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Introduction to ALARP

Plan Design Enable

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Learning Objectives

- Introduce the background to ALARP
- To explain the terms used in risk tolerability
- To appreciate ‘how far to go’ in the reduction of risk
- To appreciate Wartime V’s Peacetime risk.

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Scope

- Already introduced concept of risk tolerability and risk assessment
- This presentation introduces the concept of ALARP and its interpretation in the MOD context. Specifically the following will be covered:
  - Where ALARP comes from
  - What it means
  - How we apply it.

Background to ALARP

- No activity is risk-free
  - Risks are taken to gain an advantage
  - Implies that benefits are weighed against cost
- In some cases, this computation is predetermined and prescribed in regulatory standards
  - Absolute duty – “Shall/shall not”
- In other cases, a form of judgement is required
  - Practical – Do what is necessary regardless of cost, in light of current knowledge and invention
  - Reasonably Practicable – Balance of risk against sacrifice.

Source: S&EP Leaflet 02, Sep 11

Reasonably Practicable

- 'Reasonably Practicable'
  - Term dates back from the legal case of Lord Justice Asquith (1949) in Edwards v National Coal Board, on the interpretation of the Coal Mines Act 1911

- Quote from the Court of Appeal
  - " 'Reasonably practicable' is a narrower term than 'physically possible' and implies that a **computation** must be made ... in which the quantum of **risk** placed on one scale and the **sacrifice** involved in the measures necessary for averting the risk (whether in money, time or trouble) is placed in the other and that, if it be shown that there is **gross disproportion** between them - the risk being insignificant in relation to the sacrifice - the person upon whom the obligation is imposed discharges the onus which is upon him. Moreover , this computation falls to be made by the owner at a point of time anterior to the accident".

As Low As Reasonably Practicable

- "It is a fundamental objective that the risk to the health and safety of anyone conducting or affected by Defence activities is reduced as low as reasonably practicable (ALARP)" *(DSA01.1)*

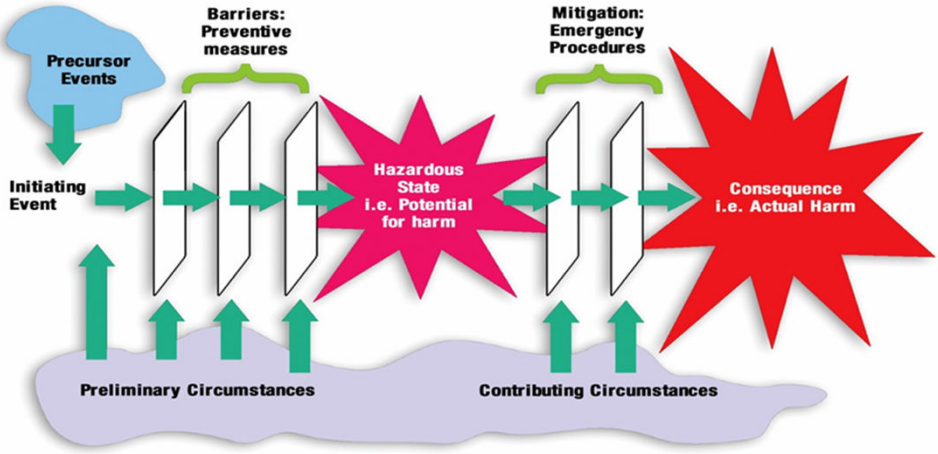
- Implies that risk reduction **should be done** if the cost (inc. time, trouble) is not grossly disproportionate to the benefit gained



- However, a key element of the ALARP principle is that risk reduction may cease when the cost needed to implement further risk reduction becomes grossly disproportionate to the safety benefits gained.
  - ALARP is essentially the "stopping condition" for risk reduction.

Risk Reduction

- Risk reduction – the systematic process of reducing risk.



Risk Reduction Hierarchy

Mitigation Hierarchy:

- Remove Hazard
- Reduce the Hazard or Risk through substitution
- Provide Passive physical controls
- Provide active controls
- Provide Personal Protective Equipment (PPE)
- Procedures, Warnings & Training

(Note: all mitigation strategies can be enhanced by using HF techniques).

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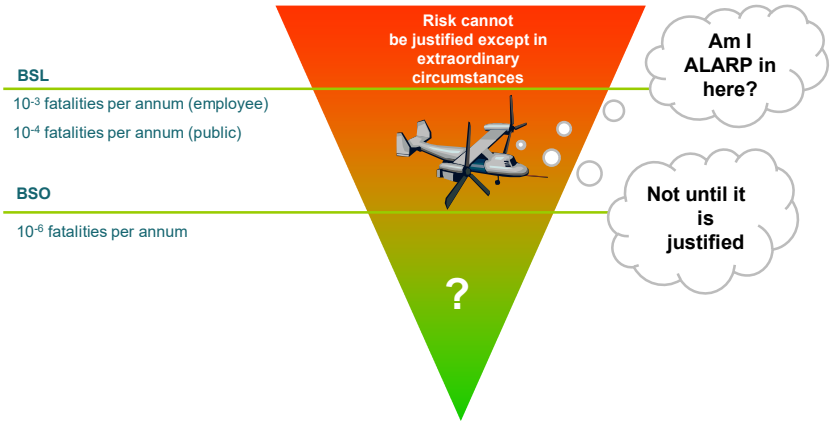
HSE Framework for the Tolerability of Risk



- A risk is only ALARP when it has been demonstrated that the cost of any further Risk Reduction is **grossly disproportionate** to the benefit obtained
  - "…justifying and recording how this is reached is an important and vital step in Safety Management." (*RA1210, Annex B*).

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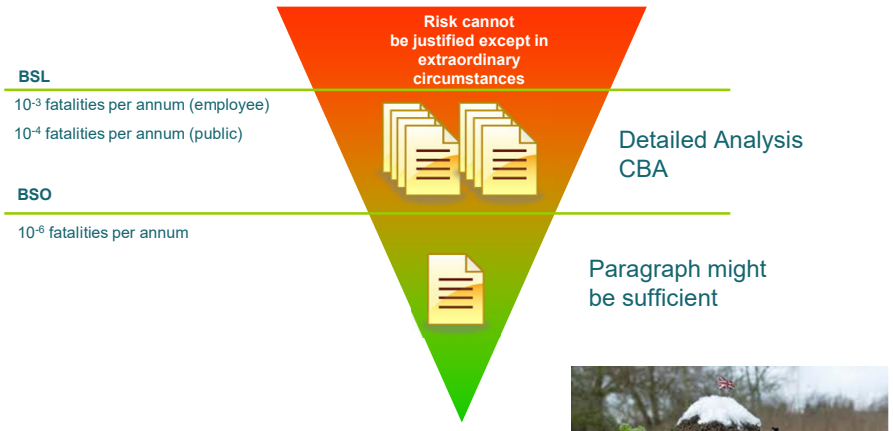
Risk Acceptance

- It is not sufficient to declare that something is or is not ALARP. The fundamental requirement for ALARP is to consider "what are the options to further reduce risk and why are they not reasonably practicable to implement", and to demonstrate that this process has been undertaken appropriately
- HSE and DE&S have issued guidance that compliance with Relevant Good Practice is a source of evidence for claiming ALARP. For most day-to-day risks this is sufficient without further assessment. However, Relevant Good Practice may only be a starting point where the hazard is high or control measures complex
- Cost benefit analysis, where employed, can be used to support the ALARP statement.

ALARP Statements - Proportionate to Risk



- Do not make a mountain out of a mole hill !!

ALARP Strategies

HSE is very clear on priority of ALARP strategies:

1. Good Practice Arguments
   - HSC-approved ACoPs, HSE/Gov guidance, Standards (BS, CEN, CENELIC, ISO etc), Trade Federation/Professional Institution agreed standard practice, etc
   - Good practice ≠ Best practice
   - Good practice is a minimum, must be relevant & can change over time
2. First Principles Argument (**Qualitative**)
   - Common Sense, Professional Judgement, Experience
3. First Principles Argument (**Quantitative**)
   - Use of Cost Benefit Analysis (CBA) to support judgement
   - Look for **practicable** methods and then judge "**reasonableness**"
   - **Gross disproportion**, not just simple balance (for human harm only)
   - Rarely required but often contentious.

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ALARP Statement Construction

- Demonstrate risk cannot be avoided
- Demonstrate compliance with prescriptive regulatory based standards
  - Designed and compliant to CS-25, Def Stan 00-970, PSSR2000, etc…
- Demonstrate appropriate risk reduction has been applied (*in-line with recognised good practice*)
  - Follow the risk reduction hierarchy
  - Demonstrate safety being designed into the equipment (engineered safeguards, interlocks)
  - Demonstrate equipment is operated safely (limitations, training, SOPs, provision of information)
  - Demonstrate generic safety arrangements in place (local arrangements, PPE, first aid)
- Demonstrate how the cost of any further risk reduction is grossly disproportionate to the benefit gained
  - Engineering judgement, CBA.

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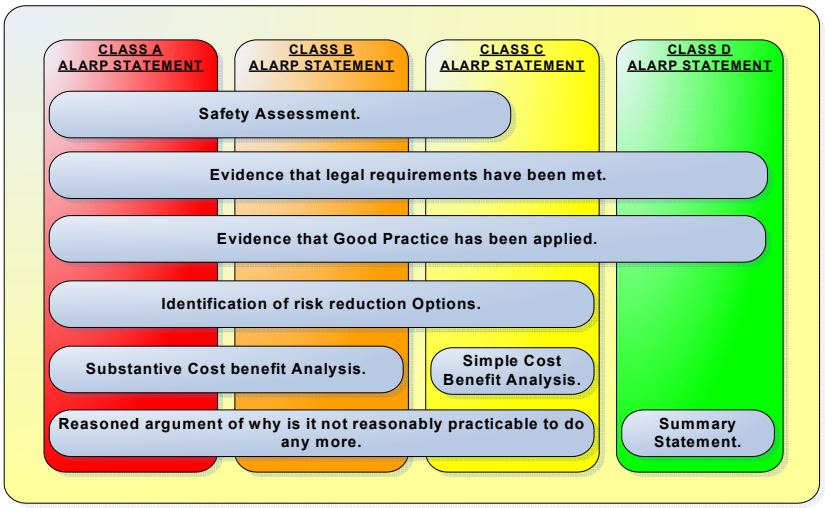
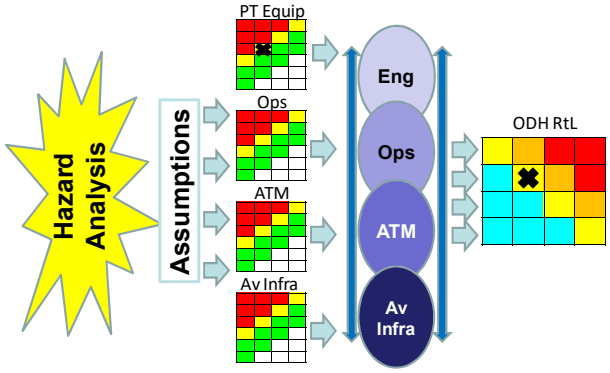
ALARP Statements - Proportionate to Risk



Annex B to D Ships Op Centre MSDP Safety Risk Review Instruction

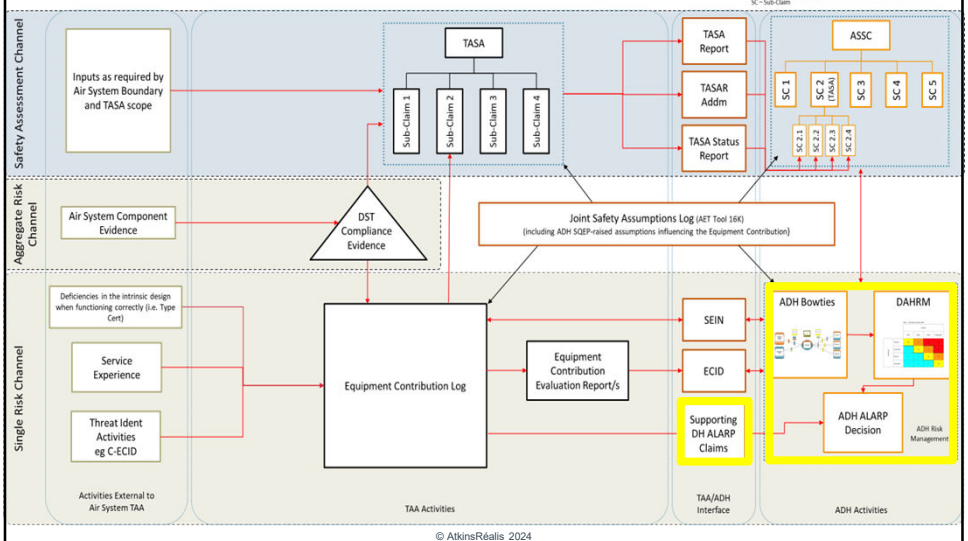
Responsibility of the Duty Holder

- **Duty Holders** must decide whether the ALARP point has been reached and must be able to justify the decision.



- Can we make ALARP recommendations at the equipment level?

ASPIRE – Joint Operating Model for the Equipment Contribution to Air System Safety



Peace and War Time Risk?

- Safety Management aims to prevents accidents (unintended events)
  - Hostile action are deliberate acts
    - Outside the remit of Safety Management
    - Survivability is better classed and managed as an Operational Risk
- HOWEVER, we must still ensure the safety and airworthiness of aircraft when configured for wartime operations.

Concluding Remarks

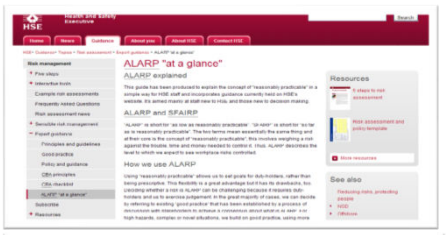
- Within MOD, all risks must be demonstrated to be reduced to ALARP
- Implies that risk reduction **should be done** if the cost (inc. time, trouble) is not grossly disproportionate to the benefit gained
- It is not sufficient to declare that something is or is not ALARP, a reasoned argument must be presented
- ALARP cannot be used as a defence against implementing regulatory standards or recognised good practice
- Ultimately, it is the Duty Holder that determines whether a risk is ALARP or not.

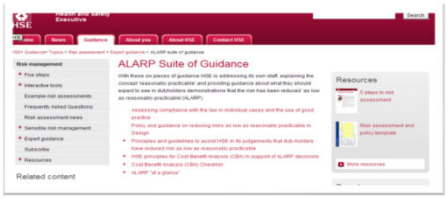
Have we achieved the learning objectives?

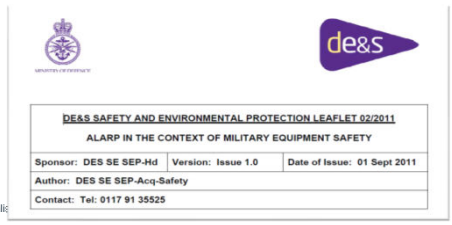
- What should be taken into consideration when applying the ALARP Concept?
- What evidence can be presented to underpin an ALARP justification?
- Who decides if a risk is ALARP (or otherwise)?

Further Information

- http://www.hse.gov.uk/risk/theory/alarpglance.htm
- http://www.hse.gov.uk/risk/theory/alarp.htm
- http://www.hse.gov.uk/foi/internalops/nsd/tech_asst_guides/tast005.htm
- Google “HSE ALARP”
- S&EP Leaflet 02: “ALARP in the context of Military Equipment Safety”, Sep 11
- ASPIRE Tool 17G







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Questions