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What's on Your Runway?

NOTAMs enhanced with airport diagrams help pilots mitigate risks during U.S. runway/taxiway construction.

BY WAYNE ROSENKRANS

Operating aircraft near runway/taxiway construction projects adds extraordinary complexity for everyone involved. Today's risk mitigations consequently have the best chance of success under a blame-free, open communication approach with all airport stakeholders well versed in the latest safety resources and planning tools, says a current U.S. Federal

Aviation Administration (FAA) educational campaign.

Pilots, for example, already may be familiar with U.S. air traffic controllers' use of special clearance phraseology during such projects. However, clearance wording introduced last September to heighten flight crew awareness of reductions in available takeoff/landing distance is just one of many defenses against

human error and safety system issues related to temporarily shortened runways.

Threats to flight operations from construction-related communication issues and other factors have necessitated these extra mitigating actions, says Jim Krieger, chairman of the FAA's Airport Construction Advisory Council (ACAC) and staff manager, Chicago-O'Hare International Airport (ORD) Air Traffic

Control Tower. Relevant safety events at ORD in 2009 were among many analyzed before taking these actions.

Latent effects of runway/taxiway construction are often difficult to predict or even to detect, Krieger said. “Many serious events have happened because of airport construction, and it is difficult to see them coming,” he said. “If the closure pattern and sequence are not well planned, for example, bottleneck intersections and extra runway crossings raise the safety risk, so it’s important to get the details right. A big red flag for the ACAC is when we hear someone say, ‘This is just a taxiway project,’ or ‘We have done this a million times.’

“This effort is not about blame because that approach gets us nowhere. The key in any given safety event is to determine why everything made sense to the individuals involved at the time. Once we know that, we have something to work with.”

Characteristic Hazards

Operations on runways shortened due to construction represent the riskiest type of activity that involves air traffic control (ATC), Krieger said. “These operations are the only situation in which we intentionally put aircraft, people, vehicles and sometimes other objects

on the same piece of pavement all at the same time,” he said.

The common denominator in recent construction-related flight safety events has been that “pilots, controllers and airfield personnel sometimes are just not aware of construction notices to airmen [NOTAMs],” Krieger said. “At the moment of truth, for whatever reason, people don’t know something has been altered on the runway, taxiway or wherever. While this is not new, the consequences of missing such information at the times that they need it most — like during the takeoff or landing phases of flight — cannot be overlooked. Sometimes people knew about the NOTAM at one point and later forgot; on other occasions, they simply never knew about the construction NOTAM at all.”

At major U.S. airports, aviation professionals sometimes have struggled to handle the high volume of raw data, to “separate the wheat from the chaff” in Krieger’s words. He noted that ORD typically publishes six pages of NOTAMs a day, and other U.S. airports publish 15 pages or more.

“When a serious 2009 safety event happened one evening in Chicago involving a shortened runway, more than 70 NOTAMs were in effect,” Krieger said. “The NOTAM that made all the difference in the world to this flight

crew was buried in the list at about no. 56. The list’s no. 1 NOTAM, prioritized by currency, was, ‘Runway 22L windsock unlit’ — not too important in the grand scheme of things.”

The ACAC concluded in 2010 that causal factors in aircraft safety events associated with runway/taxiway construction include missed, forgotten or obsolete construction information that affects dispatchers, pilots and ATC; ineffective ATIS broadcasts; potential airport diagram improvements; confusion surrounding ATC’s use of the term “full length”; missing or ineffective visual cues on the airport surface to reinforce or back up pilot/driver alertness to construction effects such as shortened runways; numerous unprioritized NOTAMs; and diverse human factors issues.

Key Web Page

The ACAC’s leaders urge the aviation community to take advantage of the FAA’s free and continually updated *Runway and Taxiway Construction* Web page <www.faa.gov/airports/runway_safety/runway_construction>. The Web page provides graphically enhanced NOTAMs called *construction notices*; a simple interface for searching, sorting and checking NOTAMs; a partial runway construction closure checklist; runway-taxiway construction best practices and lessons learned; and airport construction frequently asked questions. Using this Web page already has been shown to improve recognition of significant items within NOTAMs, enabling pilots and dispatchers to reduce the risk of missing construction-related information, Krieger said.

“We expect more website capabilities to be added as needed in the future, along with fillable online construction checklists for air traffic managers,” he said. The ACAC also has made



presentations to many industry conferences. These have included advising aircraft operators and their flight operations safety specialists to note all the other changes. This will help to ensure that pilots recheck aircraft performance on shortened runways, he added.

Although rollout of changes within the FAA has met expectations, early data show lower Web page traffic from pilots than planned, Krieger said. The ACAC expects continued support from a dozen industry groups in promoting routine use of the Web page while other communication channels and materials — such the FAA’s *What’s on Your Runway?* promotional card — evolve.

Persuading non-FAA stakeholders to take advantage of the appropriate tools — especially if they may require updates to standard operating procedures — has been a challenge. “Getting the information out is the crux of what we are facing,” Krieger said. “We have different audiences — the pilot community, dispatchers, airport managers, the air traffic manager community and ATC facility personnel. The pilot crowd is tough to reach because they are a diverse group using different types of communication. So, we’ve started with the Web page. But we will have failed if pilots do not know about the improved NOTAM access

tools, construction notices, other safety information and where to find all these online.”

Highlights of Work

The ACAC was put together in 2010 as an ad hoc effort, said David Siewert, air traffic manager, John F. Kennedy International Airport (JFK) Air Traffic Control Tower, and a leader-spokesman for the ACAC. Early this year, the FAA asked the ACAC to write a charter to become a permanent part of the Air Traffic Organization (ATO). As of July, the charter was in near-final form, he said.

This agency support has enabled the ACAC to expand its composition, do more to publicize the changes already made, furnish on-site technical support for local airport construction projects and follow up on further proposed changes, Siewert said.

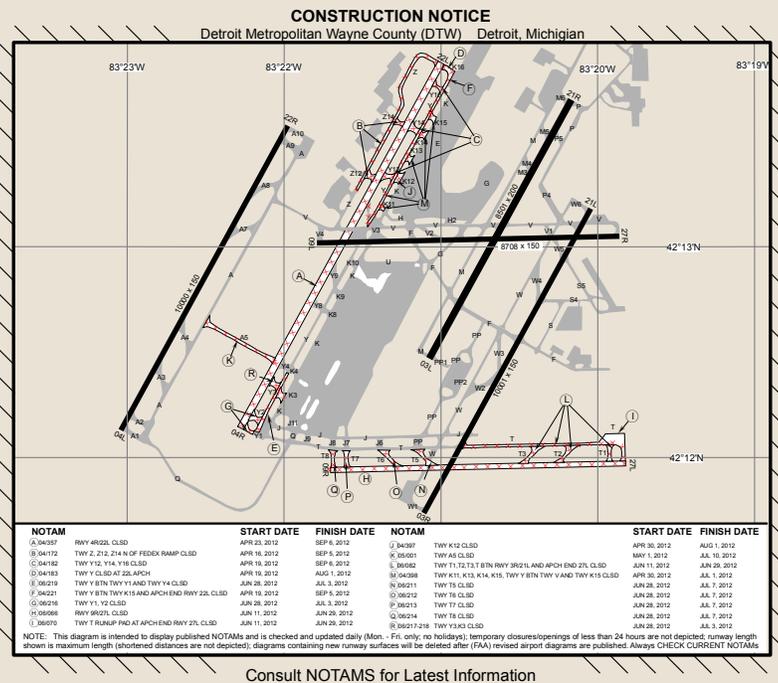
In 2012, the ACAC has focused on addressing new safety issues involving runway/taxiway construction, adding people and organizations that bring wider expertise and perspectives, and joining forces with international efforts and non-U.S. counterparts.

Some changes that the ACAC championed in 2010 now remind or warn pilots about their situation. One was made in FAA Order JO 7110.65S, *Air Traffic Control*. The policy requires that the words *warning* and *shortened* be added to ATIS broadcasts to say, for example, “Warning Runway 14R shortened, 9,800 ft [2,987 m] available, consult NOTAMS.” Also, the word *shortened* has been adopted by ATC for takeoff and landing clearances; for example, “Runway 10 shortened, cleared for takeoff [or cleared to line up and wait]” and “Runway 10 shortened, cleared to land.”

The policy change also has eliminated the word “full length” in ATC phraseology when clearing pilots to take off or line up and wait on a shortened runway. The ACAC’s 2010 analysis had documented some runway safety events in which U.S. and non-U.S. pilots cited confusion about ATC use of the term.

Other policy changes for ATC management were adopted into FAA Order JO 7210.3V, *Facility*

The FAA’s *Runway and Taxiway Construction Web page* simplifies NOTAM access and adds graphical construction notices.



Operation and Administration. These include the required notification of the ACAC about all construction projects at U.S. airports; training of ATC personnel prior to construction, if possible; and a pre-broadcast review of ATIS messages by a person other than the message originator.

Construction Notices

The Aeronautical Information Service office in ATO Mission Support invented the construction notices to address pilot-reported shortcomings of the NOTAM system — focusing on the difficulty for pilots and dispatchers in recognizing and prioritizing the scattered information pertaining to runway/taxiway construction. “We believe that construction notices are the most intuitive way to communicate this NOTAM information,” Krieger said.

Each construction notice developed as part of a trial program has a simplified airport diagram with overlaid red “X” marks that show construction project areas with letters and arrows indicating corresponding NOTAMs, start dates and finish dates in an adjacent legend. Based on updates and verification of closures by FAA headquarters staff — currently performed weekdays excluding holidays — the construction notices are hosted on the National Flight Data Center website.

Positive Signs

Proposed airfield signs, as already approved for experimental use at ORD, indicate at runway intersections that a runway has been shortened and show pilots the takeoff run available from that point. “We’ve asked the FAA Office of Airports to allow all airports to temporarily install approved signage at certain intersections that both the airport manager and the air traffic

manager agree are most used by departing aircraft,” Krieger said. This office agreed to expedite its response to this request but a firm time frame has not been announced, he said.

The latest version of prototype lighted signage tested at ORD under a waiver of existing standards contains the message format “RWY 14R SHORTENED, TORA 9,685 FEET.” Signage showing runway remaining from taxiway intersections already is used by some non-U.S. airports, according to Krieger and Siewert. They have proposed the use of “safety orange” and a pattern of alternating diagonal white and orange stripes as a standard for temporary airport construction-related signage and markings. This color already is used for airport obstacles. Some ATC facilities, in cooperation with airports, will add temporary construction-related signage to communicate that a runway has been shortened.

“The Office of Airports is exploring the human factors aspects of the ACAC’s request to use this color on all runway and taxiway signage related to active construction closures,” Krieger said.

Evidence of Value

Siewert said that many reports from the field offer preliminary evidence that the ACAC initiatives overall are making a difference to some pilots and other stakeholders. While providing on-site support during construction at Lafayette (Louisiana, U.S.) Regional Airport, ACAC representatives heard controllers report that pilots often follow up a clearance to land containing “shortened” with questions about the partial runway closure, such as “Which end is shortened and by how much?”

“These pilots said they did not know that the runway had been shortened until they heard our ‘Runway XX shortened’ phraseology,” Siewert said.

“We also have received that feedback from other places. The tools that we have implemented are taking hold and have had an effect on enhancing safety.”

Similarly, numerous air carrier crews questioned ATC at San Francisco International Airport (SFO) about the state of the runway upon receiving their clearance to land with the “shortened” phraseology, Krieger added. “If our phraseology prompts them to ask these questions about what’s closed on that runway, that’s great,” he said. “That’s exactly the kind of response that we were hoping for — an opportunity for clarification and increased awareness. Without the information exchange, I don’t think that pilots were always aware of partial closures that could affect aircraft performance and safety.”

The ACAC also collaborates on flight safety issues involving runway/taxiway construction with stakeholders around the world, Krieger said. In 2012, the ACAC briefed the secretariat of the International Civil Aviation Organization (ICAO) Air Navigation Bureau in February and the ICAO Air Navigation Commission in March. In response to ICAO’s request, the ACAC during July presented proposed construction-related revisions to ICAO Doc 9137, *Airport Services Manual*, Chapter 8, “Airport Operational Services.”

In summary, Krieger said, “It’s risky to let the scope of a runway/taxiway construction project lull people into thinking that they don’t have to be concerned about flight operations safety. The ‘small’ projects have caused just enough confusion to result in accidents with many fatalities. We simply cannot afford to let down our guard.”

To read an enhanced version of this story and a table of ACAC safety event examples, go to <flightsafety.org/aerosafety-world-magazine/july-2012/construction-council>.