Strål
säkerhets
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Swedish Radiation Safety Authority

A Systemic Approach to Safety from a Regulatory Perspective

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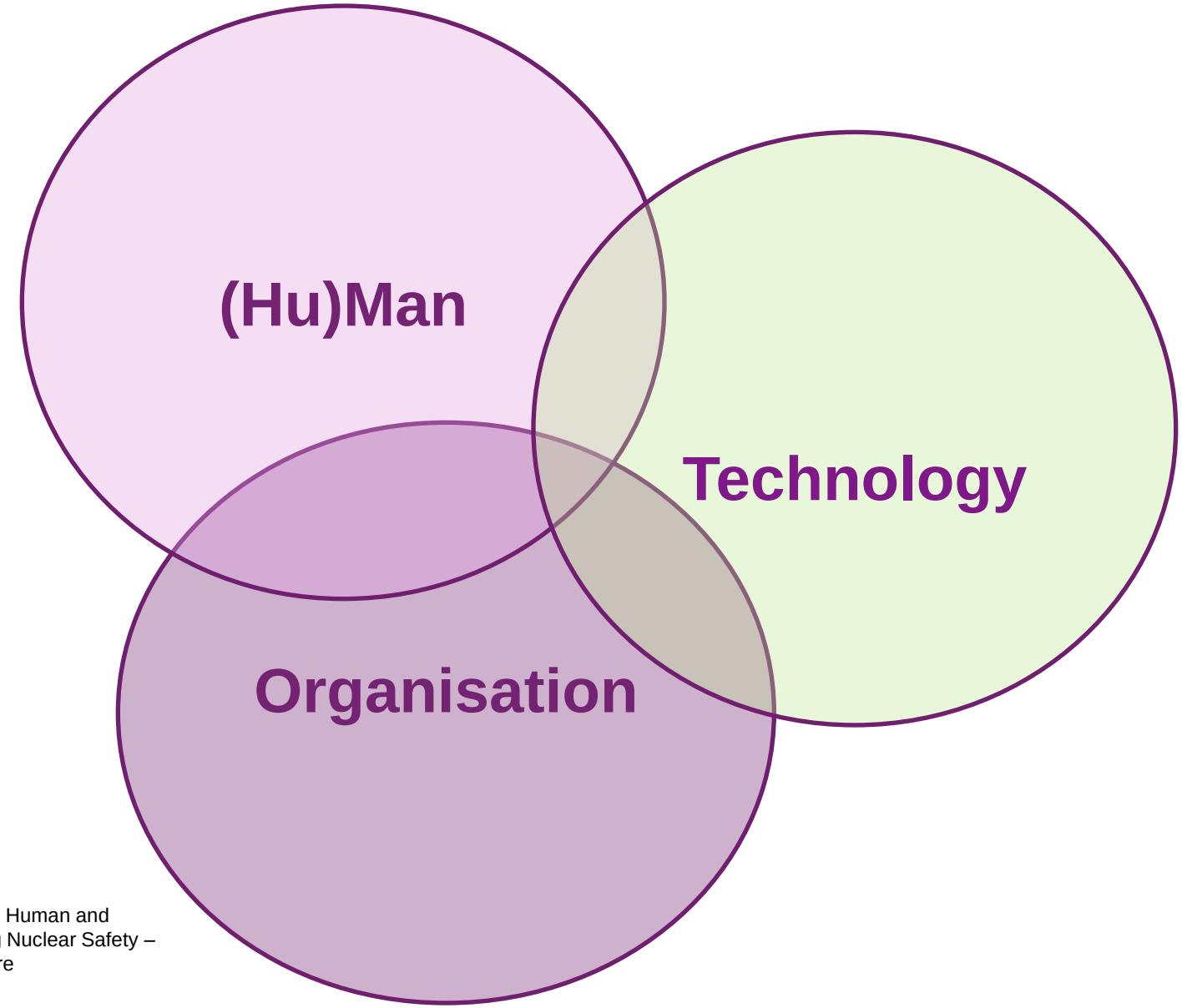

(Hu)Man
Technology
Organisation

The interaction Man- Technology - Organisation

MTO stands for the interaction between humans, technology, organization: the term refers to a systemic perspective on how radiation safety are affected by the relationship between:

- Human's abilities and limitations
- Technical equipment and the surrounding environment
- The organization and the opportunities this provides

The Section of Man-Technology-Organisation section in Sweden consist of 12 Human factors specialists responsible for the following areas:

- Safety management, leadership and organisation
  (e.g. Quality assurance, management systems, organisational changes)

- Safety culture
  - (also responsible for the departments coordination of safety culture as well as coordinating SSMs internal safety culture work)

- Working conditions

- Competence, fitness for duty, suitability, education and staffing, knowledge management

- MTO perspective/Ergonomics of control room work and plant modification

- Incident analysis and risk analysis from the MTO-perspective (and learning from experience)

- The SSM regulations concerning safety in nuclear facilities (SSMFS 2008:1) have explicit requirements and general recommendations in all of the above-mentioned areas

- Together with inspectors/experts from other sections and departments we create integrated MTO teams (human factors expertise as well as technicians) where we inspect, review and work together in safety issues etc.

- Human factors are an expected expertise in almost all activities at the authority

Human factors experts at SSM need to have professional skills and competence in the following areas

- Management system and quality assurance
- Management, organisation and safety particularly during changes, rationalization and cost efficiencies
- Organisations function and operation, management and group psychological aspects
- Safety culture and safety leadership
- Methods and principles of competence assurance and for ensuring adequate staffing

- Suitability Requirements and suitability assessment
- Physical, psychological, social, technical and organizational conditions that affect people's abilities and motivation,
- Control room work and plant modification with MTO perspective incl. ergonomic aspects of human-system interface
- Investigation of events and conditions with regard to the man-technology-organization
- Risk analysis in the field, especially qualitative risks of the human- technology-organization perspective.

MTO – Basic statements

- A systemic view of safety, focusing on the relations between human, technology and organisation
- The concept is well established both in the industry and at the regulator.

- The technical systems must be able to “handle” errors (not based on 100% human efforts)
- Humans must be supported to report mistakes
- Important to create a just and blame free organizational culture were the reasons for mistakes are investigated, corrected and learned from

- Proactive and reactive prevention efforts
- Human error is inevitable and can not be eliminated
- To err is human, we can not change people's basic conditions but we can change the conditions that people working in
- An accident is often the result of a chain of events
- There is very seldom one single cause to an accident, instead there are many contributing factors
- Important to have knowledge in factors that affect the performance of individuals, groups and organizations

There are two ways to look at the human contribution in safety problems

PERSON approach:

Focuses on individual persons errors and mistakes. Actions aimed towards people at the operator level (the sharp end).

SYSTEMIC approach (SSMs view):

A holistic view which traces contributing factors back into the whole system. Actions aimed towards situations and organizations.

SYSTEMIC approach

Incidents and accidents are caused by a linked series of failures in defenses, barriers and control functions that has been established to protect from unknown dangers.

The important questions are:

- How and why did the system fail?
- What can we do to reduce the risk that will happen again?

Reason, 2000

Regulatory Processes at SSM

Plant Surveillance

Notification of Plant Modification

ABG

Investigation and Research

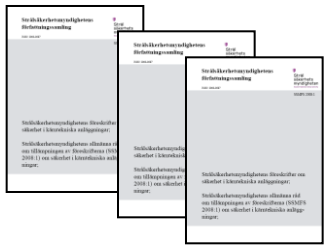
Inspections

Safety Review

Event analysis and operational feed-back

ASK

RASK



Indicators

Safety Evaluation

Risk contribution - PSA

Experience and skills of SSM-staff for example International co-operation

Integrated Safety Assessment

Regulatory Actions:
Decisions
Enforcements

Planning and bud-geting/Prioritisation

Safety is based on preventive actions where both technology and human behaviour need to be considered

Humans, management and organisations should be discussed not only in terms of their limitations, errors and shortcomings but also in terms of their strengths in stopping a chain of events, in learning, inventing and improving.

Thank you for your attention