

# SMS Thoughts from an Occasional Subject Matter Expert and SMRP Facilitator (ARP Process)



*Airport Safety Management Systems  
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Contact:

Greg Albjerg, P.E.  
National Aviation Planning Leader  
HNTB Corporation  
galbjerg@hntb.com



# Safety Risk Management Process Generally Working Well

- Definitions – Could Use Some Enhancements
  - Example: What constitutes major aircraft damage? Is damage to a jet engine where no one is hurt a major incident?
- Data
  - Formal SMS has not been in existence very long
    - Formal data records do not have a significant sample size
    - Earlier data records are inconsistent and vary by source
  - Data in ACRP Report 131 found to be very helpful

# Severity Classifications - Example

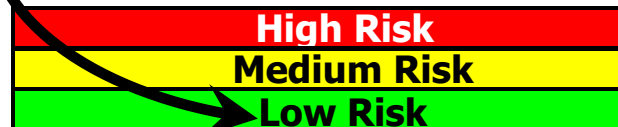
Effect On:	Minimal 5	Minor 4	Major 3	Hazardous 2	Catastrophic 1
ATC Services	-Conditions Resulting in a minimal reduction in ATC services, or -A loss of separation resulting in a Category D Runway Incursion (RI), or -An Operational Deviation (OD), or -A Proximity Event (PE)	-Conditions resulting on a slight reduction in ATC services, or -A loss of separation resulting on a Category C RI, or Operational Error (OE)	-Conditions resulting in a partial loss of ATC services, or -A loss of separation resulting in Category B RI or OE	-Conditions resulting in a total loss of ATC services (ATC Zero), or -A loss of separation resulting in a Category A RI or OE	Conditions resulting in a collision between aircraft, obstacles or terrain
Flight Crew	-Flight crew receives TCAS Traffic Advisory informing of nearby traffic or, -Pilot Deviation (PD) where loss of airborne separation falls within the same parameters of a Category D OE or PE, or -Minimal effect on operation of aircraft	-Potential for PD due to TCAS Preventive Resolution Advisory (PRA) advising crew not to deviate from present vertical profile, or -PD where loss of airborne separation falls within the same parameters of a Category C OE, or -A reduction of functional capability of aircraft but does not impact overall safety (e.g. normal procedures per AFM)	-PD due to response to TCAS Corrective Resolution Advisory (CRA) issued advising crew to take vertical action to avoid developing conflict with traffic, or -PD where loss of airborne separation falls within the same parameters of a Category B OE, or -Reduction in safety margin or functional capability of the aircraft requiring crew to follow abnormal procedures per AFM	-Near mid-air collision (NMAC) results due to proximity of less than 500 feet from another aircraft or a report filed by pilot or flight crew member that a collision hazard existed between two or more aircraft; or -Reduction of safety margin and functional capability of the aircraft requiring crew to follow emergency procedures as per AFM.	-Conditions resulting in a mid-air collision (MAC) or impact with obstacle or terrain resulting in hull loss, multiple fatalities, or fatal injury
Flying Public	Minimal injury or discomfort to passenger(s)	-Physical discomfort to passenger(s) (e.g. extreme braking action; clear air turbulence causing unexpected movement of aircraft causing injuries to one or two passengers out of their seats) -Minor injury to greater than zero to less or equal to 10% of passengers	-Physical distress on passengers (e.g. abrupt evasive action; severe turbulence causing unexpected aircraft movements), or -Minor injury to greater than 10% of passengers	Serious injury to passenger(s)	Fatalities or fatal injury to passenger(s)
Airport	No damage to aircraft but minimal injury or discomfort of little consequence to passenger(s) or workers	-Minimal damage to aircraft, or -Minor injury to passengers, or -Minimal unplanned airport operations limitations (i.e. taxiway closure), or -Minor incident involving the use of airport emergency procedures	-Major damage to aircraft and/or minor injury to passenger(s)/worker(s), or -Major unplanned disruption to airport operations, or -Serious incident, or -Deduction on the airport's ability to deal with adverse conditions	-Severe damage to aircraft and/or serious injury to passenger(s)/worker(s); or -Complete unplanned airport closure, or -Major unplanned operations limitations (i.e.. runway closure), or -Major airport damage to equipment and facilities	-Complete loss of aircraft and/or facilities or fatal injury in passenger(s)/worker(s); or -Complete unplanned airport closure and destruction of critical facilities; or -Airport facilities and equipment destroyed

# Severity Classifications for Airports

	Minimal 5	Minor 4	Major 3
Airport	No damage to aircraft but minimal injury or discomfort of little consequence to passenger(s) or workers	<ul style="list-style-type: none"> <li>-Minimal damage to aircraft, or</li> <li>-Minor injury to passengers, or</li> <li>-Minimal unplanned airport operations limitations (i.e. taxiway closure), or</li> <li>-Minor incident involving the use of airport emergency procedures</li> </ul>	<ul style="list-style-type: none"> <li>-Major damage to aircraft and/or minor injury to passenger(s)/worker(s), or</li> <li>-Major unplanned disruption to airport operations, or</li> <li>-Serious incident, or</li> <li>-Deduction on the airport's ability to deal with adverse conditions</li> </ul>

# Risk Matrix

Severity \ Likelihood	Minimal 5	Minor 4	Major 3	Hazardous 2	Catastrophic 1
Frequent A	Low Risk	Medium Risk	High Risk	High Risk	High Risk
Probable B	Low Risk	Medium Risk	High Risk	High Risk	High Risk
Remote C	Low Risk	Low Risk	Medium Risk	High Risk	High Risk
Extremely Remote D	Low Risk	Low Risk	Low Risk	Medium Risk	High Risk
Extremely Improbable E	Low Risk	Low Risk	Low Risk	Low Risk	High Risk *



# ACRP Report 131 – Appendix F Good Source for Determining Likelihood

## Typical Accident and Incident Rates

- Facilitating the SRA
- 18.3 Recording/Documenting the Proceedings
- Chapter 19 - SRA for Small Airports
- 19.1 SRA Planning
- 19.2 Conducting the SRA
- 19.3 Documenting the SRA
- Appendix A - SRM and the FAA
- Appendix B - SRM Handbook
- Appendix C - SRM Process Tools
- Appendix D - SRM Templates
- Appendix E - Preliminary Hazard Lists (PHL)
- Appendix F - Typical Accident and Incident Rates**
- Appendix G - Typical KPIs and Associated Data

Risk Category	Subcategory	Rate	Source	Data Period
Runway/Taxiway Incursion	Towered airports	2.5 runway/taxiway incursions per day in the U.S.	GAO, 2008	Partial data from 2008
	Towered airports	1 incursion per 167,000 operations	GAO, 2008	1998 to 2007
	Towered airports	1 collision per 37,500,000 operations	FAA, 2004	2000 to 2003
	Towered airports	1 fatality per 65,500,000 operations	FAA, 2004	2001 to 2003
Runway Excursion	Overrun - landing	1 overrun in 1,050,000 landings	ACRP Report 50, 2010	
	Overrun - takeoff	1 overrun in 4,120,000 takeoffs	ACRP Report 50, 2010	1982-2009
	Undershoot	1 undershoot in 4,160,000 landings	ACRP Report 50, 2010	1982-2009
	Veer-off - landing	1 veer-off in 840,000 landings	ACRP Report 51, 2010	1982-2009
	Veer-off - takeoff	1 veer-off in 3,860,000 takeoffs	ACRP Report 51, 2010	1982-2009



# Additional Observations

- Seems to be uncertainty on how to handle SRM Safety Assessment Screening for a major airport ALP update
  - How far do you go with safety risk assessment?
  - What kind of SRM is required for an ALP update?
  - Have been getting pushback that SRM should happen during project design phase
  - Fear that SRM process panel will get bogged down on a major Hub airport ALP and not get to the end

## When To Use An SRM Panel (continued)

- The Airports Org. Order 5200.11 states the following FAA approval actions **may** require an SRM panel:
  - Development of new or updated airport planning or design standards published in Advisory Circulars
  - **FAA approval of new or revised Airport Layout Plans**
  - Construction project coordination, review or approval of Construction Safety Phasing Plans
  - Approval of Modifications of Standards for airport planning or design
  - Approval of certain non-construction airfield changes (marking, signage, designation)





# Engagement of FAA and Key Stakeholders

- ➔ Panel Members Generally Good About Participating
  - Facilitator needs to be organized and get material out in advance
  - Need to identify purpose for, and type of SMEs needed so last minute substitutes come with proper knowledge and skills
  - Off site location (Hotel) with plenty of food works well in bringing and holding participants
- ➔ WebEx for Meeting can Help
  - Only for those who absolutely cannot be there
  - Provides a recording of proceedings that's especially helpful for completing report

# Summary

- ➔ Safety Management Assessment Process Seems to be Working Fairly Well
- ➔ Could Use Some Clarifications/Enhancements
  - Follow up white paper or ACRP Study on new lessons learned and best practices
  - FAA Clarifications on Safety Risk Assessments in the Planning Process