

Finnish Institute of
Occupational Health

Boosting safety: Integrating Human Factors in the safety critical industries

 2.10.2025
Safety Days ERA

Anna-Maria Teperi, PhD, Research professor

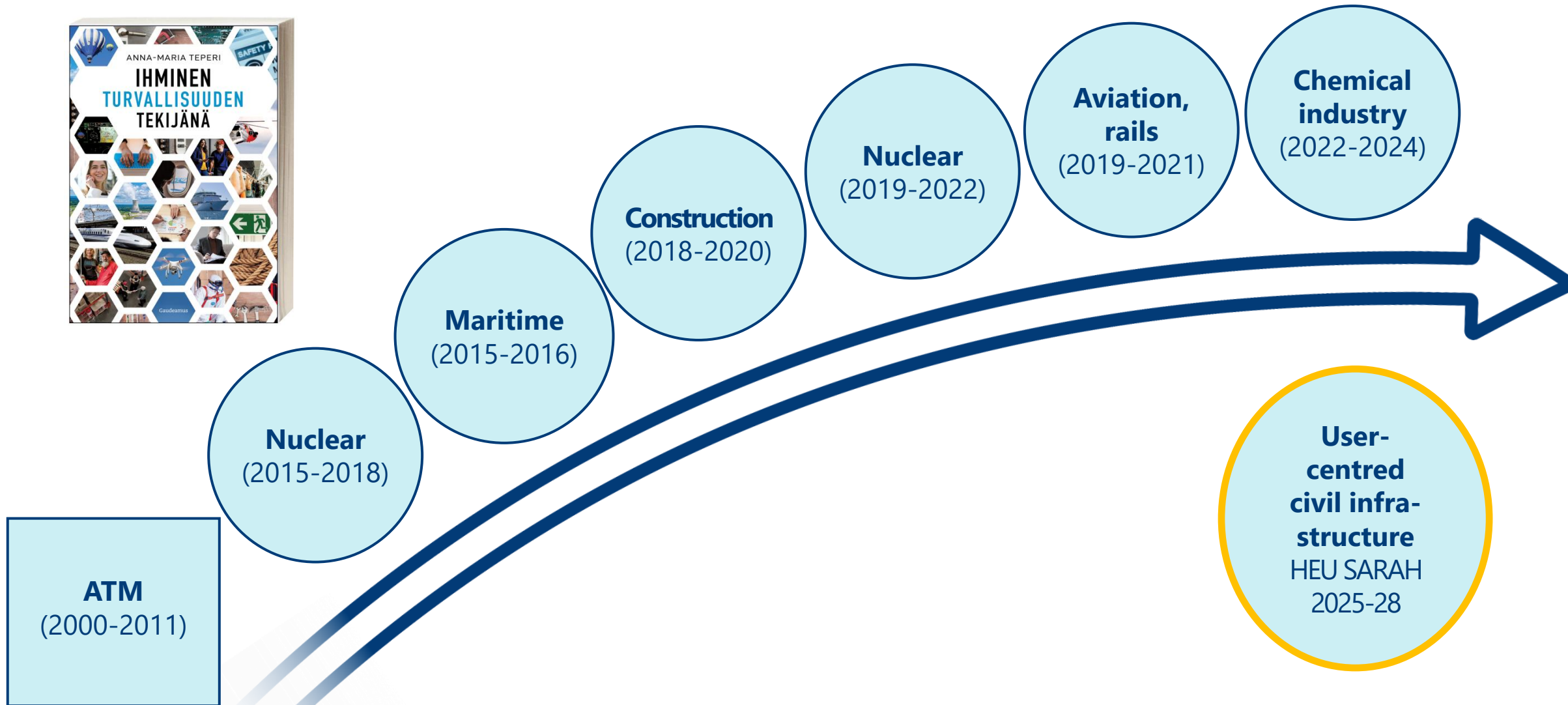
80 YEARS OF
WELL-BEING
THROUGH WORK

Anna-Maria Teperi

- **Psychologist**; work and organisational psychology
- **Title of Docent**: University of Tampere, University of Vaasa
- **Finnish Institute of Occupational Health (FIOH)**
- **Co-Chair, The Finnish Expert Panel for sustainable** development, the Prime Minister's Office
- **EU Commission**: Working Party 'Climate change and OSH'
- **Earlier:**
 - **Finavia** Human Factors in aviation // **Occupational Health Centre**
 - **Accident Investigation Board** HF Specialist // Nuclear **Safety Committees**



**MOTTO: HOW TO
HELP PEOPLE
SUCCEED?**



SUPPORT SYSTEM AND HUMAN RESILIENCE:
Ability to anticipate, cope, recover and learn.
HELP PEOPLE SUCCEED.

SAFETY I

FACTORS WEAKENING SAFETY

- Unsuccessful actions
- Risks
- Errors

INDIVIDUALS AND ERRORS IN FOCUS

- "Bad Apple Theory"
- "Find the weakest link and throw them away"
- Latent systemic failures remain in system

= OLD THINKING



SAFETY II

FACTORS MAINTAINING SAFETY

- Things working well
- Understanding human variation
- Limited resources

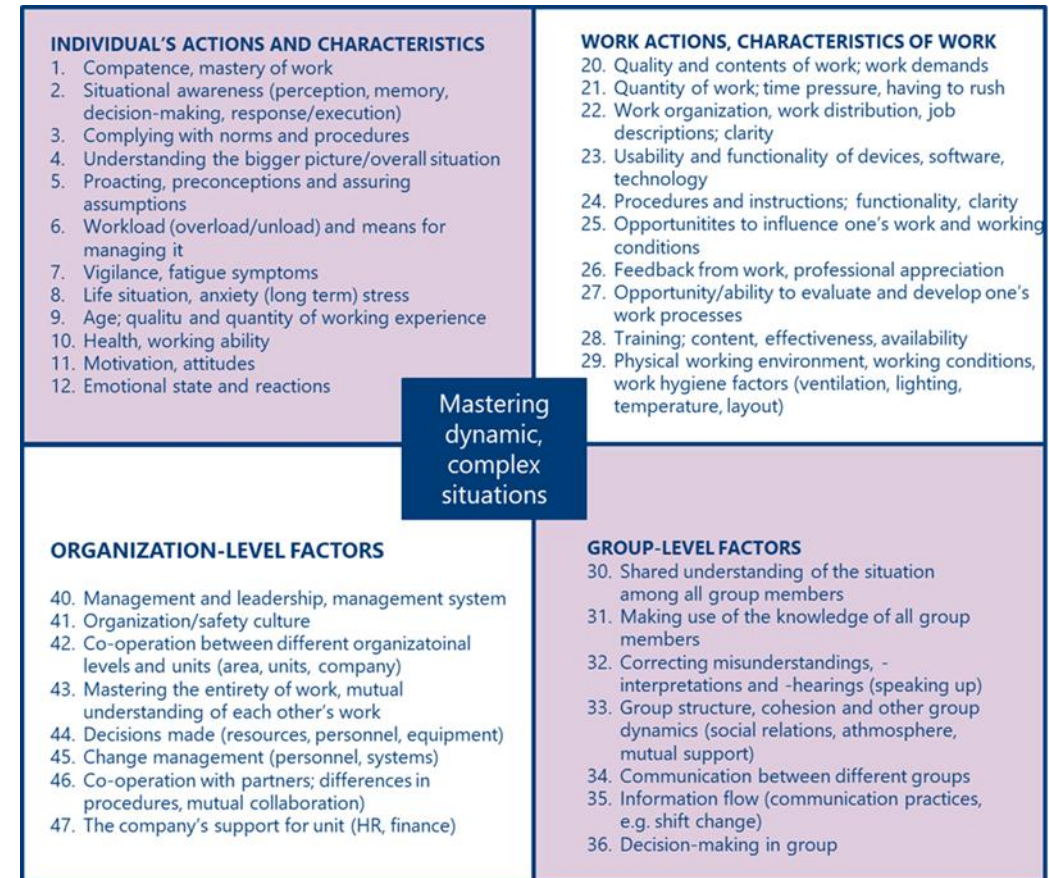
ORGANISATION, SYSTEM, RESOURCES AND DEVELOPMENT IN FOCUS

- Several contributing factors behind the cases
- Learning is main goal of investigation
- Human error is starting point for improvement - not the conclusion

= NEW THINKING

HF Tool™ – a tool for understanding and analysing human activity

- Helps to perceive the **big picture** and the systemic nature of human contribution in operations.
- Describes the factors influencing the **individual, work, group and organization** levels.
- Describes the **strengths and weaknesses of activities** and how they affect each other.



Currently trademarked to FIOH (HF Tool™). Based on the development work at Finavia 2000-2011 (Teperi, 2012)

Why such a tool?

- intended for **operative personnel's own use** (not only 'HF/safety-professionals')
- **easy-to-use** (compared to 'heavy investigation methods')
- **embedded in everyday life** (part of SMS)
- **holistic**
- **positively-minded**



HF Tool



**Individual's
actions and
characteristics**
Items 1-12



**Work actions,
characteristics of
work**
Items 20-29

**Organization-level
factors**
Items 40-47



**Group-level
factors**
Items 30-36



Analysing a case with the HF Tool

Timeline for successes



+1 Professional competence
+34 Communications

+5 Anticipation and
making sure

Event timeline



Timeline for failures



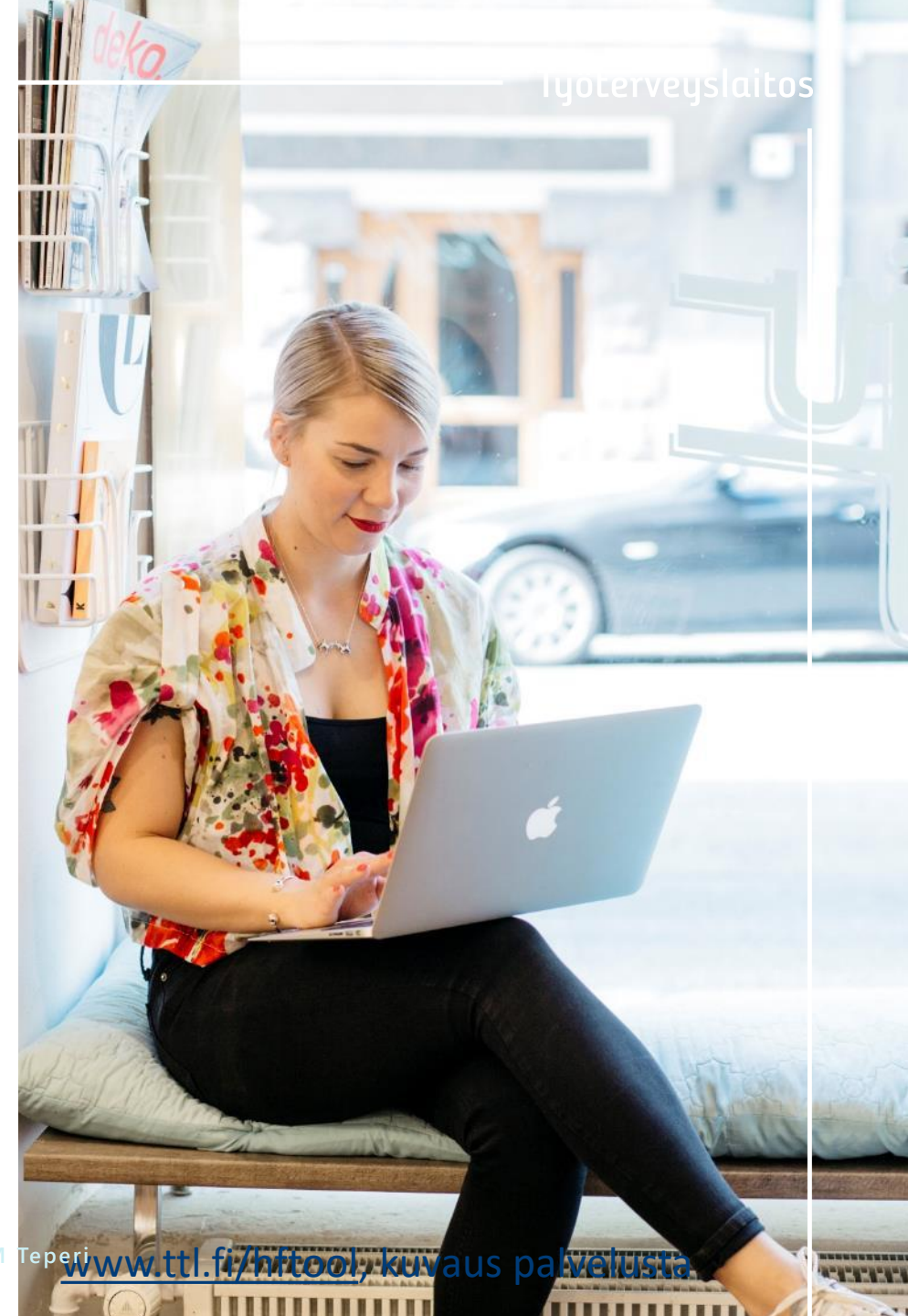
-11 Motivation, attitudes
-22 Instructions and division of tasks

HF Tool – Gripping the Real-World

A concept for bringing about change and implementation, includes several parts:

- Basic, continuing education and trainer training
- Information and presentations to management
- Investigative tools, support for corrective actions
- Constantly evolving, researched in different fields

The basis for long-term, systematic development projects
(aviation maintenance, rail, forestry logistics, food industry,..)



Air Traffic Management 2000-2011

1. phase: Post strike actions, analyzing ATM work processes (2000-2003)

2. phase: HF Tool embedded in SMS

- Operational personnel, incl. supervisors
- **Incident investigation and reporting**
- **Monthly reports** on incidents throughout the organization (from board to personnel)
- HF Tool included in **risk analyses**
- HF Tool introduced in 2003, **still in use** today



(Improving HF in ATM From must to mindset)

Nuclear power industry 2015-2018 / on-going collaboration

- HF Tool used **by safety experts and managers** of two nuclear power plants
- **Investigations** currently include HF Tool as an analysis method
- Helped to focus **on successes**
- Explored in UK at EDF [Applying Adaptive Safety Methods to Normal, Everyday Work in a Nuclear Powerplant by Robin Hamer, Thomas Jun, Patrick Waterson, Anna-Maria Teperi :: SSRN](#)



Maritime 2015-2016, continued in 2020-2025

- Collaboration with **eight maritime operators**, both on land and at sea
- HF Tool provides **an opportunity to report deviations positively** and develop safety inclusively
- Application **in simulator training** for maritime and other sectors (rescue services, emergency care)
- **Study for high-speed workboats** [Human factor analysis of cockpit work incidents in high-speed workboats: the mystery hidden between the lines – PubMed](#)



Railway 2015-2019

- Implemented **proactively with VR Group** in Finland since 2015 (EU directive 2016)
- **Trigger:** Accident investigation in 2015
- **HF-programme in 2015-2018:** training sessions, workshops, network meetings, revised safety investigation
- ..continued by **research 2018-2019**



The development path with HF

Human-centric mindsets and practices evolve over time and across different spaces

- Awareness; **Competence**
- Safety management and **safety practices**
- **Work practices and** planning; system design
- Systemic and proactive multi-stakeholder collaboration
- **HF Tool supported organizational learning**, enabling the development of safety practices and work

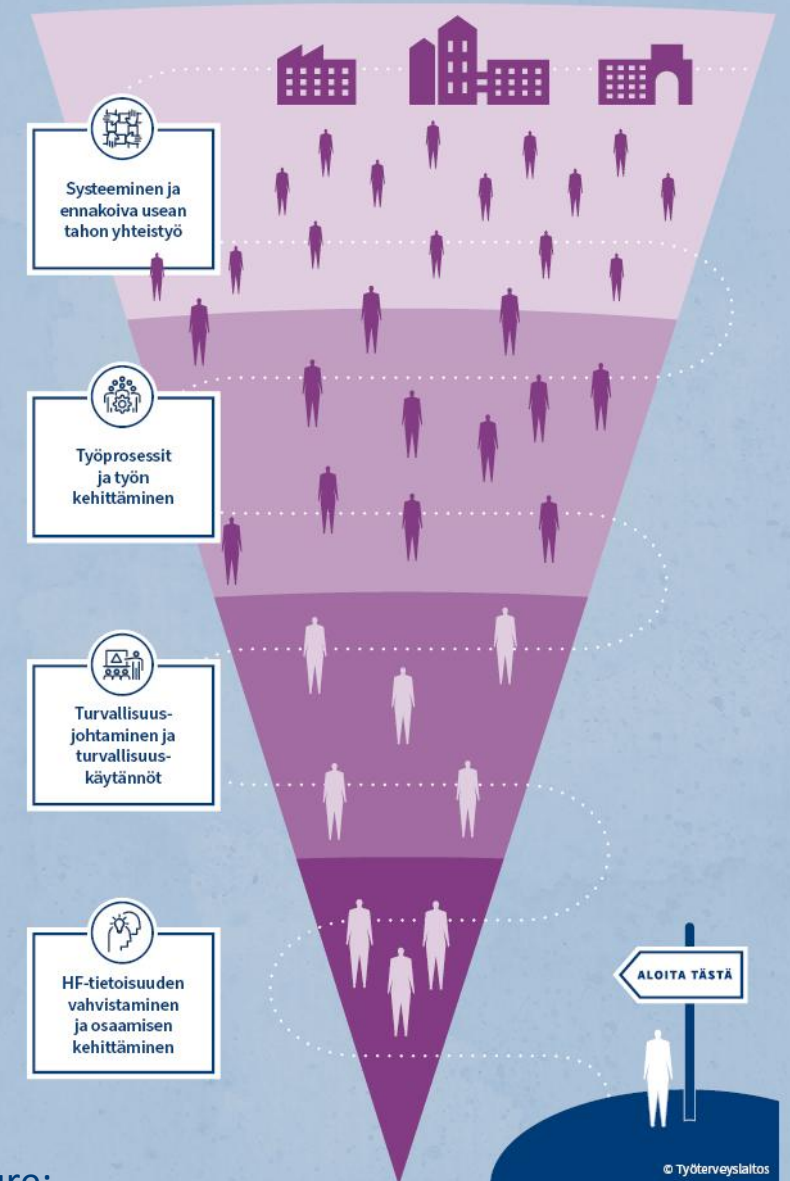


Figure:
www.ttl.fi/prohf

SARAH: uSer-centric civil infrAstructure Reliable assessment And Healing -projekti

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- The human-centric concept of the EU Horizon project is based on the **HF Tool™** - research and development over 20 years
- **Use Cases:** Maintenance and repair of a viaduct along the railroad; Stabilization of slopes using ground anchors



Horizon EU Twin digital transition: [uSer-centred civil infrAstructure Reliable Assessment and Healing | SARAH | Project | Fact Sheet |](#)
[HORIZON | CORDIS | European Commission](#)



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Thank you

 HAVE A GOOD DAY
AT WORK!

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