



Risk Assessments

Not Just an opinion

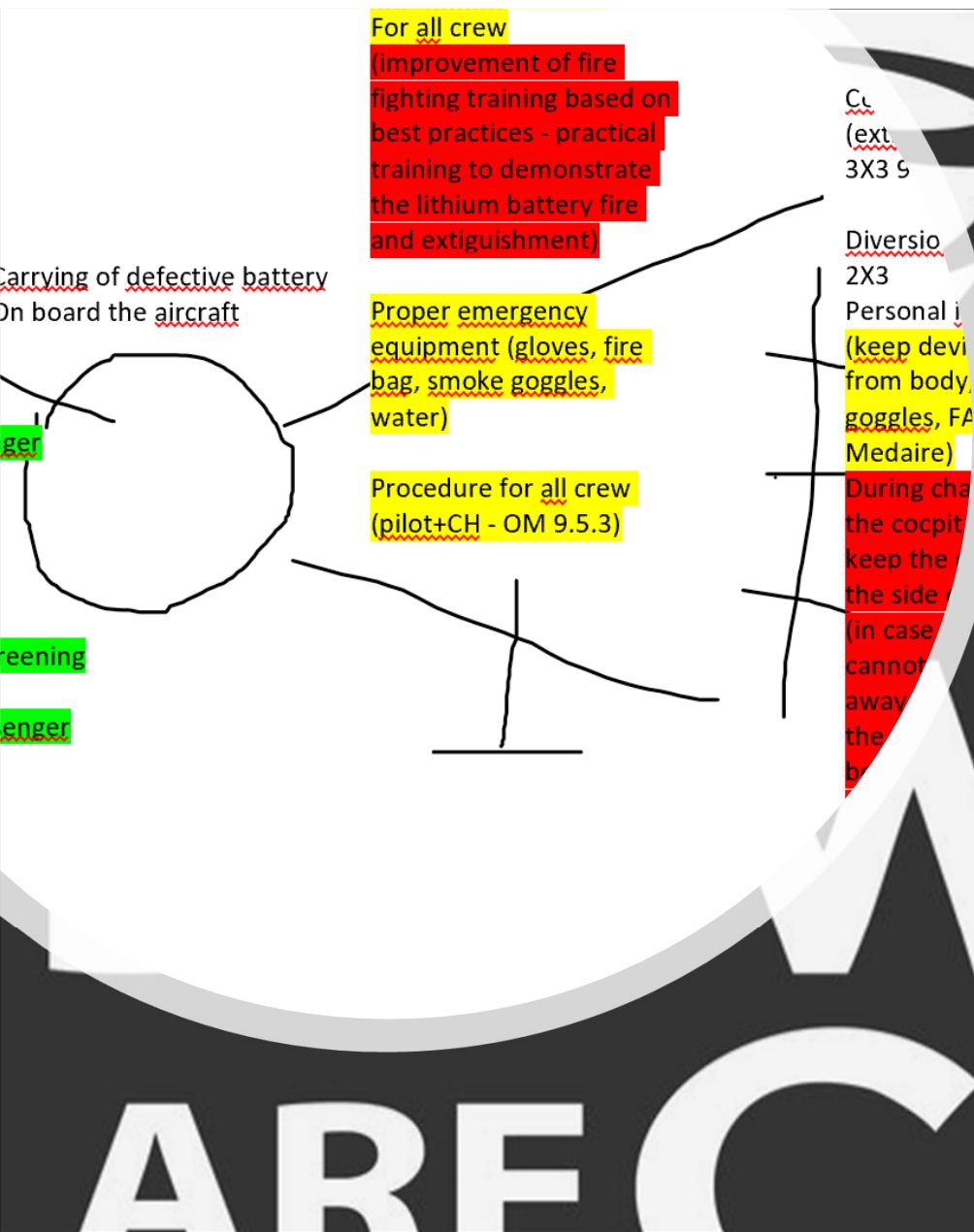
S. Oprandi - VistaJet

- ICAO Doc 9859
- SMICG – Risk Based Decision Making Principles
- EU 965/2012
- ARMS



What are the
training
requirements to
perform a risk
assessment?





1. Relatively inexperienced risk professional can quickly develop a risk assessment
2. Generally clear graphical illustration
3. Easy to understand at all levels.

The loneliness of the risk professionals

The R.A. is only for
safety dept. and to
satisfy compliance?



Collaborative approach to R.A.

Any Monkey Can Beat The Market



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Analyst and adviser on asset allocation, index funds, ETFs and more!

Give a monkey enough darts and they'll beat the market. So says a draft article by [Research Affiliates](#) highlighting the simulated results of 100 monkeys throwing darts at the stock pages in a newspaper. The average monkey outperformed the index by an average of 1.7 percent per year since 1964. That's a lot of bananas!



What is all this monkey business? It started in 1973 when [Princeton University](#) professor Burton Malkiel claimed in his bestselling book, [A Random Walk Down Wall Street](#), that "A blindfolded monkey throwing darts at a newspaper's financial pages could select a portfolio that would do just as well as one carefully selected by experts."



Severity

Severity	Meaning	Value
Catastrophic	<ul style="list-style-type: none">— Equipment destroyed— Multiple deaths	A
Hazardous	<ul style="list-style-type: none">— A large reduction in safety margins, physical distress or a workload such that the operators cannot be relied upon to perform their tasks accurately or completely— Serious injury— Major equipment damage	B
Major	<ul style="list-style-type: none">— A significant reduction in safety margins, a reduction in the ability of the operators to cope with adverse operating conditions as a result of an increase in workload or as a result of conditions impairing their efficiency— Serious incident— Injury to persons	C
Minor	<ul style="list-style-type: none">— Nuisance— Operating limitations— Use of emergency procedures— Minor incident	D
Negligible	<ul style="list-style-type: none">— Few consequences	E

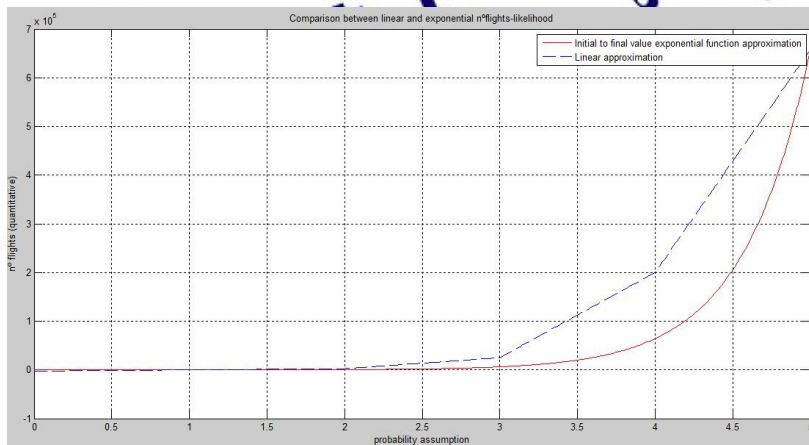
Severity table should be customized by the organization.

A possible solution is to define the extremes (Catastrophic and Negligible) first and then derive the intermediate values.

Probability

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

	Probability of Occurrence Definitions				
	Extremely improbable	Extremely remote	Remote	Reasonably probable	Frequent
Qualitative definition	Should virtually never occur in the whole fleet life.	Unlikely to occur when considering several systems of the same type, but nevertheless has to be considered as being possible.	Unlikely to occur during the total operational life of each system but may occur several times when considering several systems of the same type.	May occur once during total operational life of one system.	May occur once or several times during operational life.
Quantitative definition	$< 10^{-9}$ per flight hour	10^{-7} to 10^{-9} per flight hour	10^{-5} to 10^{-7} per flight hour	10^{-3} to 10^{-5} per flight hour	1 to 10^{-3} per flight hour



Probability table should be customized by the organization.

To define the “extremely improbable” consider that an ultra-safe system has 1 accident per 10^7 operations.

Exponential curve can be used to define intermediate values between Extremely improbable and Frequent.

Discuss the results of the customized severity and probability tables on the risk matrix: a catastrophic with Improbable is tolerable?

SMART

Define actions:

1. Specific (which part of what organization do you want to do what and when)
2. Measurable
3. Agreed
4. Realistic (doable for the person implementing them)
5. Time bound (agreed due date)



Achievements

- More engagement and understanding from the management
- More engagement and understanding from the front-line
- Data that support the Expert Judgement





The way forward

Uncertainty and Strength
of Knowledge

Further references

- P. Cacciabue – Sicurezza del Trasporto Aereo
- S. Dekker – Drift into failure. From hunting broken components to understanding complex systems
- S. Dekker – The field guide to understanding human error
- Eurocontrol – From Safety I to Safety II
- ISO 31000:2009
- NASA – Risk Informed Decision Making Handbook
- L. Ostrom – Risk Assessment
- R. Stephans – System Safety for 21st Century
- J. Reason – Managing the risk of organizational accidents
- N. Taleb – The Black Swan
- T. Aven – various publication

