

Human and Organisational Factors in Perspective

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Do we need accidents for safety?

A common observation after large accidents is that there were precursors not reflected properly in attempts to enhance safety.

Accident	Date	Influencing issues
Three Mile Island	28 March 1979	human factors
Chernobyl	26 April 1986	organisational factors
Fukushima	11 March 2011	societal factors

Three activities

- A book on HF in the nuclear industry
- Papers presented in Knoxville, Tennessee at the ANS conference 21-24 April 1986
- LearnSafe revisited, 15 years later

Our common objective is to in a broad context assess needs for the nuclear industry to operate their NPPs safely from now onwards

Book: 'Human Factors in the Nuclear Industry'

ELSEVIER BOOK STRUCTURE "Human Factors in the Nuclear Industry"

Option #1

Introduction / Editorial note Anna-Maria Teperi and Nadezhda Gotcheva

Part I: Historical accounts and current perspectives

- Chapter 1:** Human factors in nuclear power: Reflections from 50 years in Finland Björn Wahlström
- Chapter 2:** Applying Human Factors in nuclear industry - people as a presence of positive capacity Anna-Maria Teperi
- Chapter 3:** From classical Human Factors towards a system view – experiences from the Human Factors nuclear field in Sweden Carl Rollenhagen

Part II: Practices and tools to support team performance

- Chapter 4:** Human performance tools as a part of programmatic human performance improvement Kaupo Viitanen
- Chapter 5:** Team performance, communication and shared situational awareness - control room resource management (CCRM) in the nuclear industry Matti Sorsa
- Chapter 6:** Multitasking and interruption management in control room operator work Jari Laarni
- Chapter 7:** Resilient power plant operations through a self-evaluation method Mikael Wahlström, Timo Kuula, Laura Seppänen, Piia Rantanummi and Pekka Kettunen

Part III: Means and methods to facilitate organizational learning

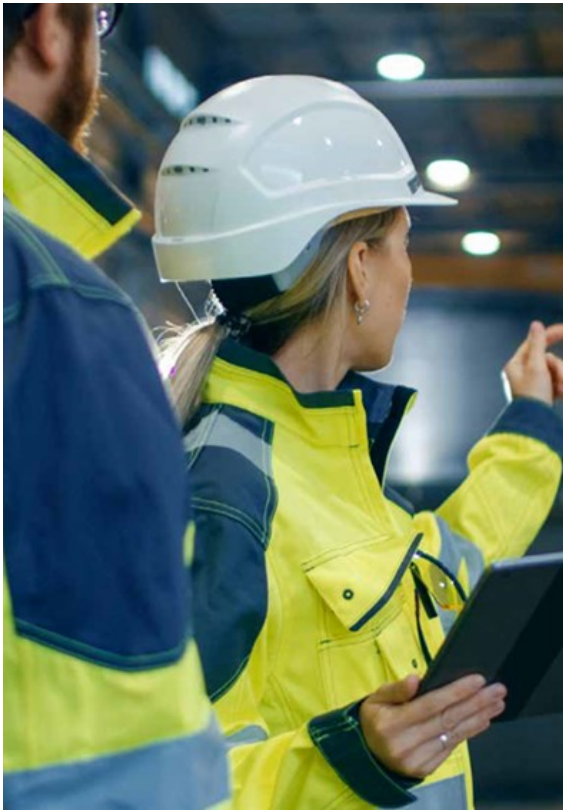
- Chapter 8:** Learning from Operational Experiences Vuokko Puro, Henriikka Kannisto and Eero Lantto
- Chapter 9:** Practical solutions and actions to support organization performance and resilience in Finnish nuclear industry Krista Pahkin
- Chapter 10:** Towards learning organization – practices in NPPs Petri Koistinen
- Chapter 11:** Learning from emergency exercises through systematic debriefing Marja Liinasuo

Part IV: Insights and visions to develop inter-organizational cooperation

- Chapter 12:** The urgent need to learn from Fukushima nuclear power accident – from reactive to proactive through a systemic approach to safety Monica Haage
- Chapter 13:** Ensuring safety across organizational boundaries in complex nuclear industry projects – an issue of system level HF (tentative title) Nadezhda Gotcheva, Kirsi Aaltonen, Jaakko Kujala
- Chapter 14:** Assessing the goodness of the concept of institutional strength-in-depth Marja Ylönen
- Chapter 15:** Utilizing design thinking to rethink safety management practices in the nuclear industry Anna-Maria Teperi, Nadezhda Gotcheva, Kirsi Aaltonen

*21 authors
from nine organization,
representing nuclear
research, practice
and development*

PARticipative development for supporting human factors in **SA**afety (**PARSA**)



- On-going research in maintenance of two NPPs
- Methods:
 - work process analysis
 - video-based reflection of work place learning
 - critical inquire of human performance tools
 - .. to speed up learning among nuclear actors.

Benefits of applying HF perspective (on-going-research; preliminary findings from railway)

1. Focus on successes and what goes well
2. More analytic incident analysis, including human variability with holistic view
3. More accurate corrective actions
4. Acceptance of slow systemic moves (blunt end vs. sharp end), not just 'quick fixes'
5. Understanding better own and others' errors
6. Trust on views of operative reality (bottom-up)
7. Top management follow-up and interest
8. Improved quality of communication and openness of discussion.



www.ttl.fi/prohf; data collection and analysis in progress; interviews, workshops, quantitative measures, documents

References

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Project full name:	Learning organisations for nuclear safety
Research programme:	NUC (Euratom)
Contract number:	FIKS-CT-2001-00162
Duration:	1 Nov 2001- 30 Apr 2004
Partners:	VTT (Co-ordinator), TUB, ULANC, CIEMAT, SWP, UNESA, WANO, TVO, FKA, KKG, KKK, BNFL, OKG, Rinhals and European Commission.

Project Summary

The objective of the LearnSafe project was to create methods and tools for supporting processes of *organisational learning* at the nuclear power plants (NPP). Organisational learning is important for the nuclear industry in its adaptation to changes in political and economic environments, changing regulatory requirements, a changing work force, changing technology in the plants, and the changing organisation of NPPs and power utilities. The danger during a rapid process of change is that minor problems may trigger a chain of events leading to actual degrading of safety and/or diminishing political and public trust in the safety standards of the particular NPP, utility or corporation.

The focus of the project was senior managers at NPPs and power utilities who are responsible for strategic choice and resource allocation. This focus was selected with the understanding that their decisions, approaches and attitudes have an important influence both on safety and economy of the NPPs. The LearnSafe project developed methods and tools, which can be used in the management of change, and in ensuring an efficient organisational learning. Project results include recommendations and inventories of good practices. The project was built on results of an earlier EU-project "Organisational factors; their definition and influence on nuclear safety" ([ORFA](#)).

The project was set up in two major phases, which covered both theoretical considerations and empirical investigations. The first phase placed an emphasis on management of change and the second on components of organisational learning. Both phases started with the creation of data collection instruments, which were used in the empirical part of the work. The second theoretical and empirical phase took a major step towards developing methods and tools, which can be applied by the NPPs themselves in creating maintaining efficient processes of organisational learning.

One important feature of the project was a continuous interaction between the researchers and managers at the NPPs in addressing issues connected to organisation and management. Preliminary results of the project were presented and discussed in small workshops at the NPPs during the project. Several small spin-off projects were carried out together with the participating NPPs.

[Project Overview](#)
[Project Brochure](#)
[Main Report](#)
[Project Reports](#)
[Final seminar](#)
[Project Data sets](#)
[LearnSafe Team](#)

<http://dy.fi/4wo>

Data

PHASE 1

Semi-structured interviews with 11 top utility management from 6 utilities within 5 European countries.

19 **metaplan sessions** with senior and multifunctional NPP managers at 10 NPPs within 5 European countries and 1 session at WANO.

PHASE 2

Semi-structured group interviews with 36 participants from 8 NPPs within 5 European countries.

11 **metaplan sessions** at 9 NPPs within 5 European countries and 1 session at Head's of Safety and Environment Meeting in the UK.

11 **discussion sessions** at 9 NPPs within 5 European countries and 1 session at Head's of Safety and Environment Meeting in the UK.



Why revisit LearnSafe now?

- Enough time has gone, it has been possible to open the files
- LearnSafe gives a snapshot of the nuclear industry in Europe in the year 2004
- What has happened during 15 years?
- Relying on the results from LearnSafe, can we give guidance to the plants today?
- Data has been collected from Forsmark, Sweden in interviews carried out at 17 April 2019
- Continued contacts and discussions

Present plans

- A search for additional partners
- A seminar in Forsmark to discuss a draft report
- Discussions on OF-issues to form a consensus view in the group
- Separate reports on selected issues of safety management
- A follow up study of the question "How safe is safe enough?"*

*Starr, C., 1969. Social benefit versus technological risk. Science 165, 1232–1238.

Conclusions

HF/OF/SF are important for nuclear safety

Human and Organisational Factors are evolving

THANK YOU!

Questions?
Comments?