9-1-2011

Integrating Wildlife Hazard Management into a Safety Management System (SMS)

Wayne Clifton
ESIS, Inc.

Canadian Military Airport: New Risk Assessment Procedure
2:30 PM
Pierre Molina

A standard airport bird-hazard risk analysis process (ABRAP) is proposed by Transport Canada for civilian airports. It usually takes into account the risk associated with aircrafts, bird populations and their land-use around the airport. This method cannot be directly applied to military airports because of the different types of aircraft and because of their particular flight pattern. We developed a new risk assessment procedure suitable to Canadian military airports based on Transport Canada guidelines. Firstly, we advanced a ranking system to assess the bird strike hazard for every type of movement of each aircraft model. Secondly, we combined usual on-site bird sampling techniques with an innovative radar technology to monitor and survey bird populations at and around the airport. Land surveys permitted to identify bird species and abundance on the airport site, while the radar allowed to accurately map surrounding areas where birds mostly fly. Then, the landscape was characterized by remote sensing and photo-interpretation. By analysing flight patterns, bird surveys and landscape characteristics, we were able to produce regional bird strike hazard probability maps from which bird hazard zones can be generated for each aircraft type. In addition, airport managers can easily identify areas used by birds and have a better idea of the risk hazard relative to each kind of habitat. This methodology has the advantage to be based on quantitative information specific to the studied airport, resulting in a highly accurate tool for airports' safety management system (SMS).

Integrating Wildlife Hazard Management into SMS
3:00 PM
Amy Johnson and Wayne Clifton

A Safety Management System (SMS) is an organized approach to proactively managing safety. Jacksonville International Airport (JAX) was chosen as part of a FAA Part 139 SMS Implementation Study. One study task was to complete a risk assessment of wildlife hazards at their airport. Risk assessments, an important component of SMS, determine the need for new risk controls. Using two risk factors (likelihood and severity) and wildlife data collected at JAX throughout 2010, a risk assessment was completed that identified wildlife hazards, potential risk factors, and risk management strategies to be implemented for the future. By evaluating risk using a SMS risk matrix, JAX was able to identify critical controls and prioritize management strategies that will ultimately reduce risks associated with wildlife. The SMS team assessed risks for 24 different wildlife hazards located within the movement areas, on JAX property outside the movement areas, and on adjacent off-site properties. Of the 24 identified hazards, 17 were given a "High Risk" rating. These hazards include geese, feral hogs, coyotes, vultures, wading birds, raptors, etc. Based on these identified "High Risk" hazards, corrective actions were recommended and assigned to various airport departments for implementation. These recommendations will be included in the JAX wildlife management program. Moving forward, it is likely that all Part 139 airports will have to integrate their wildlife hazard management programs into a SMS. Using JAX as an example, wildlife coordinators at airports can learn how to integrate wildlife hazard management into SMS.

Perspectives On Private Sector Involvement In Airport Wildlife Hazard Assessments (WHAs): An Update
3:30 PM
Jay Tischendorf

The exhilarating realm of airport WHAs provides challenge and opportunity for private sector biologists/consultants seeking to expand their personal, professional and financial horizons. In the USA, federal money for WHAs is provided via contracts through individual airports. Oddly, the US Department of Agriculture, functioning as a private vendor, is able to compete with the private sector for these contracts. This situation is highly irregular in the USA marketplace. As a result, there is much consternation among the private sector, which feels that government competition for federal contracts is inappropriate and a violation of the free-enterprise system. This topic was broached at the 2010 Bird Strike Committee Meeting. This paper will provide further perspective and updates, citing the most recent examples in which WHA contracts have been awarded to USDA in order to highlight the subjectivity of current regulations and FAA and USDA oversight. The paper will also characterize the implications of recent changes to FAA guidance and regulations, as well as the entry of the Bureau of Alcohol, Tobacco and Firearms (BATF) into the regulatory picture. Finally, it will illuminate current FAA and USDA statistics on airport wildlife work and the short, mid, and long-range outlook for private sector participation in WHAs and abatement.

Vole Control Workshop

4:00 PM – 5:30 PM Oakes South Room
Gary Searing and Nick Atwell

This workshop will provide participants an opportunity to explore together current issues in small mammal management at airports including population control, habitat management, research needs and any other hot issues on the minds of participants.

Workshop attendance is limited. Please sign up at the Conference Registration & Information Desk located in the Foyer outside of the Exhibit Hall.

Integrating Wildlife Hazard Management into a Safety Management System (SMS)

Presented by: Wayne Clifton, ESIS, Inc.

Wednesday, September 14, 2011

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Objectives for Today

Goal: to provide an overview of the Risk Assessment process used to develop the wildlife risk assessment

Today's presentation will focus on:

- What is Risk and Risk Assessment?
- What are our Risks and Controls?
- How do we do Risk Management?

SMS - Risk Assessment / Management Process

Safety Risk Management Process Steps:

- Step 1- Describe the system – *Identify the safety significant activity;*
- Step 2- Identify the hazards;
- Step 3 - Determining the risk;
- Step 4- Assess and analyzing the risk;
- Step 5 -Treating the Risk
- Step 6 - Managing the Risk
- "*The manner in which SMS improves safety is by proactively managing risk.*" (JAA Safety Management System Manual)

Risk Ratings

Risk Rating	Definition	Examples
L(Low)	Mitigation may not be necessary	Controls such as elimination, substitution, isolation and barriers are still preferable, but these hazards may rely more on warnings, training and other devices that may require operator intervention.
M (Moderate)	Mitigate on a priority basis	Controls such as elimination substitution and engineering controls are preferable. If reliance on warnings and training, these should be redundant to additional controls, or additional barriers, guards and other protective devices. *(monitor controls based on severity levels)*
H (High)	Mitigation is required	Use controls or multiples of controls (defense in depth), such as elimination, substitution or engineering controls like interlocking barrier guards, controls with built in redundancies, physical devices that do not require adjustment or operator intervention, or provide positive, ongoing indicators of operation. *(monitor controls)*

Risk and Risk Factors

Risk is the Product of Two Factors:

- Likelihood
- Severity

Risk Matrix

Severity Levels	Likelihood Levels				
	A Frequent	B Probable	C Remote	D Extremely Remote	E Improbable
5 Negligible	Low	Low	Low	Low	Low
4 Minor	Moderate	Moderate	Low	Low	Low
3 Major	High	High	Moderate	Low	Low
2 Hazardous	High	High	High	Moderate	Low
1 Catastrophic	High	High	High	High	

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Severity Definitions Example

Criteria	Effect on **aircraft** and/or **operations**	Effect on **people**	Effect on airport **reputation** (corrective action response)	Damage to airport **assets**	Damage to Tenant **assets**
1	Negligible effect on aircraft or airport operations.	Inconvenience, Nusiance	One time impact, no lasting repurcussion	Damage is less than $5,000	Damage is less than $5,000
2	Reparis to aircraft, vehicles or equipment can be done on-the-spot. Operational Delays to one flight	Physical discomfort, first aid	Loss of community reputation and/or airport only stakeholder involvement	Damage between $5,001 and $50,000	Damage between $5,001 and $50,000
3	Damaged aircraft, equipment or vehicles requiring them to be taken out of service for more than one day. Delays to a few flights. Shut down of runway.	Physical distress possibly including injuries	Loss of state/regional reputation and or multiple stakeholders and state agencies.	Damage between $50,001 - $1,000,000	Damage between $50,001 - $1,000,000
4	Extensive repairs or replacement of aircraft, equipment or vehicles. Delays to multiple flights and airlines. Shut down of of more than one runway.	Severe Injury or Fatality	Loss of national reputation and or multiple stakeholders involvment, impact on operating certificate.	Damage between $1,000,001 - $10,000,000	Damage between $1,000,001 - $10,000,000
5	Alert 3, hull loss, or other event resulting in shut down of airport.	Multiple fatalities	Loss of international reputation.	Damage exceeds $10,000,000	Damage exceeds $10,000,000

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Likelihood Definitions Example

Quantitative (occurrence)				
A	B	C	D	E
Improbable	Extremely Remote	Remote	Probable	Frequent
(<1x/100yrs.)	*(1x/10-100yrs.)*	*(1x/1-10yrs.)*	*(1x/month)*	*(1^{+}x/week)*
Qualitative (exposure)				
Performed by only a few people	**Performed by staff or a single entity**	**Performed by some departments and tenants, one or two subcontractor personnel**	**Performed by most departments/Tenants, Limited contractors**	**Performed by airport, by tenants, vendors, and contractors**
Seldom performed	Performed a few times a year	Performed less than 1X/wk	Performed a few times a week	Performed at least every day

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Cause and Effect

Hazard: Any real or potential condition that can cause injury, illness, or death to people; damage to or loss of a system, equipment, or property; or damage to the environment.

Cause: Events that lead to or result in a hazard or hazardous condition

Effect: Outcome or harm of a hazard for a given system state

“Worst CREDIBLE Outcome”

POSSIBLE

Vs

CREDIBLE

Step 2: Hazard Categories

Hazard Sources Are Broad; Some Not Obvious:

A. ***Energy/Forces/Pressurization/Vibration:*** *What forces are present that can contribute to accidents? Jet blast? Jetbridge tires under pressure? Electrical hazards (shock, fire, static, power loss to critical safety equipment/airfield lighting)?*

B. ***Mechanical****: Can one strike an object or be stricken by a moving object? Vehicles/construction equipment? Being caught in, on, or between (Baggage handling equipment)?*

C. ***Structural****: What results from failure of the structure? Runway/taxiway/ramp? Buildings?*

D. ***Substances****: What chemical or substances pose a threat? Fueling? Toxic substances?*

E. ***Surroundings****/Physical Layout/Geographic Limitations: Always consider airfield dynamic movements as accident potentials; aircraft taxing/takeoff/landings. Geographic limitations affect airfield design, safety areas, approach and landings, wildlife habitat.*

F. ***Environmental : Wildlife is an example of e****nvironmental facto. Others include weather factors contribute to hazards? Winter events? Fog? Noise? Rain? Wind, etc.?*

Cause

This is the actual event that needs to be controlled.

For example, for Wildlife, a partial list can include:

- **Deer on the runway;**
- **Lake near safety area that attracts birds;**
- **Dead armadillo left on taxiway.**

Hierarchy of Controls

Hierarchy of Controls:

Elimination is most effective; PPE is least

Training

Table .1.3 Control Selection	
Controls	**Examples**
Elimination (including Frequency)	Eliminate the need to replace lighting as often (like LED Runway lights) Preclude human interaction (Perimeter road to avoid crossing active taxiways) Eliminate pinch point (increase clearance) Automated materials handling (forklifts, scissors lifts) Eliminate tool or process (like automated generator-set).
Substitution	Replace with less hazardous compound Replace items; reduce steps (Solar-powered barricade flashers) Reduce time on Site
Engineering	Project planning Planning airfield geometry Fencing, Platforms & guardrails – Terminals & Parking Lift tables, conveyors, tool balancers SMGCS (Surface Movement Ground Control Systems)
Warnings	Signs, Backup alarms, Beepers, Horns, Labels
Administrative	Work procedures, safety inspections **Training** Worker rotation (Especially during winter operations) Radio communications
Personal Protective Equipment (PPE)	Reflective vests Ear protection, gloves, respirators Safety glasses, face shields Safety harnesses and lanyards Protective Clothing

Risk Reduction Options

Elimination

Substitution

Only controls that can affect Severity

Automation

Engineering Controls

Better tools

Early warning

Training

Rotation

Risk Mitigation Options

We need to implement effective and appropriate risk mitigation plans to mitigate or eliminate hazards

- Control (using your Hierarchy of Effectiveness and Defense in Depth)
- Management Systems (Organizational Controls)
- Avoidance
- Transfer
- Assumption

Risk control is the option most often used and preferred

Objectives for Today

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Today's presentation will focus on:

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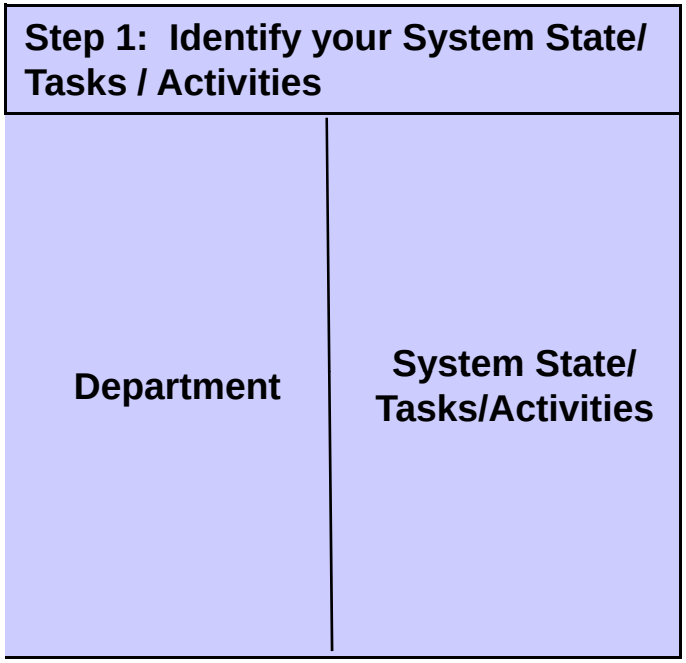
- What does the existing data tell us
- What are Risks and Controls
- How do we do Risk Management

Step 1: ID System State/ Tasks or Activities

Let's look at the Risk Assessment



What are the "System States" or what are the hazards that impact the operations?

SRA: Step 2 - ID Hazards

Step 2: Identify your Hazards and Threats				
Hazard Category (What could go wrong)	Hazard Aspect (Types)	Cause	Effect / Scenario / outcome	Part 139 Task Applicability

Let's look at the Risk Assessment

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SRA: Steps 3 and 4

Step 3: Identify your Controls		Controls: Refer to Part 139 if Applicable (place an "X" if a control exists.)				Step 4: Determine Risk Factors and Evaluate Risk				
Preferred Controls		Less Effective Controls								
Controls: Elimination/Substitution	Controls: Engineering	Controls: Warnings	Controls: Administrative/procedures/training	Controls: Personal Protective Equipment (PPE)	Description of Controls	Residual Severity		Residual Probability		Residual Risk Total

Let's look at the Risk Assessment

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Step 5: Treat Risk

Effectively treating risk involves

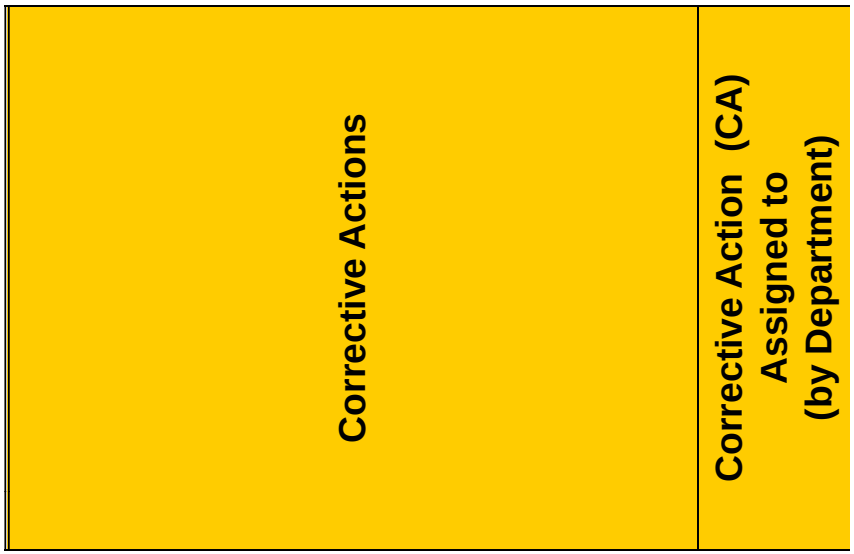
- Identifying feasible mitigation options
- Selecting best balanced response
- Developing risk treatment plans
- Implementing and verifying
- Monitoring the effectiveness of the mitigation

Step 5: Mitigation
Corrective Action and Implementation

Problem	Corrective Action	Owners	Due Date	Completion Date/ Status
	Task 1: Total perimeter fencing for construction area.			
	Task #2: Sweeping truck routes twice per day to control FOD?			
	Task #3: Monitor use of escorts for construction vehicles?			

SRA: Step 5

Corrective Actions



Let's look at the Risk Assessment

Step 6: Risk Management and Risk Reduction

Step 6 Risk Management and Risk Reduction					
Critical Control (Y if Residual Severity is Catastrophic or Serious, or if Residual Risk is High)	**Describe the Critical Control?** (add to inspection, testing or observation)	**Critical Control Owner** (by Title)	**Control Category** (based on Corrective Action)	**Hierarchy/Defense in Depth Met** (If No, then add additional controls via CAs is Step 5)	**Risk Reduction Target**

Risk Management:

Conformance to using or following Critical Controls

Ensuring Preferred Controls or Defense in Depth is in place

Risk Reduction = Continuous Improvement:

Establishing Goals to add better/more controls based on your Risk Priorities

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Step 6: Identify Critical Controls

Residual Severity	Residual Probability	Residual Risk Total	Critical Control	Describe the Critical Control? (add to inpsection, testing or observation)	Critical Control Owner (by Title)
M	L	M	N	Enclosure of electrical junctions.	Maint
C	L	H	Y	Training	Security
S	L	H	Y	Flight Path. Clearance areas.	Tower

If Residual Severity is

- S=Serious or
- C=Catastrophic

If Residual Risk is

- High

Then Control is "Critical"

(Other Controls may be Critical, based on Assessor's judgment)

Assign Critical Control Owners

Require "Failure Rate Metrics" from them periodically

Validate through inspections and observations

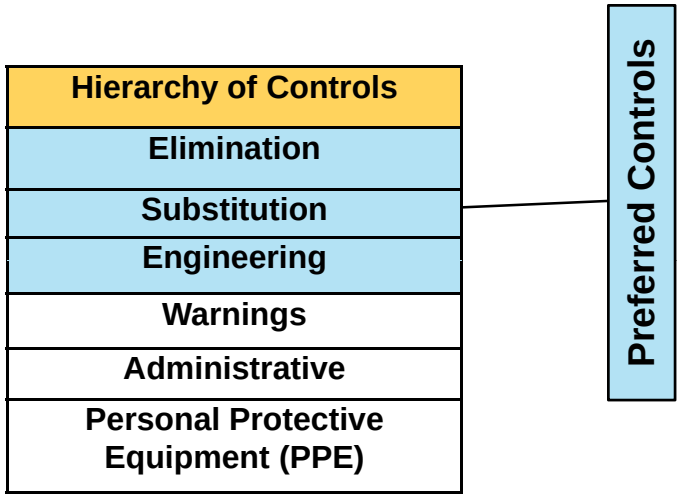
Hold them accountable for maintenance & long-term controls

Control Selection – Preferred Controls and Defense in Depth

If The <u>Preferred Controls</u>

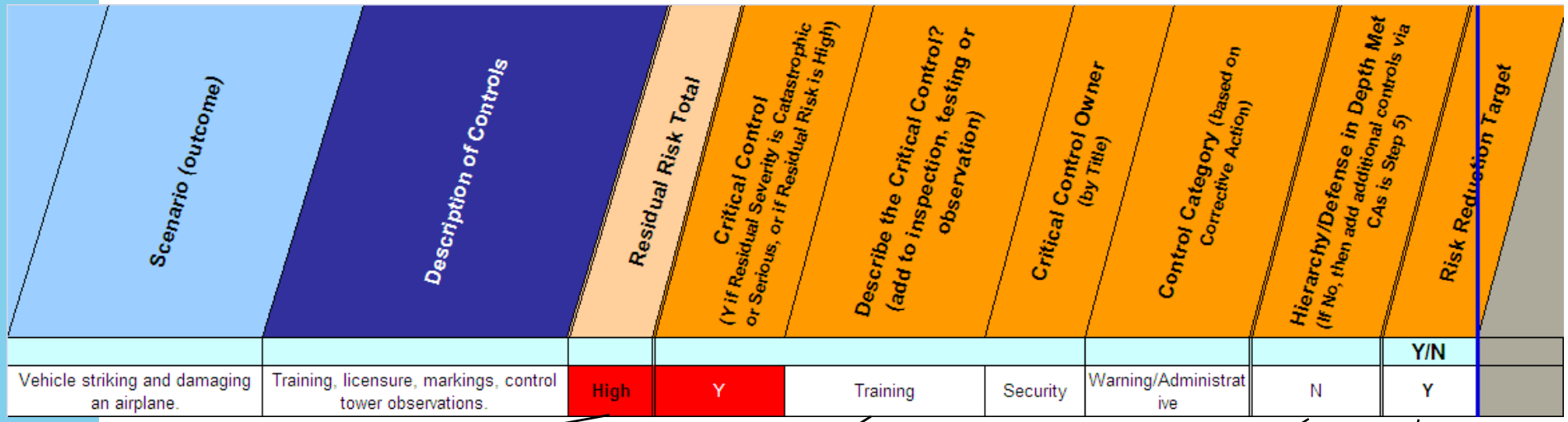
- Elimination,
- Substitution or
- Engineering

are not feasible, or the risk is high, then additional and multiple controls (Defense in Depth) should be identified to control the Risk!



For example: (See next page)

Hierarchy/Defense in Depth Control Verification



Scenario (outcome)	Description of Controls	Residual Risk Total	Critical Control (Y if Residual Severity is Catastrophic or Serious, or if Residual Risk is High)	Describe the Critical Control? (add to inspection, testing or observation)		Critical Control Owner (by Title)	Control Category (based on Corrective Action)	Hierarchy/Defense in Depth Met (If No, then add additional controls via CAs is Step 5)	Risk Reduction Target
								Y/N	
Vehicle striking and damaging an airplane.	Training, licensure, markings, control tower observations.	High	Y	Training	Security	Warning/Administrative		N	Y

"High" Residual Risk

Training is a "Less Effective" control

Additional Controls are expected (H/DiD not Met)

Either Identify better/more controls or set this Action as part of your Annual SMS Goal Setting

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Risk Reduction

Safety Management System and Risk Management philosophy both include the concept of:

- **Continuous Improvement**

This means ongoing efforts should continually be looking for opportunities to improve or *REDUCE RISKS.*

Set targets for risk reduction, ether by developing

- Corrective Actions for additional controls and or
- SMS Goals to investigate, fund etc. additional controls