one B747 takeoff that cleared a fence on the runway by only 5 meters.



Vienna, Austria

There have been other documented events and, most likely, many others that have gone unreported. Airport construction can lead to ambiguity and operator confusion, sometimes with catastrophic results.

Common Causal Factors

Reviews of safety events involving construction reveals a set of frequently repeated causal factors: the Automatic Terminal Information Service (ATIS), Notices to Airmen (NOTAMs), visual cues, air traffic controller phraseology and airport diagrams and charts.

ATIS: The ATIS broadcast at large airports often contains a significant amount of information besides airport construction data. Construction NOTAMs have sometimes blended in with the background information and are not absorbed and recognized by pilots. In other cases, the ATIS does not include declared distances and other critical construction-related information.

NOTAMs: Large airports frequently have a significant number of NOTAMs in place, especially during times of airport construction. This can lead to information being overlooked by the people who really need it: pilots, dispatchers and air traffic controllers. Also, the information contained in NOTAMs sometimes elude an operator's memory just when it is most needed—during the takeoff or landing phases of flight when information saturation and risk tends to reach a peak. Also, the NOTAM format (all capital letters and infrequently used abbreviations) is often awkward to interpret or subject to misunderstanding.

Visual cues: Airport signage, taxiway and runway markings, and other visual cues can help or hinder flight crews as they attempt to distinguish closed surfaces from active ones. Lack of visual cues has contributed to aircraft operating on closed surfaces, and to wrong runway departures and arrivals.

Controller phraseology: Controller phraseology can sometimes lead to ambiguity or mistaken conclusions about the actual condition and specifications of the surfaces impacted by construction.

Airport diagrams and charts: Airport diagram publications often lag behind construction closures and sometimes are not updated at all during an airport construction project. Operators must “connect the dots” between such diagrams and the NOTAM content to get an actual assessment of the pavement they are using. One airport even published a revised configuration before the construction was complete. Because the diagram did not match the actual configuration on the date published, safety was jeopardized. When the newest airfield diagrams are published, some operators assume the latest surface configurations are depicted when they are often omitted due to the temporary nature of construction.

Combinations of some or all of these factors have contributed to safety events worldwide during airport construction. In effect, the variety of conditions created situations in which “everything made sense” to the people involved, right up until the time of the occurrence. It appears that construction frequently causes operational disruptions that overload users and service providers alike.

Recognition of these factors is important in understanding how these events could have happened. It is also helpful in avoiding the temptation to conclude investigations too early and incompletely by merely assigning blame, and in understanding how the steps leading up to these events could easily be repeated anywhere.

Solutions

While it is evident that airport construction adds risk to air traffic operations, the good news is that risk can be managed.

The ACAC has developed a portfolio of ways to manage airport construction risks for air traffic managers, airport operators, pilots, dispatchers and air traffic controllers. Some examples include:

Policy changes: The ACAC generated several changes to the FAA Air Traffic Control Handbook (JO 7110.65) and the FAA Facility Operation and Administration Order JO 7210.3. These changes specifically target the causal factors (listed in above) associated with numerous safety events associated with construction.

Enhanced NOTAM information: The ACAC has championed the development and distribution of graphic NOTAMs that use the “picture tells a thousand words” concept to present critical NOTAM information in a human-friendly, intuitive format. These graphics are based on the geographic information system (GIS) using digital records validated through surveys, and they can be easily uploaded to electronic flight bags (EFBs), iPads and other commonly used devices with Internet access. See page 7 for an example.

Checklists: The ACAC developed and implemented checklists to help document and institutionalize organizational learning to ensure consistently safe construction projects.

Improvements to airport signage and markings: The ACAC has formally proposed changes to airport signage and markings to increase pilot situational awareness about the impacts of airport construction on airfield operations. The ACAC is sponsoring a study to see if more orange-colored signs would improve recognition and awareness.

On-site support: Many ACAC members are peer air traffic managers who provide on-site support on request. This “managers helping other managers” concept facilitates acceptance of other perspectives and provides the ACAC with much-needed airport construction safety feedback.

Best Practices: The ACAC has solicited feedback from industry experts, frequently polling airport operators, air traffic controllers and pilots. This permits a comprehensive Best Operating Practices list of workable solutions to reduce the risk inherent with construction at airports.

Communications: The ACAC has reached out to aviation organizations such as ICAO, the International Air Association, American Association of Aircraft Executives, Airports Council International-North America and several other entities to solicit feedback and to gain assistance in getting the word out. The ACAC uses websites, email blasts, the FAA Safety Team (FAAST), InFO messages, and professional association publications to reach everyone who might deal with construction disruptions.

Most of these solutions have already been adopted by the FAA and have been validated at many airports across the United States during 2011-2012.

Summary

Airport construction has been proven to add risk to air traffic operations across the globe. While there are usually many causal factors, some have persistently been identified in most, if not all, of the construction-related safety events. These common factors include the ATIS, NOTAMs, misleading visual cues, controller phraseology and airport diagrams and charts.

Thankfully, risk can be managed to acceptable limits. The ACAC was created by the ATO in 2010 to improve the management of airport construction risks in the United States. The ACAC has employed a variety of strategies to accomplish this goal such as air traffic policy changes, enhancements to the ways in which NOTAMs are presented, the development and use of standard checklists and good operating practices, improvements to airport signage and markings, and provision of on-site support on request. These strategies were designed to specifically target the common causal factors.

These initiatives have proven quite successful in the United States at airports of all sizes. However, airport construction safety is a global issue that deserves a global, unified and coordinated response. Without such a response, pilots worldwide will continue to be exposed to methods and strategies that sometimes vary greatly by region.

The ACAC initiatives and concepts are flexible and can be used by all organizations responsible for aviation safety. Safety will be truly enhanced by the widespread and consistent adoption of these and similar innovations. The ACAC welcomes all opportunities to share related information and wants to collaborate with global safety organizations on airport construction safety solutions. Contact us for additional information.

Contact Us

Airport Construction Advisory Council

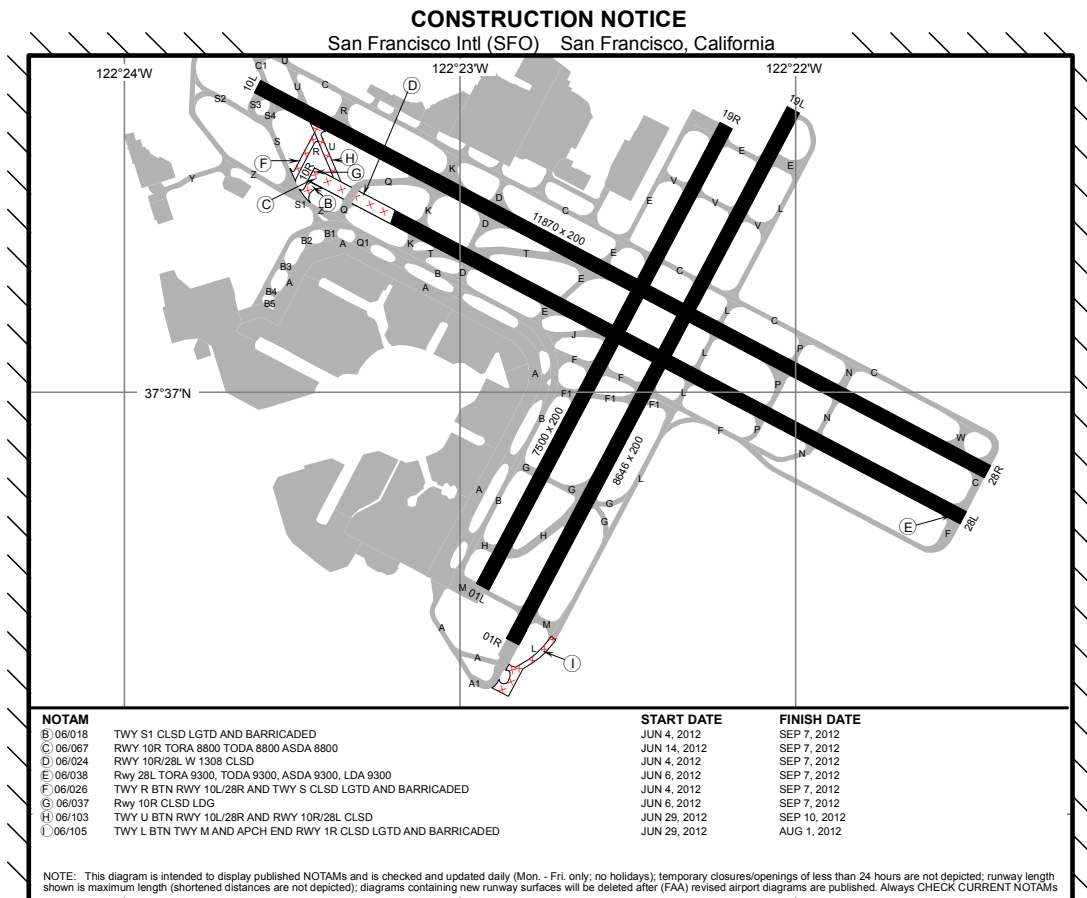
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Consult NOTAMS for Latest Information

Graphic NOTAM Information