Aviation SMS Exposure – How to Measure Risk?

Considerations by Sofema Aviation Services (SAS) www.sassofia.com

Introduction

Let's start by considering in simply terms what me mean by Risk?

Let's start with a Hazard which is essentially anything which has the potential to cause harm in some way, then to add that Risk is a measure of how likely such a Hazard will actually manifest and if it does how much it will hurt us, and this is it!

We use terms like

- Likelihood
- Severity
- Tolerability (How much pain can the organisation accept) and
- Visibility (How Likely we would discover the exposure through normal work behaviours – independent from our SMS activities)

Measuring Risk

As part of the development of an EASA compliant Safety Management System an essential benefit will require the development and continuous monitoring of a Risk Register.

A risk register is a crucial part of your approach to managing these risks. It's a tool to help you identify, assess, and record your risks and the actions you're taking to eliminate or minimize them.

To support the development of an effective risk register the following generic risks have been documented as a starting point to support the development of your risk register.

1 Limited or lack of management commitment – Management do not demonstrate support for the activity 2 Lack of or incomplete description of roles, accountabilities and responsibilities 3 Limited or lack of resource availability or planning, including staffing 4 Lack of or ineffective policies	19 Lack of or poor or inappropriate materials/equipment acquisition decisions 20 Lack of, poor staffing recruitment/assignment (Note: Staff should be hired or assigned according to organizational needs but also according to their skills, qualifications and abilities. An employee with the wrong skill set can be a hazard. This includes management. Related to Documentation Process and Procedures	36 Over saturation of digital information 37 Lack of or poor airworthiness verification 38 Lack of or poor verification of equipment and instruments necessary to a particular flight or operation 39 Lack of, incorrect or incomplete aircraft performance limitations verification

5 Incorrect or incomplete procedures including instructions 6 Lack of or poor management and labor relationships 7 Lack of or ineffective organizational structure 8 Poor organizational safety culture 9 Lack of or ineffective safety management processes (including risk management, safety assurance, auditing, training and resource allocation) 10 Lack or ineffective audit procedures 11 Lack of or limited resource allocation 12 Incorrect or incomplete or lack of training and knowledge transfer. (Note: Training should reflect the needs of the organization. (Accidents have shown that inadequate training is a hazard and may even lead to accidents.) 13 Unofficial organizational structures Note: These structures may be of a benefit but also may lead to a hazard. 14 Growth, strikes, recession or organizational financial	21 Incorrect, poor or lack of internal and external communication including language barriers 22 Lack of, incorrect or incomplete manuals, or operating procedures (including maintenance) 23 Lack of, incorrect or incomplete employee duty descriptions 24 Lack of, incorrect, incomplete or complicated document update processes 25 Lack of, incorrect or incomplete reports and records 26 Lack of, incorrect or incomplete control of necessary documents for personnel (licenses, ratings, and certificates) Related to Human Circumstances 27 Heart attack, Stroke, Kidney stone, Seizure 28 Nausea, Diarrhea, Carbon monoxide, Medication, Fatigue 29 Influenza, Upper Respiratory Tract Infection (TI), Urinary TI 30 Color vision, Visual field limitations, Mobility limitations, Colostomy bag, Hearing loss	40 Lack of, incorrect or incomplete flight planning 41 Poor fueling processes 42 Lack of or poor aircraft dispatch or release 43 Lack of or poor maintenance release 44 Incorrect cargo loading and distribution 45 Improper or unauthorized hazardous materials carriage 46 Poor cargo and baggage stowage 47 Incorrect information on cargo or baggage loaded 48 Improper stowage of carry-on baggage 49 Improper weight and balance calculations 50 Use of obsolete documents 51 Absence of or incorrect flight and cabin crew manuals or charts on board 52 Improper response to flight route changes 53 Lack of, or poor crew resource management 54 Lack of or poor flight following

distress Mergers or acquisition 15 Changes, upgrades or new tools, equipment, processes or facilities 16 Incorrect or ineffective shift/crew member change over procedures 17 Changes or turnover in management or employees 18 Informal processes (Standard Operating Procedures)	31 Fatigue (lack of sleep), Alcohol and substance abuse, Medications, Complacency 32 Financial, Birth of child, Divorce, Bereavement, Challenging timelines, Inadequate resources 33 Inflight turbulence cabin crew injury, injury caused to personnel during ground aircraft operations or luggage handling 34 Jet lag, Paint shop, Solvents, Chemical/Biological exposures, Noise, Vibrations, Distractions 35 Human factors related to design, manufacturing, maintenance and operations.	55 Improper execution of procedures in all flight phases 56 (including taxiing and parking) 57 Inadequate or complicated procedures 58 Equipment and instruments necessary for a particular flight or operation not available or malfunctioning 59 Lack of, or poor communication (ATC, ramp, maintenance, flight Ops, cabin, dispatch, etc.) 60 Language barriers (Multiple languages)

In addition, you can use the generic ICAO 5 x 5 Risk Matrix or use the SAS recommended Tool to assess exposure by calculating the Event Risk Classification.

https://sassofia.com/wp-content/uploads/2021/02/Building-a-CAMO-Risk-Register-in-an-EASA-Compliant-Safety-Management-System.docx

Risk probability	Risk severity				
	Catastrophic A	Hazardous B	Major C	Minor D	Negligible E
Frequent 5	5A	5B	5C	5D	5E
Occasional 4	4A	4B	4C	4D	4E
Remote 3	3A	3B	3C	3D	3E
Improbable 2	2A	2B	2C	2D	2E
Extremely improbable 1	1A	1B	1C	1D	1E

Assessment risk index	Suggested criteria
5A, 5B, 5C, 4A, 4B, 3A	Unacceptable under the existing circumstances
5D, 5E, 4C, 4D, 4E, 3B, 3C, 3D, 2A, 2B, 2C	Acceptable based on risk mitigation. It may require management decision.
3E, 2D, 2E, 1A, 1B ,1C, 1D, 1E	Acceptable

Performing an Assessment

For each of the items identified in the table perform a risk assessment and ask the questions which help you determine the level of exposure that currently exists in your organisation by asking for each item the following 6 questions.

- Is this an issue in our organisation?
- If it is not considered an issue, how can I demonstrate – where is the evidence?
- How can I measure the effectiveness of the current process?
- How effective is the documentation/training?
- If there are changes in this element how effective would the system accommodate the changes?

Severity	Probability			Risk Class	Detectability			Risk Measure
	Lo	Med	Hi		Hi	Med	Lo	
Hi	4	7	9	Class 1	4	7	9	Hi
Med	3	5	8	Class 2	3	5	8	Med
Low	1	2	6	Class 3	1	2	6	Low

Severity	Severity is a measure of how much the event will hurt the business
Probability	Probability is a Measure of How likely it will happen
Detectabilty	Detectability is a Measure of How likely we will be able to identify the exposure before the event
Tolerability	Is a measure of how resilient the organisation would be to an occurrence of this event

Step 2

Risk Measure	Tolerability			Action Required	Event Risk Clasification	
	Hi	Med	Lo			
Hi	4	7	9	Urgent Action	Hi Range 7x7x7 = 343	9x 9 x 9 = 729
Med	3	5	8	Management Review	Med Range 4x4x4=48	6x6x6 = 216
Low	1	2	6	Monitor	Lo Range 1x1 x1 =3	3x3x3=27

Next Steps

Sofema Aviation Services (SAS) Provides Safety Management System Consultancy, Classroom, Webinar and Online Training including the following course
https://sassofia.com/course/sms-safety-risk-management-3-days/

Please see our websites www.sassofia.com and www.sofemaonline.com or email team@sassofia.com