



**EASA**  
European Aviation Safety Agency

# Reviewing risk assessment and hazard logs

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# Back again.....





# Objectives



- Structure of a risk assessment
- Bow Tie, ERC and SIRA
- Hazard log structure and consistency
- Link between hazard log and risk assessment
- Examples



NEW MiNDSET

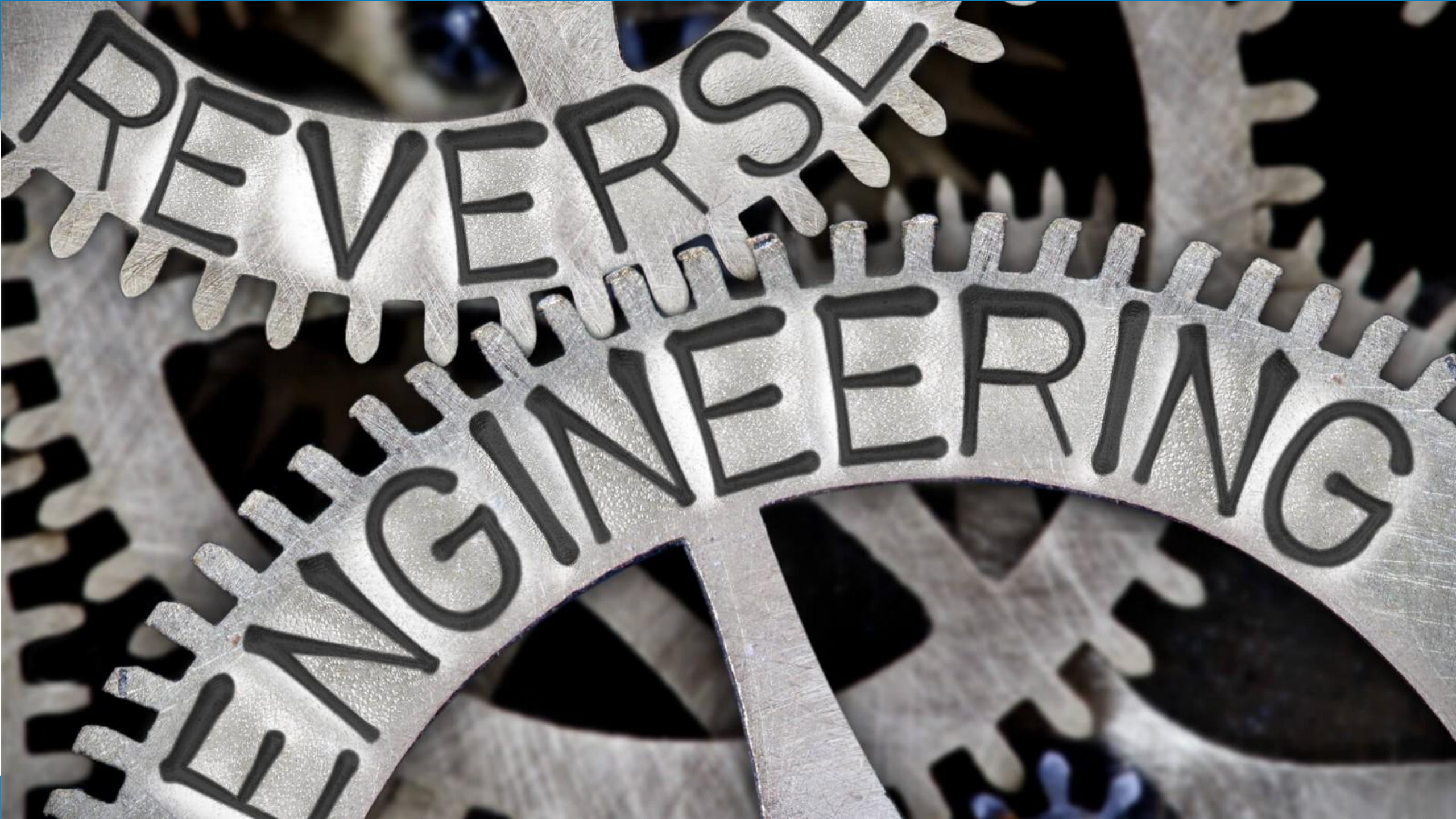


NEW RESULTS





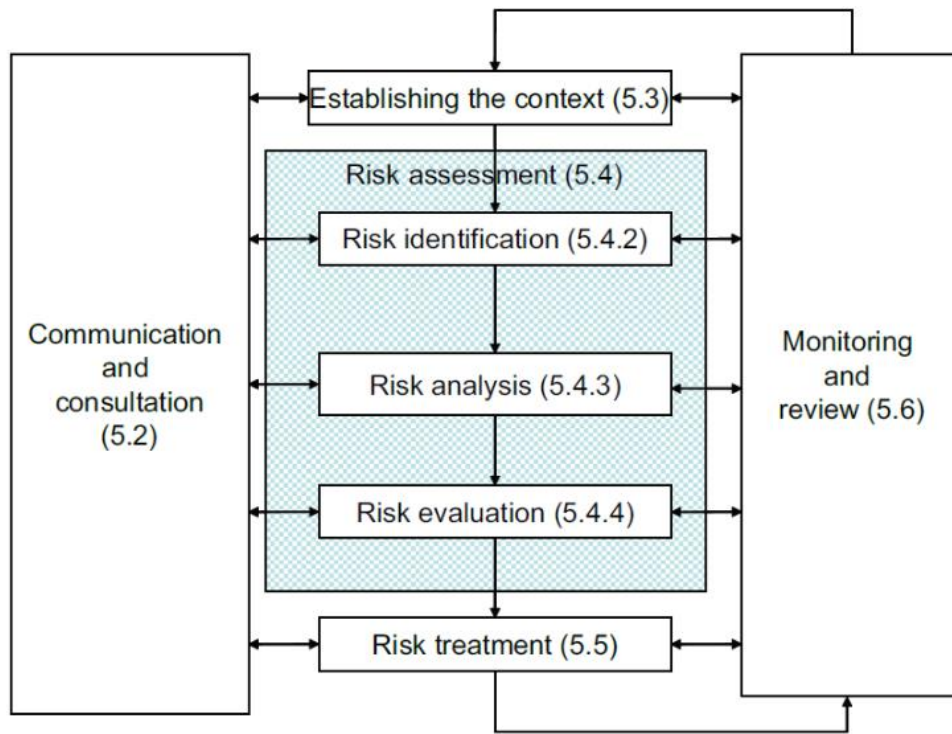




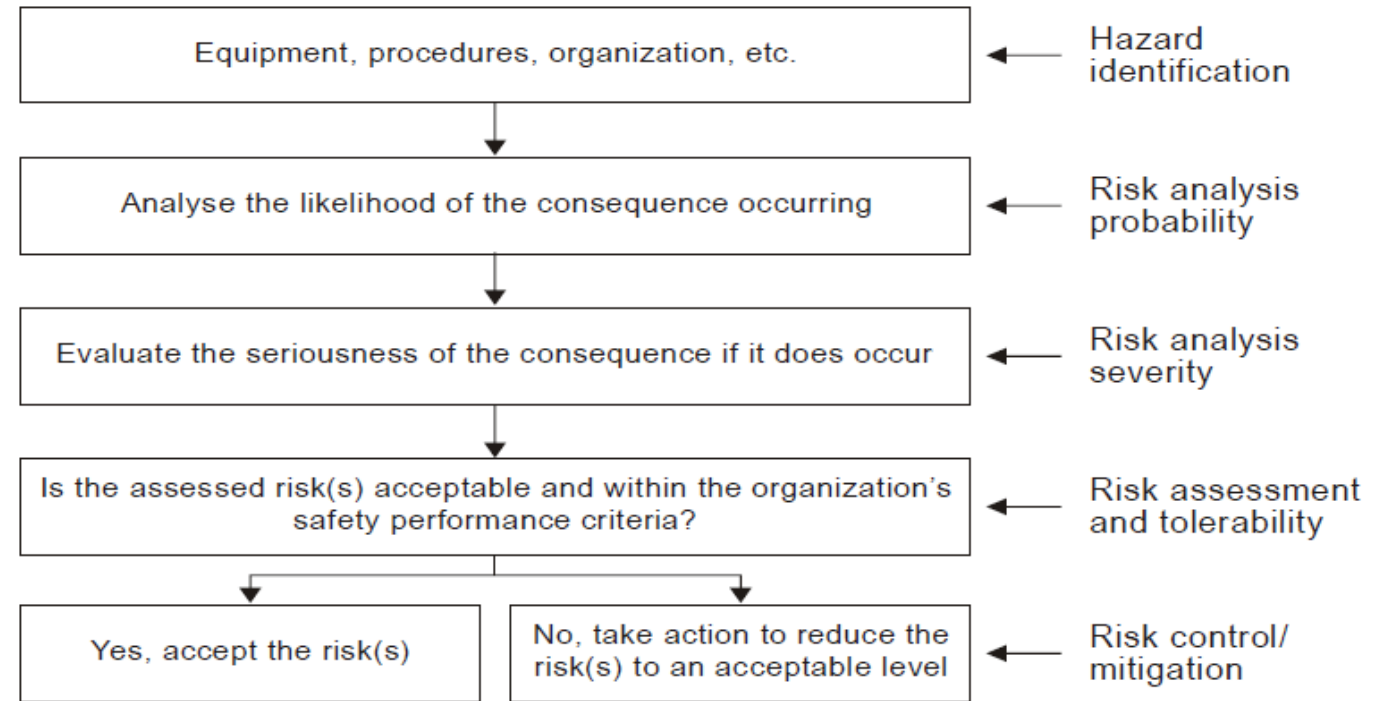
REVERSON  
ENGINEERING



# Safety Risk Management process



ISO 31000



ICAO Doc 9859 Ed.3

**Modelling of risk**





Bow Tie Yes or Bow  
Tie No





# Modelling Risk

## Using BOW TIE

### Assess Risks

*Simple and elegant methodology  
Qualitative approach to risk assessment*

### Manage Risks

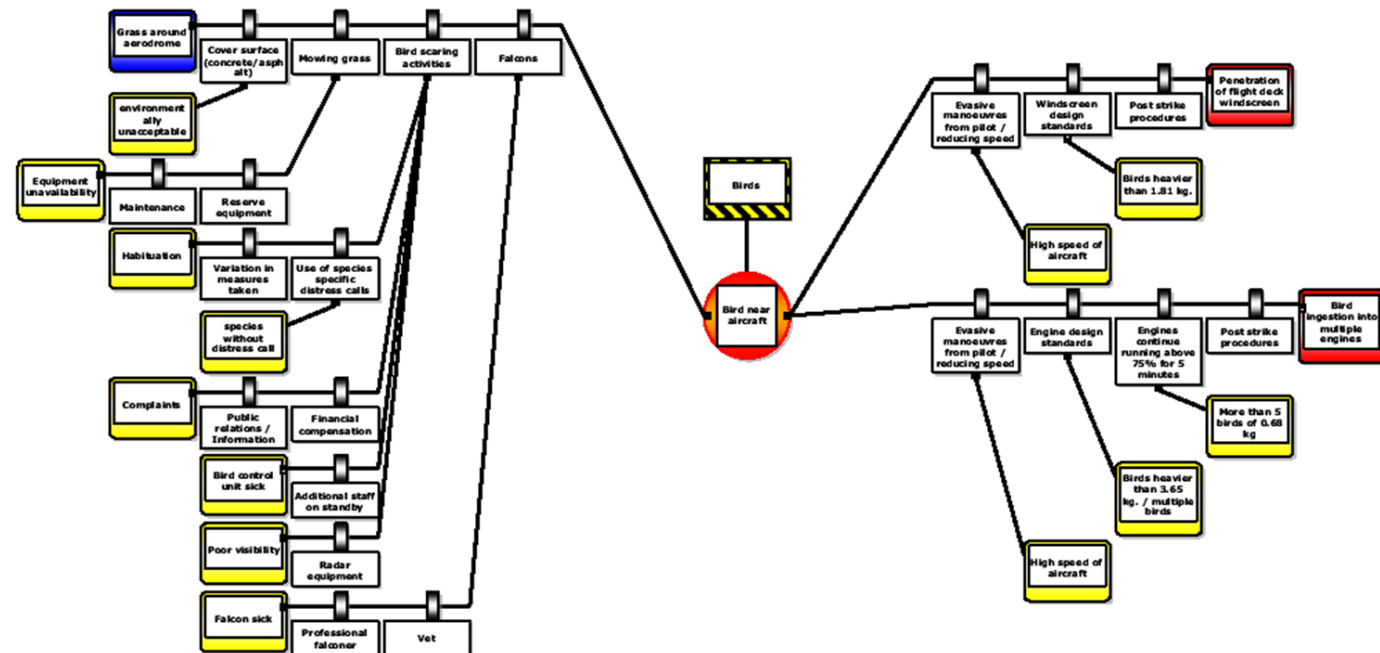
*Integral risk management  
Focus on how risks are managed*

### Communicate Risks

*Easy to understand at all levels of the organisation  
No need for thick reports  
A bow tie model summarises complex risk issues*

### Audit Risks

*Easy auditing tool  
Welcomed by regulators*





ARMS  
ERC & SIRA



# Concept of ERC

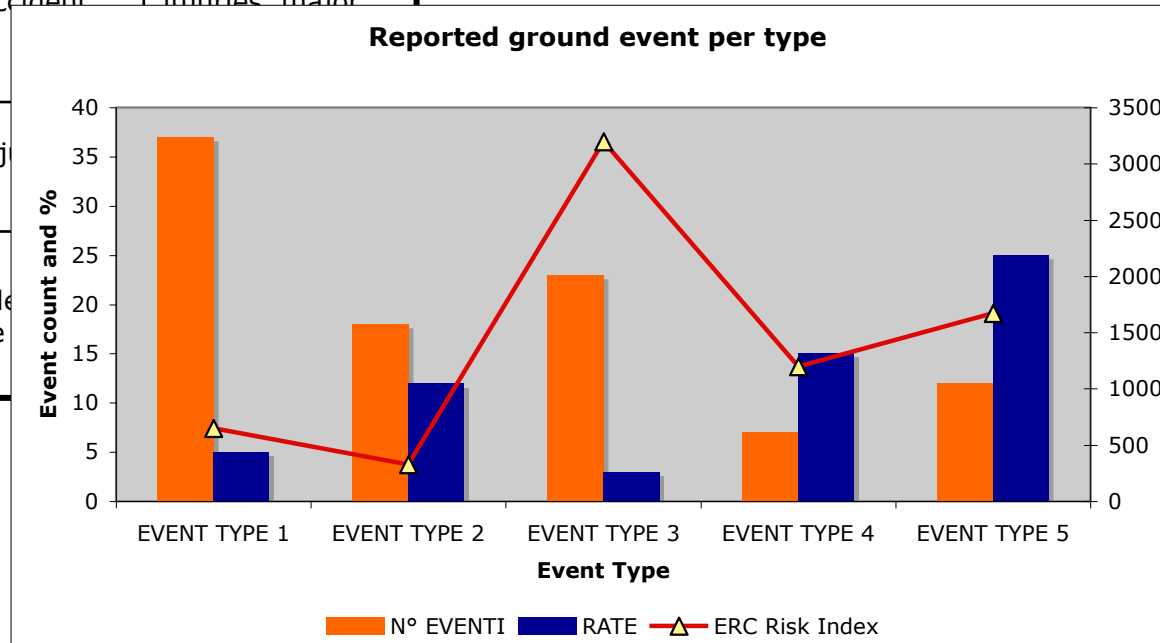
What was the effectiveness of the remaining barriers between this event and the most credible accident scenario?

Effective	Limited	Minimal	Not effective
50	102	502	2500
10	21	101	500
2	4	20	100
1			

If this event had escalated into an accident outcome, what would have been the most credible outcome?

Catastrophic Accident	Loss of aircraft or multiple fatalities (3 or more)
Major Accident	1 or 2 fatalities, multiple serious injuries, major damage
Minor injury damage	
No accident outcome	

The main objective of Event Risk Classification is to act as the first screening of all incoming safety data.



N° EVENTI

EVENT TYPE 1	37
EVENT TYPE 2	18
EVENT TYPE 3	23
EVENT TYPE 4	7
EVENT TYPE 5	12

ERC Risk Index

EVENT TYPE 1	650
EVENT TYPE 2	325
EVENT TYPE 3	3200
EVENT TYPE 4	1200
EVENT TYPE 5	1670





# Concept of SIRA



Define and scope the Safety Issue properly :

- Safety Issue Title
- Description of Hazard(s)
- Description of related accident scenario(s)
- A/C types considered
- Locations considered
- Time period under study
- Departments whose involvement in the assessment is necessary



# Risk assessment equation



$$\mathbf{RISK = SEVERITY \times LIKELIHOOD}$$

RISK is assessed using a formula with 4 factors:

1. Frequency/likelihood of triggering event
2. Effectiveness of the Avoidance Barriers
3. Effectiveness of the Recovery Barriers
4. Severity of the most probable accident outcome



# Hazard Log





# Why do we need an Hazard log/Risk register ?

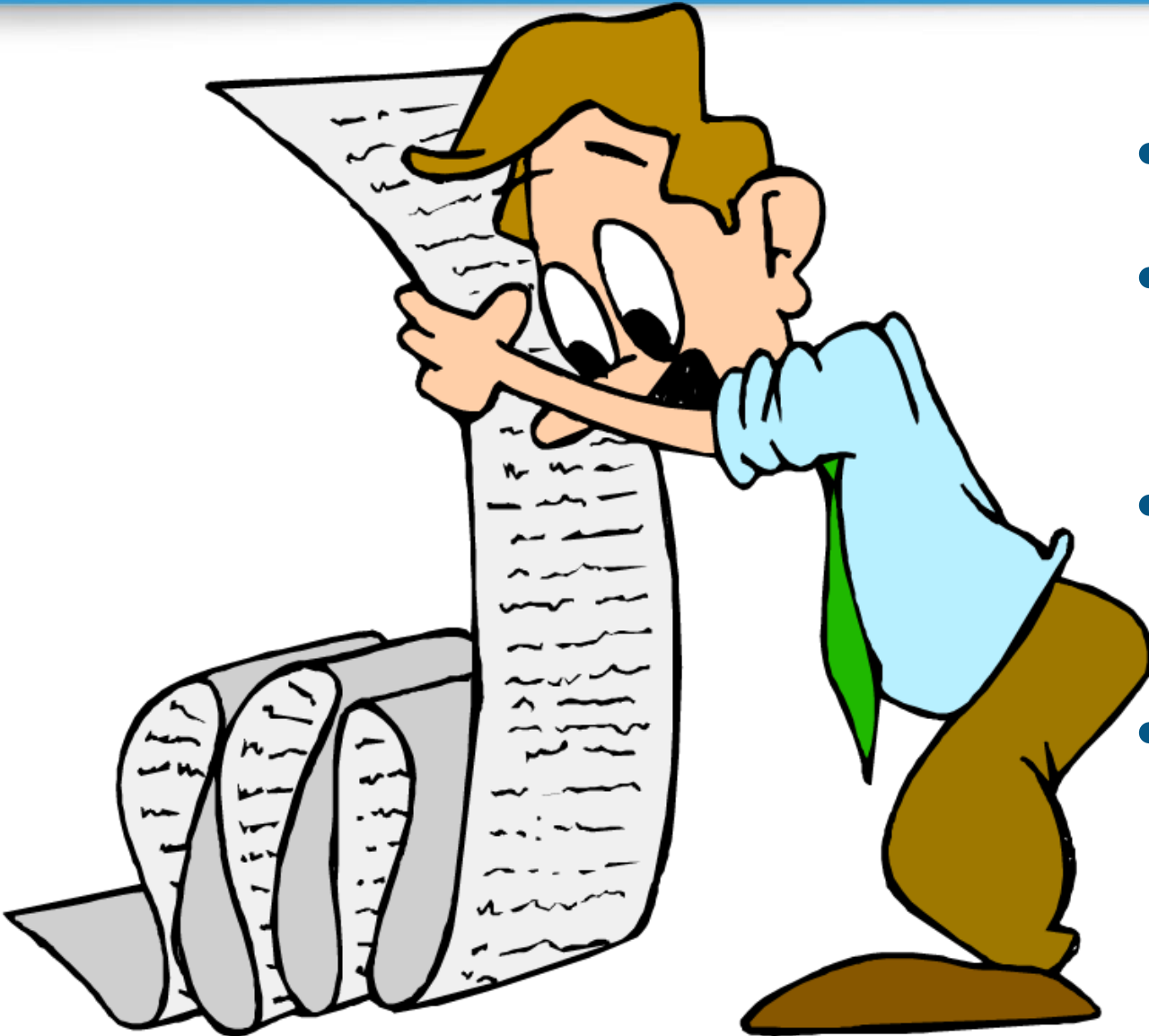
Regulation (EU) 965/2012 on air operations

Annex III – Part-ORO  
ORO.GEN

Hazard		Incident Sequence Description	Existing Controls	Outcome (Pre-Mitigation)			Additional Mitigation required	Outcome (Post-Mitigation)			Actions and Owners	Monitoring and Review Requirements
No.	Description			Severity	Likelihood	Risk		Severity	Likelihood	Risk		



# Not an endless - useless list



- List identified consequences
- All the consequences as to be risk assessed
- All the identified hazards need to be managed
- Hazard/Risk register must be updated (including already identified hazards)



# Preaching alone







EXAMPLES

Airliner / Department & Exact Location Of The Work Performed: [REDACTED] Airlines / All / [REDACTED] (ACMI Contracted Activities)				Project / Work Description: [REDACTED] Airlines Wet Lease In [REDACTED]			
Risk Assessment Team (Name/s): [REDACTED]				Approved By Supervisor / Reporting Officer: [REDACTED] Compliance Monitoring Manager [REDACTED]			
Date Conducted: 16/10/2017		Next Review Date: after first six months of operation or if any incident occurred		(Name, Date & Signature) 16/10/2017			

Hazard Identification				Risk Evaluation				Risk Control					
1a.	1b	1c.	1d.	2a.	2b.	2c.	2d.	3a	3b	3c	3d	3e	3f
S/N	Work activity	Hazard	Possible Accident/ Ill health to persons, fire or property loss	Existing Risk Control	Severity	Likelihood	RPN*	Additional Risk Control Measures	Severity	Likelihood	RPN*	Follow up by (name) & date	Remarks
1	Flight Operations	Reduced flight Operations safety standards	Possible incident or accident	Internal safety system in place	3	2	6	Audit performed at flight operation department to ensure that meet the minimum requirement. [REDACTED] CAA statement issued to verify the [REDACTED] standards	3	1	3	N/A	Will be reviewed in cause of an incident happens
2	Crews training	Reduced flight Operations safety standards	Reduced crews capability. Possible incident or accident	Training Department has been established	3	2	6	Audit performed at flight operation department to ensure that meet the minimum requirement. [REDACTED] CAA statement issued to verify the [REDACTED] standards	3	1	3	N/A	Will be reviewed in cause of an incident happens
3	Flight Duty Limitations	Performances Excessive fatigue	Decision delay and or wrong decisions	Defined working hours and flight time limitations in the Flight Operation Manual of [REDACTED] Airliner [REDACTED] has more strick limitations than EASA requirements	3	1	3	N/A			0	N/A	N/A
4	Maitenance operation	Airworthiness condition	Inadequate Airworthiness condition	[REDACTED] airliner aircraft are in controled maintenance enviroment and maitening by EASA Approved Part 145	3	1	3	N/A			0	N/A	Will be reviewed in cause of an incident happens
5	A/C configuration	Different A/C configuration, i.e. cockpit layout, loading, minimum / maximum mass	Wrong decisions	Training Organization - Only operation with [REDACTED]s,	1	4	4	It will be used only one aircraft for [REDACTED] operation	1	2	2	N/A	Will be reviewed in cause of an A/C configuration variation will be exists
6	Proper Airliner certification	Reduced safety standards	Possible incident or accident	[REDACTED] is approved by [REDACTED]	4	3	12	[REDACTED] gain [REDACTED] Athorization. [REDACTED] statement issued to verify the [REDACTED] standards	2	2	4	N/A	Will be reviewed in cause of an incident happens
7	Maitenance operation	Not sufficient line maintenance	Inadequate Airworthiness condition	[REDACTED] aircraft is maintaining by Approved EASA Part 145 Organizations	2	2	4	N/A			0	N/A	Will be reviewed in cause of an incident happens



## 2. Aircraft performance calculations

### 2.1. Evaluate aircraft operation limits at hot temperatures ( Closed )

Worst possible consequence / Impact of change:	All a lot of baggage are offload from the flight. or Overload if it is allowed to take too much baggage.	
Risk	Initial	Residual
Severity of risk:	Moderate	Moderate
Risk probability:	Repeated per 3000 FH	Repeated per 3000 FH
Risk level:	acceptable	acceptable
Risk should be:	terminated	
Risk mitigation:	Please contact our aircraft performance provider to make another calculations.	
Due date:	2017-08-25	
Responsibles:	[REDACTED]	
Mitigation actions:		
[REDACTED]	mitigation actions are acceptable	
2017-09-15 10:21		



For the risk assessment above, the following risks have been identified:

## Risks Identified

Key	Status	Summary	Undesirable Event	Contributing Factors	Reporter	Created	Initial Risk Score	Mitigation Strategy	Due	Re Ris Sc
[REDACTED]	PREL. ASSESSED	Training and qualification	No appropriate for the approval of the Form 4	-Lack of training -Lack of records -Lack of technical background	[REDACTED]	Nov 08, 2018	22	-The appointed Director Quality has extensive experience from the department, and been involved in all strategic changes and development over the last few years. -The Deputy at the department has technical background and will be supporting in the oversight of this area.		3
[REDACTED]	PENDING IMPLEMENTATION	Workload	Workload associated with additional tasks are not adequately known or quantified	Short notification of change and additional tasks.	[REDACTED]	Nov 08, 2018	102	-Assign additional manpower from [REDACTED] designated to work with [REDACTED] -The current Deputy will continue in his present position. -The nominated Director Compliance has 4,5 years of experience from the Compliance department is considered to have the qualifications required for the task.	Nov 08, 2018	2

2 issues



	No effect	Minor	Major	Hazardous	Catastrophic
Frequency class	Inconvinience	Discomfort	Minor Injuries (Sick leacve up to 3 month)	Serious injuries, few fatalities. (Sick leave more than 3 month. Disabilities/death)	Several serious injuries and facilities.
Frequent	Review 24	Review 103	Unacceptable 502	Unacceptable 1001	Unacceptable 2500
Occaisional	Acceptable 10	Review 23	Review 102	Unacceptable 501	Unacceptable 1000
Remote	Acceptable 6	Acceptable 9	Review 22	Review 101	Unacceptable 500
Exremeliy Remote	Acceptable 3	Acceptable 5	Acceptable 3	Review 21	Review 100
Extremely Improbable	Acceptable 1	Acceptable 2	Acceptable 4	Acceptable 7	Review 20
No action required. Contributes to Safety database.		More refined RA and/or investigation required		Immediate action & further investigation required	



- New mind-set “Inspector 2.0”
- Challenge – YOU need to be satisfied
- Bow Tie vs ARMS
- DO NOT measure SMS effectiveness using as a parameter the number of hazards identified



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**Thanks for your attention**

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