Safety-Security Interfaces at TRIGA PUSPATI Research Reactor

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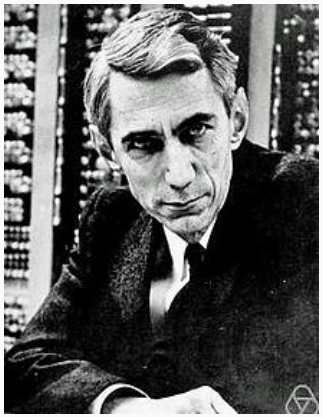
CONCEPT OF SAFETY AND SECURITY.

• In 1883, Dutch cryptographer Auguste Kerchoffs was introduced new principle to protect and secure the information from unauthorized person by using contemporary encryption algorithms. The security of the encrypted message depends solely on the security of the secret encryption key that created by the sender. Kerckhoff's principle is the concept that a Cryptographic system should be designed to be secure, even if all its details, except for the key, are publicly known.

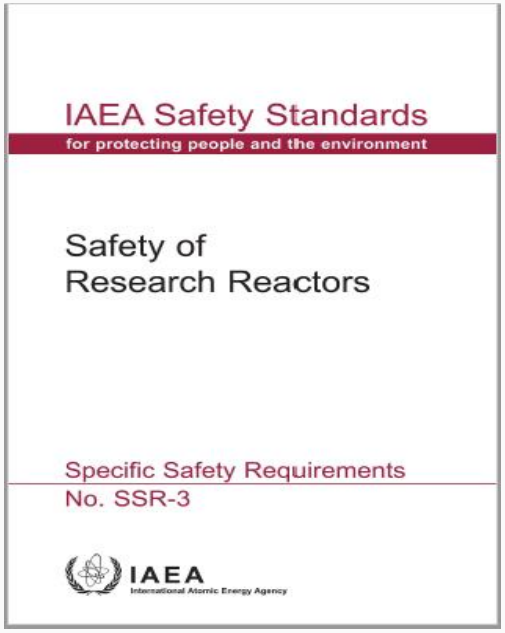
The principle, sometimes referred to as Kerckhoff's axiom or law, forms the basis of open security and security by design and contrasts directly with the deprecated security through obscurity model.

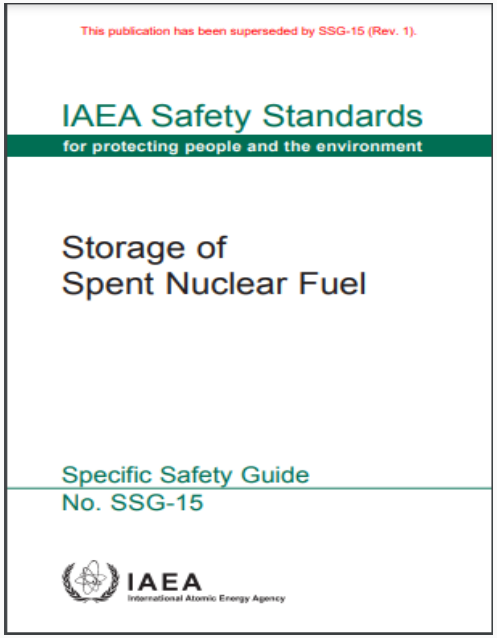


Later a US Mathematician Claude Shannon in 1948 elaborated that protection of information during communication is a key factor in security.

- It was then thought that if a facility is not secure-- IS IT SAVE ??
- This is how security gained importance for facilities having higher potential of risk.

- Safety is a state in which hazards and conditions leading to physical, psychological or material harm are controlled in order to preserve the health and well-being of individuals and the community.
- In Research Reactor facility especially in TRIGA PUSPATI the main concern to ensure the safety regime and security regime can work smoothly and properly they needs some guide line to harmonized the condition all the time by refer to some documents' that has been developed by IAEA through TECDOC 1801 Management of the Interface between Nuclear Safety and Security for Research Reactors and Safety Standards (Specific Safety Requirements SSR 3 and Specific Safety Guide SSG 15).





DEFINITION AND FOCUS TO SAFETY - SECURITY IN TRIGA PUSPATI.

- Definition of safety: The achievement of proper operating conditions, prevention of accidents or mitigation of accident consequences, resulting in protection of workers, the public and the environment from undue radiation hazards.
- Main focus of safety is on risks arising from unintended events initiated by natural occurrences (such as earthquakes), hardware failures, other internal events or interruptions (such as fire, pipe breakage), or human mistakes (such as the incorrect application of procedures).

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- Definition of security: The prevention and detection of, and response to, theft, sabotage, unauthorized access, illegal transfer or other malicious acts involving nuclear material, other radioactive substances or their associated facilities.
- Main focus is to provide protection against malicious acts (deliberate actions), including theft, sabotage and other criminal or intentional unauthorized acts that may lead to unacceptable radiological consequences or other adverse situations.

ELEMENTS OF NUCLEAR SAFETY AND SECURITY

Safety	Security
Inadvertent	Intentional
1. Loss or damage	1. Damage ➢ Sabotage
2. Misplaced	2. Malicious ➢ Cause Terror ➢ Intent to harm other(s)
3. Forgotten	3. Acquisition ➢ Theft ➢ Illegal purchase
4. Accidents	4. Financial ➢ Illegal sale for profit ➢ Avoidance of costs of ownership ➢ Extortion

COMMON INTERFACE OF SAFETY AND SECURITY.

- Safety measures and security measures have in common the aim of protecting human life and health and the environment.
- The acceptable risk is reasonably the same whether the initiating cause is a safety or a security event.
- In safety and security programmes, there are or could be overlap also known as interfaces. These areas of overlap present opportunities that could be exploited for synergy, or areas of conflict that could be resolved.
- Understand and identify these overlaps.

INTERFACE BETWEEN SAFETY AND SECURITY IN TRIGA PUSPATI

Safety

- Classification of systems and components based on potential for accident,
- Health and dose monitoring.
- Environmental monitoring
- Publicity of information on materials, locations, activities need to be records, signage, notices, communications and etc.
- Information exchange as early warning systems

- Legal and regulatory framework (Licensing, Inspections…)
- Design and classification of systems, structures and components.
- Organizational culture.
- Risk-informed, graded approach.
- Information and computer (Cyber Security).
- Access control.
- Structural protection – partly.
- Materials accountancy and control.
- Coordinated response

Security

- Classification of systems and components based on intentional activities.
- Personal security:
  - ✓ Background checks.
  - ✓ Health.
  - ✓ Behavioral monitoring.
- Need – to – know – basis.
- Detection and delay.
- Crime scene management.
- Forensics.
- Information exchange as early warning systems.

AREAS NEEDS TO BE CONSIDER FOR INTERFACE.

- Safety – Security Analysis
- Defense in Depth
- Integrated Management System
- Safety-Security Culture
- Graded Approach
- Interface at Design Stage.

SAFETY – SECURITY ANALYSIS.

- The safety analysis has to be based on the design basis accident such as Properbility Safety Assessment (PSA).
- The security plan has to be based on the security requirements to address the design basis threat or threat assessment such as Design Basic Threat (DBT).

DEFENSE-IN-DEPTH.

Safety	Security
• Preventing deviations from normal operation; • Controlling deviations from operational states; • Controlling accidents within the design basis; • Mitigating accidents and ensuring confinement of radioactive materials; • Mitigating the consequences of radioactive releases.	• Deterrence • Detecting the adversary; • Delaying the adversary; • Responding to and neutralizing the adversary.

INTEGRATED MANAGEMENT SYSTEM.

- Management system should integrate all quality, health, economic and environmental aspects as well as safety and security into a single coherent framework for management to adequately direct the interactions and interfaces between diverse activities and disciplines.
- The integrated management system needs to clearly identify not only safety and security as distinct processes to be managed, but also the interface between them.

SAFETY – SECURITY CULTURE.

Safety Culture

- The assembly of characteristics and attitudes in organizations and individuals which establishes that, as an overriding priority, protection and safety issues receive the attention warranted by their significance.

Security Culture

- The assembly of characteristics, attitudes and behavior of individuals, organizations and institutions which serves as a means to support and enhance nuclear security.

GRADED APPROACH.

- The graded approach is applied to safety and security provisions covering all phases of the lifetime of a research reactor facility – siting, design, construction, commissioning, operation, utilization, modification, extended shut down, decommissioning, – and for all the disciplines and activities associated with each phase – training, qualification, response planning, emergency and contingency preparedness, and regulatory supervision.

INTERFACE AT DESIGN STAGE.

SAFETY DESIGN	SECURITY ADVANTAGE
Use of passive systems to avoid human errors	Makes it more difficult for potential adversaries to tamper with safety systems
Introduction of robustness against human errors	May serve to increase protection against an insider threat
Doors or barriers for radiation protection purposes	Serves a security function by delaying or preventing unauthorized access
Safety specialists have knowledge of potential consequences of the failures of equipment important to safety and control	Useful in helping security specialists to identify sensitive targets

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INTERFACE AT DESIGN STAGE.

SECURITY DESIGN	SAFETY ADVANTAGE
Personnel screening	Increases the reliability of personnel employed
Access Control	Prevents unauthorized persons from accidently affecting safety equipment availability or reliability
Robust security doors	Provide radiological barrier
Security guards	Provide identification of abnormal events during off-hours Aid in evacuation and control post accident access to the facility
Security Barriers	Provide control of areas for safety purposes

REGULATORY APPROACH FOR SAFETY-SECURITY INTERFACE IN MALAYSIA

- AELB being a sole Regulator for nuclear safety and security, has adopted systematic approach and methodology to deal with the interface of nuclear safety and nuclear security to achieve same objective to protect life, health, environmental and property from radiological consequences.
- Principles of Leadership, Management and Safety & Security Cultures have been addressed in regulatory framework to achieve the common goal of safety and security.
- Recognition that safety and security require their own expertise and methodology with understanding of each other's disciplines and requirements.
- Rotation policy for experts to avoid complacency. (3 + 2)

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REGULATORY APPROACH FOR SAFETY-SECURITY INTERFACE IN MALAYSIA.

- Regulations address interface issues and the requirements are based on the concepts of defense in depth and graded approach.
- Common license for both safety and security.
- Common inspection programme for safety and security and conduct of joint exercises.
- Centralized emergency coordination and event reporting mechanism for both nuclear safety and nuclear security events.
- Mechanism to resolve the interface issues with the licensee.
- Training infrastructure to develop capacity building in nuclear safety and security.
- Interface issues are addressed and incorporated in the initial design phase of nuclear installations and carried out through out the life.

SUMMARY.

- In TRIGA PUSPATI Safety and security plan have the same general aim in protecting the staffs and the environment from harmful effects of radiation.
- In Malaysia Nuclear Safety and security share a common regulatory approach.
- Since Safety measures and security measures can have impact on each other, these are reviewed by the regulator at the design stage and implemented in an coordinated manner by the vendors/ operators under the regulatory oversight of a Nuclear installation so these are not compromised at any stage of project and during operations.


Thank You.