

# Understanding Different Types of Risks

## **Unintentional risks**

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# Risk

The possibility of some bad event happening

**(P of an event  $\times$  consequences)**



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# Unintentional risks

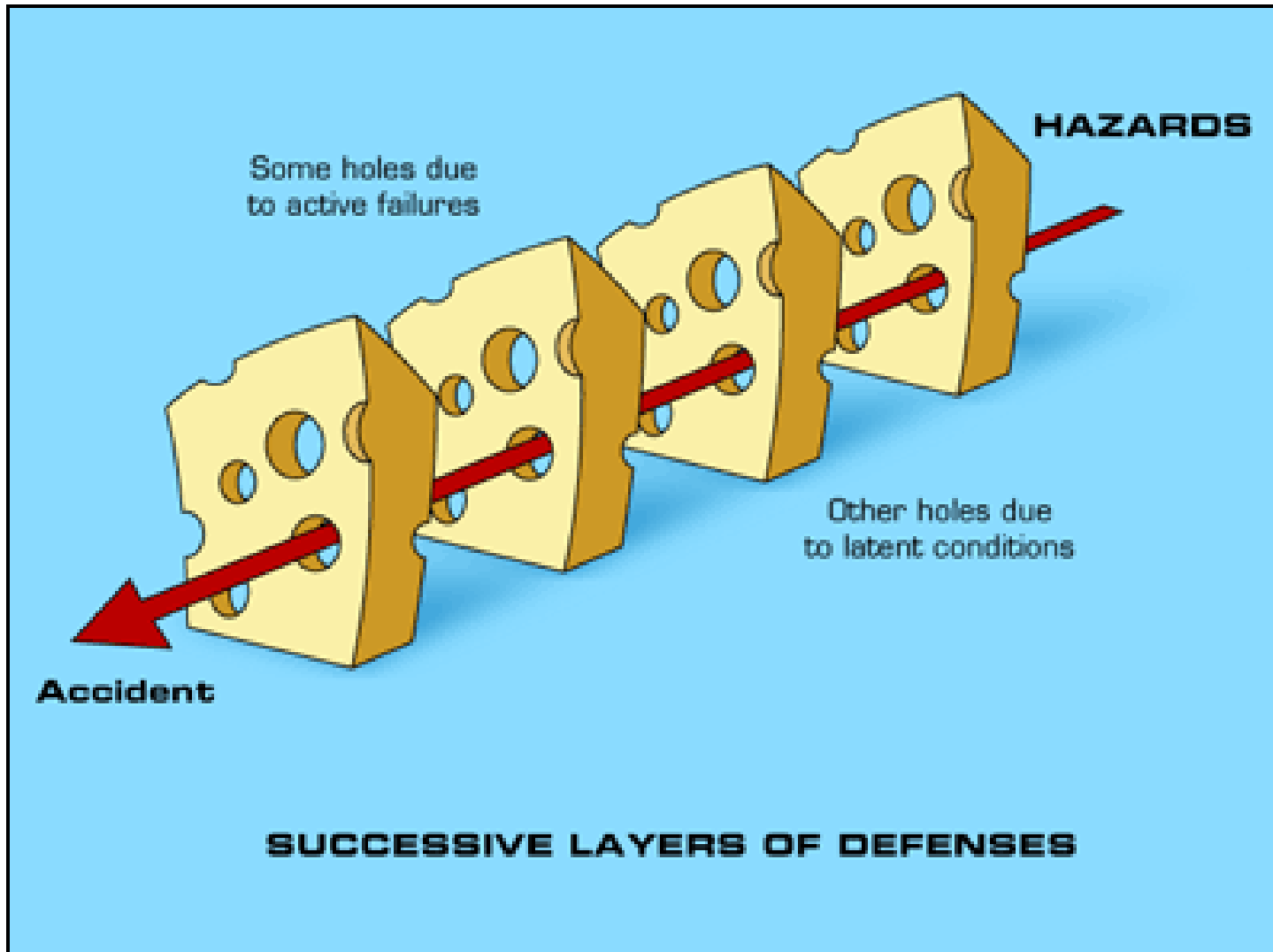
The risks associated with LAWS if these systems do not behave in ways intended by their designers and operators



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- How and to what extent could increasingly autonomous weapon systems behave in ways not intended by their human designers and operators that would endanger human life?
- Have these ‘unintentional risks’ (if any) of LAWS been systematically mapped, and widely understood?
- Based on what we know or can reasonably infer, do these risks deserve serious policy consideration as LAWS develop?
- Is there a safety dimension to the concept of ‘meaningful human control’ to be explored?
- Are there viable strategies to minimizing or preventing risk of catastrophic failures in LAWS that can be identified and communicated to policy makers?





Reason, J. (1990) Human Error. Cambridge: University Press, Cambridge.

<b>High Reliability Theory</b>	<b>Normal Accidents Theory</b>
Accidents can be prevented through good organizational design and management.	Accidents are inevitable in complex and tightly coupled systems.
Safety is the priority organizational objective.	Safety is one of a number of competing objectives.
Redundancy enhances safety: duplication and overlap can make 'a reliable system out of unreliable parts.'	Redundancy often causes accidents: it increases interactive complexity and opaqueness and encourages risk-taking.
Decentralized decision-making is needed to permit prompt and flexible field-level responses to surprises.	Organization contradiction: decentralization is needed for complexity, but centralization is needed for tightly coupled systems.
A 'culture of reliability' will enhance safety by encouraging uniform and appropriate responses by field-level operators.	A military model of intense discipline, socialization, and isolation is incompatible with democratic values.
Continuous operations, training, and simulations can create and maintain high reliability operations.	Organizations cannot train for unimagined, highly dangerous, or politically unpalatable operations.
Trial and error learning from accidents can be effective, and can be supplemented by anticipation and simulations.	Denial of responsibility, faulty reporting, and reconstruction of history cripples learning efforts.

**Table: Competing Perspectives on Safety with Hazardous Technologies**  
(reproduced from Sagan, *The Limits of Safety*, Princeton University Press, 1993, p. 46.)

- **Apportioning responsibility takes us so far**  
Is it enough on LAWS in view of unintentional risks?
- **What are the full range of causes of risk?**  
Assessment should include when systems do not behave in ways intended by their designers and operators
- **Operational and broader systemic risks**





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