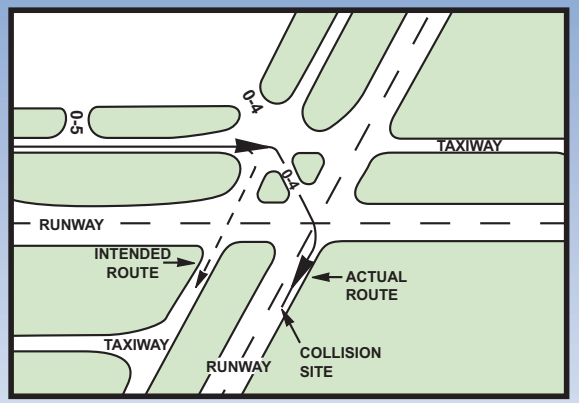

While taxiing in low visibility, a disoriented pilot made an incorrect turn at a complex intersection. Eight people died in the resulting runway incursion.

Airfield Configuration

The basic runway and taxiway configurations of many airports in the United States were constructed prior to the jet age. Since that time, the volume of operations and the speed and size of aircraft using our Nation's airports have increased dramatically. At the same time, the risk of runway incursions has also increased.

One factor that can contribute to runway incursions is airport configuration. Although these pre-jet age airfields can and do safely accommodate large volumes of aircraft operations, the airfield has been a contributing factor in some runway incursions.

Capital development can be used to improve airfield pavement configurations so they are less susceptible to runway incursions.

Layout Considerations

When undertaking capital development on the airfield, airport operators, design engineers, and planners should

Avoid layouts that include complex intersections. Generally, a complex intersection involves three or more crossing pavements, such as three taxiways, two runways and a taxiway, or two taxiways and a runway.

Even though they may look straightforward on plans, intersections with several intersecting taxiways and/or runways can confuse pilots and vehicle operators, especially at night or during inclement weather.

They can also be a challenge to mark, light, and sign.

Always look for ways to simplify intersections. If reconfiguring identifies unnecessary taxiway segments, removal of this pavement is preferable to mere closure.

Avoid layouts that result in closely spaced parallel runways.

Provide adequate distance between parallel runways so a landing aircraft can exit the runway, decelerate, and hold short of the parallel runway without interfering with subsequent operations on either runway.

Avoid layouts that require aircraft and vehicles to cross runways.

Every crossing represents a potential runway incursion.

Vehicle crossings can be eliminated by constructing all-weather perimeter and service roads.

At busy airports with a large volume of vehicles traveling from one side of the airport to the other, it may be cost beneficial to construct vehicle roadway tunnels under the runways.

Consider relocating cargo facilities and fuel farms so vehicles will not have to cross runways to access them.

Avoid layouts that require aircraft taxiing for takeoff to cross the active runway at an intermediate point to reach the approach end of the active runway.

Avoid layouts that will result in aircraft taxiing or back taxiing on runways.

Anytime an aircraft uses a runway for purposes other than landing or takeoff, the chances of a runway incursion increase.

Resolving Problems

The following techniques can be used to address specific surface movement problems attributable to airport configurations and/or facilities.

From an airfield perspective, the first thing to check is the condition and alignment of the applicable airfield marking, signs, and lights. In some cases, such as landing on the wrong runway, it may be necessary to check these items from the air as well as on the ground. It is always important to view a "hot spot" from the pilot's perspective.

Problem: Pilots fail to "hold short" after acknowledging "hold short" instructions.

- Install a hold position sign on the right side of the taxiway.
- Paint a hold position sign on the pavement surface.
- Install runway guard lights.

Problem: Pilots fail to turn as instructed or make a wrong turn.

- Check the published airport diagram to see if it accurately reflects your airfield.
- Use a 12-inch-wide centerline outlined in black to delineate the preferred route.
- Paint direction and/or location signs on the pavement surface.

Problem: Pilots land on the parallel taxiway rather than the runway.

- Install Runway End Identifier Lights at the end of the runway.
- Construct an asphalt blast pad with yellow chevrons at the beginning of the runway.
- Install approach lights for the runway.

(Note: The problems cited may also be the result of factors that do not involve the airport.)

For additional information, contact the regional runway safety program manager or airports division.

Alaska
RSPM: 907/271-5293
Airports Division: 907/271-5438

Central
RSPM: 816/329-3044
Airports Division: 816/329-2600

Eastern
RSPM: 718/553-3326
Airports Division: 718/553-3331

Great Lakes
RSPM: 847/294-7853
Airports Division: 847/294-7272

New England
RSPM: 781/238-7027
Airports Division: 781/238-7600

Northwest Mountain
RSPM: 425/227-1369
Airports Division: 425/227-2600

Southern
RSPM: 404/305-5558
Airports Division: 404/305-6700

Southwest
RSPM: 817/222-5045
Airports Division: 817/222-5600

Western Pacific
RSPM: 310/725-3550
Airports Division: 310/725-3600

Federal Aviation Administration
Office of Runway Safety
(202) 267-9131
Office of Airport Safety & Standards
(202) 267-3053
www.faa.gov/runwaysafety/

Tips for Airport Operators, Planners, and Design Engineers

IMPROVING RUNWAY SAFETY THROUGH AIRFIELD CONFIGURATION

REDUCING THE RISK OF RUNWAY INCURSIONS

FEDERAL AVIATION ADMINISTRATION