SAFETY SERVICES ORGANISATION

HAZARD AND RISK ASSESSMENTS

Risk Classification Matrix

CONTENTS

- ILOs
- Relevant Definitions
- Useful Documentation and Resources
- Who Might Be Harmed?
- Likelihood / Probability of Occurrence
- Severity
- Risk Class
- Acceptance Criteria
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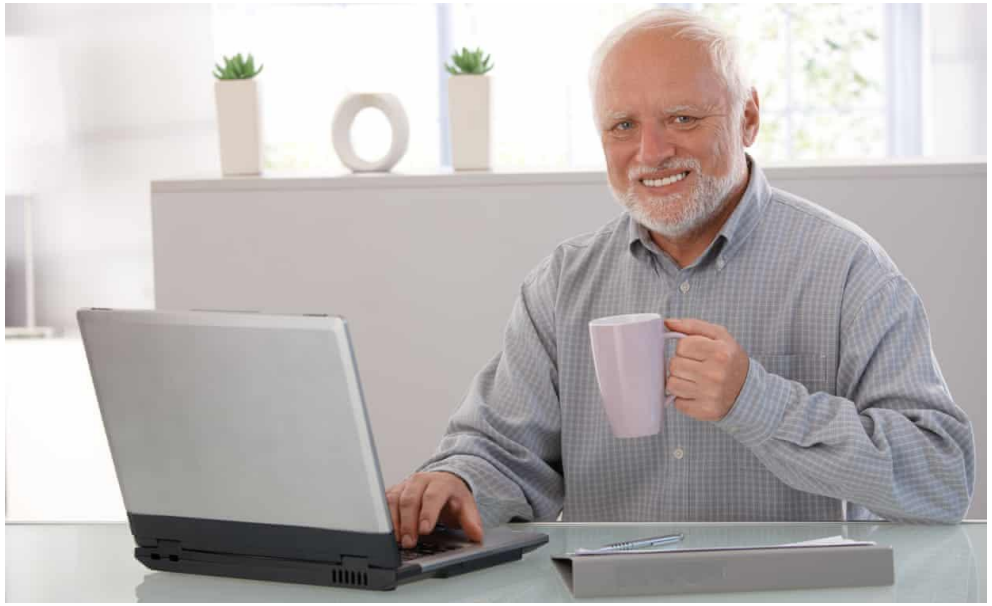
INTENDED LEARNING OUTCOMES

To understand:

- The scope of the Risk Assessment and the boundaries or The Business' responsibility.
- The perception of risk for different types of personnel.
- The purpose of the components of the Risk Classification Matrix.
- The importance of an Acceptance Criteria.



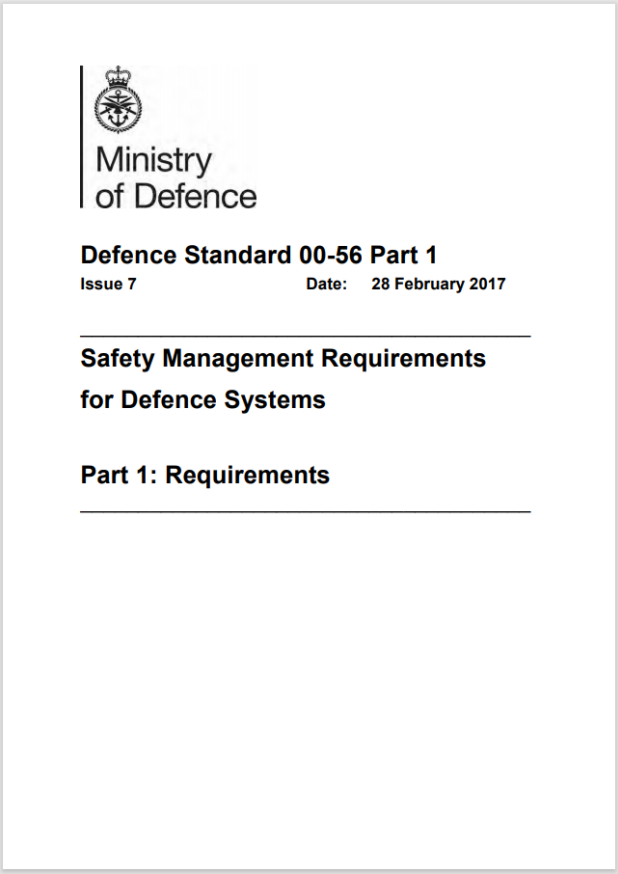
RELEVANT DEFINITIONS

Def Stan 00-056, Part 1, Issue 7 - Definitions:

- **Risk:** Combination of likelihood of Harm and the Severity of that Harm.
- **Likelihood:** A measure of the probability that the Accident will occur.
- **Severity:** A measure of the degree of Harm.

HSE's Reducing Risks, Protecting People:

- **As Low As Reasonably Practicable (ALARP):** A risk is ALARP when it has been demonstrated that the cost of any further Risk Reduction, where the cost includes the loss of defence capability as well as financial or other resource costs, is grossly disproportionate to the benefit obtained from the Risk Reduction.
- **Broadly Acceptable:** Risks that are classified into the Broadly Acceptable region of the Tolerability of Risk Framework represent those, that following analysis, are considered too insignificant or adequately controlled where no other reasonably practicable risk reduction measures are available.


Ministry of Defence

Defence Standard 00-56 Part 1

Issue 7 Date: 28 February 2017

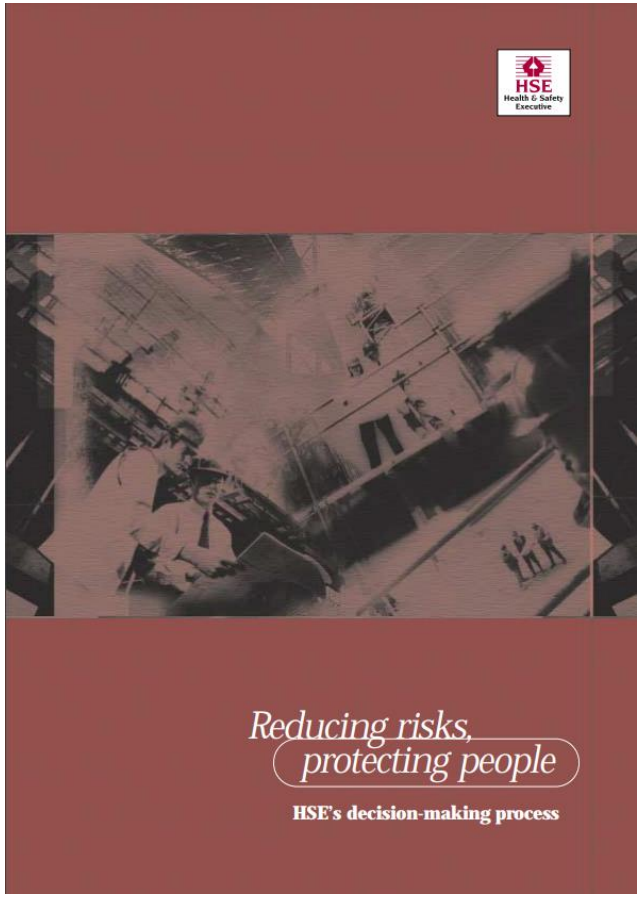
Safety Management Requirements for Defence Systems

Part 1: Requirements

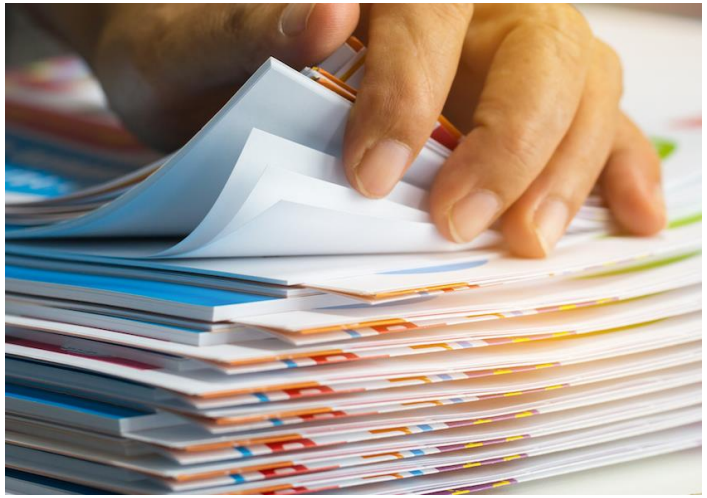
RELEVANT DEFINITIONS (2)

HSE's Reducing Risks, Protecting People:

- **Tolerable:** It does not mean 'Acceptable'. The term Tolerable refers instead to a willingness by society as a whole to live with a risk so as to secure certain benefits in the confidence that the risk is one that is worth taking in the expectations that:
  - The risks have been properly assessed, where control measures have been identified based on the best available scientific evidence (or if unavailable scientific advice);
  - The residual risks are not unduly high and are reduced ALARP, and;
  - The risks are periodically reviewed to ensure they continue to meet the ALARP criteria.
- **Intolerable (or Unacceptable):** Risks that are classified into the Intolerable region of the Tolerability of Risk Framework represent those that are unacceptable whatever the level of benefits associated with the activity. Any activity or practice giving rise to risks falling in that region would, as a matter of principle, be ruled out unless the activity or practice can be modified to reduce the degree of risk so that it falls in one of the regions below, or there are exceptional reasons for the activity or practice to be retained.



USEFUL DOCUMENTATION & RESOURCES



Useful documentation and resources:

- [1] Def Stan 00-56: The standard for "Safety Management Requirements for Defence Systems".
  - Access (Free): https://www.dstan.mod.uk/StanMIS/
- [2] The MOD's Acquisition Safety and Environmental Management System (ASEMS) Online:
  - Access (Free): http://www. https://www.asems.mod.uk/
- [3] Health and Safety at Work Act 1974
  - Access (Free): https://www.legislation.gov.uk/ukpga/1974/37/contents
- [4] The Management of Health and Safety at Work regulation 1999:
  - Access (Free): https://www.legislation.gov.uk/uksi/1999/3242/contents/made
- [5] HSE Risk Assessment - A Brief Guide to Controlling Risks in the Workplace
  - Access (Free): https://www.hse.gov.uk/research/rrhtm/rr151.htm
- [6] HSE Reducing Risks, Protecting People
  - Access (Free): https://www.hse.gov.uk/managing/theory/r2p2.pdf

WHO MIGHT BE HARMED?

Who Might Be Harmed?

What is the difference in risk perception and acceptance for different types of personnel that could be exposed to the hazards?

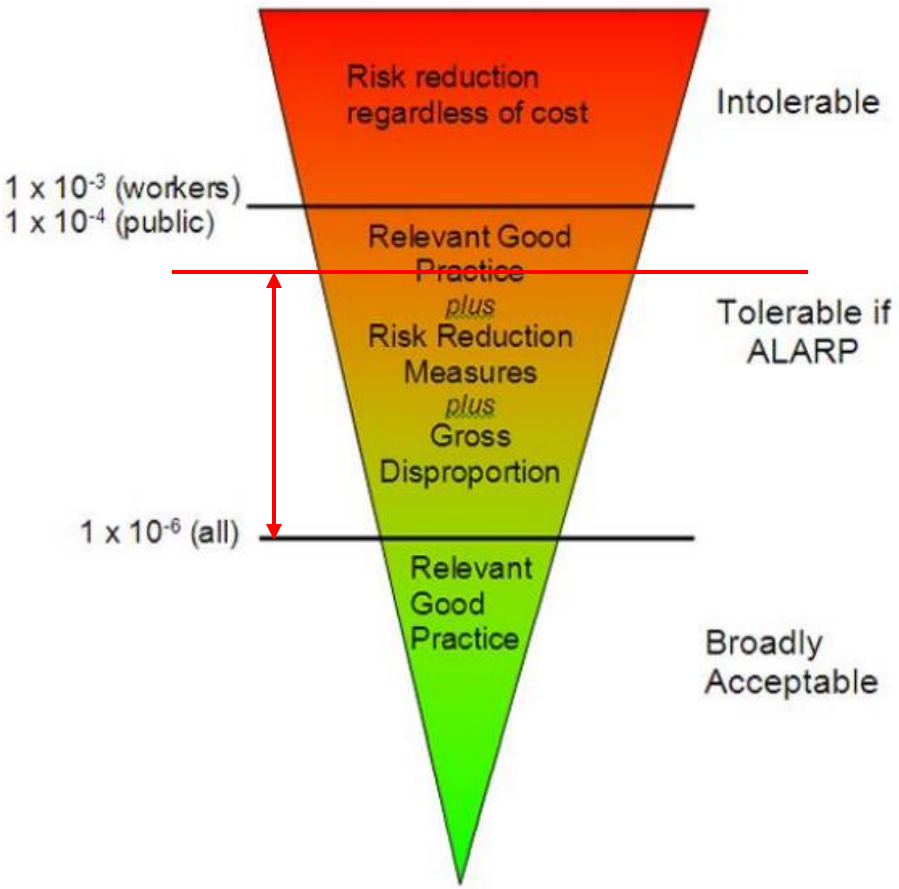
Direct Personnel, Indirect Personnel, or Third Parties / Members of the General Public? What about personnel under training?

HSE's "Reducing Risks, Protecting People" thoughts:

The tolerability region for the risk of individual fatality of Essential Personnel has the upper limit of $1x10^{-3}$ and a lower limit of $1x10^{-6}$ per annum.

The $1x10^{-6}$ risk of individual fatality is considered the upper limit of the 'Broadly Acceptable' region, whereas, the $1x10^{-3}$ risk of individual fatality is the lower limit of the 'Unacceptable'/'Intolerable' region.

The tolerability region for the risk of individual fatality of Members of the General Public has the upper limit of $1x10^{-4}$ and a lower limit of $1x10^{-6}$ per annum.



LIKELIHOOD / PROBABILITY OF OCCURRENCE

Quantitative Approach

Example:

$10^{-3} < O \leq 10^{-2}$; $10^{-4} < O \leq 10^{-3}$; $10^{-5} < O \leq 10^{-4}$; $10^{-6} < O \leq 10^{-5}$; $O \leq 10^{-6}$

Qualitative Approach

Example:

Frequent; Likely; Occasional; Unlikely; Improbable.

Any denomination you like! But note that having either too few or too many may lead to difficulties when estimating risk and enabling The Business to compare risks

SEVERITY

What is The Business' Scope of Responsibility?

The Business has Legal, Moral, and Financial responsibility for addressing the Safety of personnel.

Do you have to address the potential for the subject of the risk assessment to negatively affect the Environment, or even Infrastructure?

Account for the Who Might Be Harmed.

Example:

Catastrophic:

- Safety (Multiple Fatalities of Direct Personnel, or, Single Fatality of Third Party);
- Environment (Long-term Environmental Impact);
- Infrastructure (Complete loss of facility).

RISK CLASS

Risk: Combination of likelihood of Harm and the Severity of that Harm. (Likelihood) x (Severity) = Risk Class

Example Risk Classification Matrix

		Likelihood (Probability of Occurrence (P(O))			
		Highest	……		Lowest
Severity	Highest	Highest Risk Class			
	……				
	Lowest				Lowest Risk Class

A	Highest Risk Class
B	⋮
C	
D	Lowest Risk Class

RISK CLASS

Define each resultant Risk Class

Examples:

- Lowest Risk Class: "The risk is considered to be Broadly Acceptable. Additional risk reductions may be introduced only if the benefits justify the cost (time, money, inconvenience)."
- Medium Risk Class (Low): "The risk is considered Tolerable and ALARP."
- Medium Risk Class (High): "The risk can only be considered Tolerable and ALARP if demonstrated that further risk reduction is impracticable."
- Highest Risk Class: "The risk is considered Intolerable/ Unacceptable. The activity shall not proceed, or, the system shall not be used."

RISK CLASS AND ACCEPTANCE CRITERIA

Including an Acceptance Criteria

Examples:

- Lowest Risk Class: "The risk is considered to be Broadly Acceptable. Additional risk reductions may be introduced only if the benefits justify the cost (time, money, inconvenience). This level of risk can be accepted following endorsement of the Chief Engineer and Safety Lead."
- Medium Risk Class (Low): "The risk is considered Tolerable and ALARP. This level of risk can be accepted following endorsement of the Chief Engineer, Head of Safety, and quorum of relevant Safety Experts."
- Medium Risk Class (High): "The risk can only be considered Tolerable and ALARP if demonstrated that further risk reduction is impracticable. This level of risk can only be accepted by the Managing Director and Executive Team following review and presentation made by the Chief Engineer, Head of Safety, and quorum of relevant Safety Experts."
- Highest Risk Class: "The risk is considered Intolerable/Unacceptable. The activity shall not proceed, or, the system shall not be used. This level of risk can only be accepted by the Managing Director and special governmental dispensation, or, under force majeure to meet an immediate Urgent Operational Requirement."

RISK CLASSIFICATION MATRIX – EXERCISE

Create a Risk Classification Matrix

Qualitatively define the Likelihoods and Severities

Provide quantitative definitions for each Likelihood

Define an Acceptance Criteria for each Residual Risk Class.

Note: *Only define the perception of the residual risk, do not include, business-related roles and acceptance responsibilities.*

RISK CLASSIFICATION MATRIX – EXERCISE

Present each Risk Matrix

Clearly defined criterion?

Is there a measurable difference between criterion?

Manageable number of residual risk classes?

ILO RECAP

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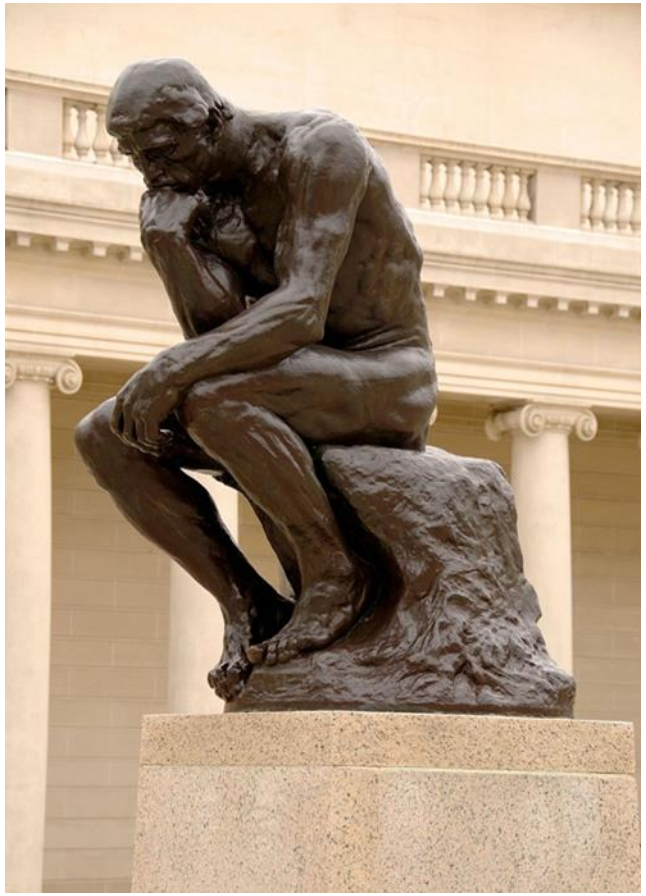

NEXT TOPICS...

Risk Reductions in Detail

Assessing Effectiveness of Risk Reductions

Bowtie Analysis

Barrier Analysis (including the ‘Swiss Cheese’ Model)

THANK YOU FOR LISTENING

ANY QUESTIONS?

REFERENCES

[1] Def Stan 00-56: The standard for “Safety Management Requirements for Defence Systems”.

[2] The MOD’s Acquisition Safety and Environmental Management System (ASEMS) Online:

[3] Health and Safety at Work Act 1974

[4] The Management of Health and Safety at Work regulation 1999:

[5] HSE Risk Assessment - A Brief Guide to Controlling Risks in the Workplace

[6] HSE Reducing Risks, Protecting People

[7] Defence Safety Authority, DSA01.2 Implementation of Defence Policy for Health, Safety and Environmental Protection, Chapter 3, Duty Holding, Issue 1.1

[8] Image - https://bbs.binus.ac.id/international-business/2017/11/writing-course-intended-learning-outcomes-cilo/

[9] Image - https://www.theguardian.com/lifeandstyle/2019/nov/08/experience-hide-the-pain-harold-face-became-meme-turned-it-into-career

[10] Image - https://tradevistas.org/blockchain-could-replace-mounds-paper-at-border/businessman-hands-searching-unfinished-documents-stacks-of-paper-files-on-office-desk-for-report-papers-piles-of-sheet-achieves-with-clips-on-table-document-is-written-drawnpresented/

[11] Image - https://www.hse.gov.uk/foi/internalops/hid_circs/permissioning/spc_perm_37/

[12] Image - https://www.reddit.com/r/MemeTemplatesOfficial/comments/ijg99m/arrow_goes_into_knights_helmet/

[13] Image - https://giphy.com/gifs/hurt-monty-python-VYcRNU4P3vyM

[14] Image - https://giphy.com/gifs/rickandmorty-season-2-adult-swim-rick-and-morty-iibEPf8xEDTedJcDJr

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[17] Image - https://giphy.com/gifs/chicken-kill-twice-CnMSGWc9a7jqw