EUROPEAN UNION AGENCY FOR RAILWAYS

HOF Conference

Human & Organisational Factors

22-23 October 2024 - Valenciennes, France

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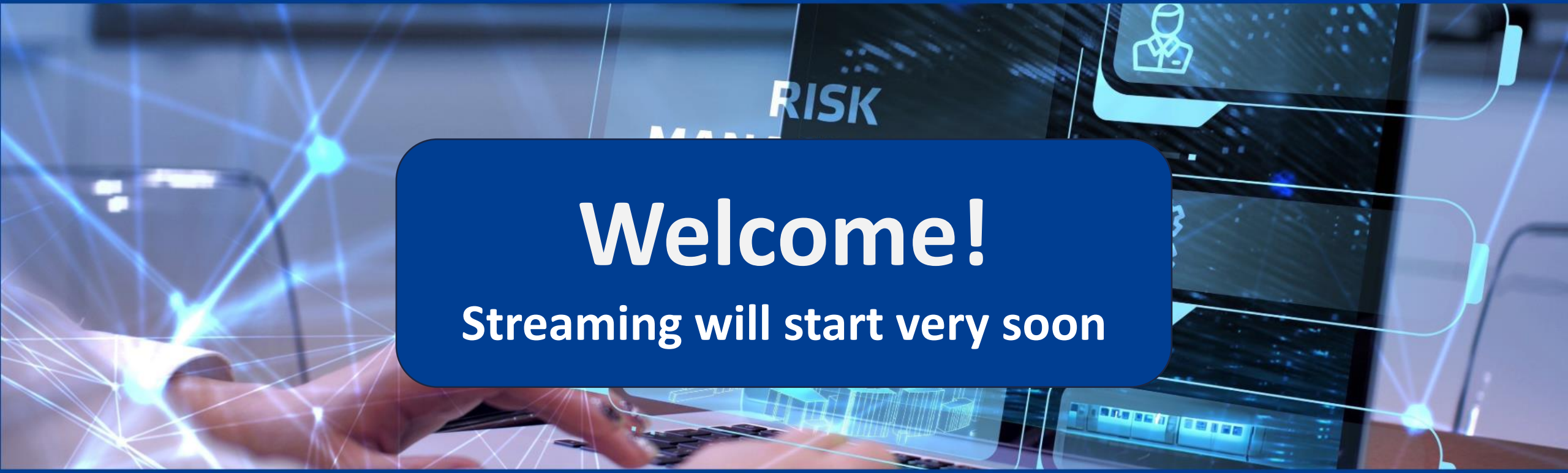
Human & Organisational Factors (HOF) Conference



Welcome!

Streaming will start very soon

22-23 Oct 2024 Valenciennes, France

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Human & Organisational Factors (HOF) Conference

Welcome by:
Dr. Josef Doppelbauer

22-23 Oct 2024 Valenciennes, France

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As railways have evolved— from steam engines to high-speed trains and digital control systems— the risks that we have to manage have also changed.

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HUMAN FACTORS

Attention on the system as a whole?

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HOF is a mindset,
a way of thinking that places human beings at the center of our safety and risk management strategies.

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AGENCIA ESTATAL
DE SEGURIDAD FERROVIARIA

MIND ON TRACK:

ASSESING TRAIN DRIVERS' PSYCHOLOGICAL FITNESS

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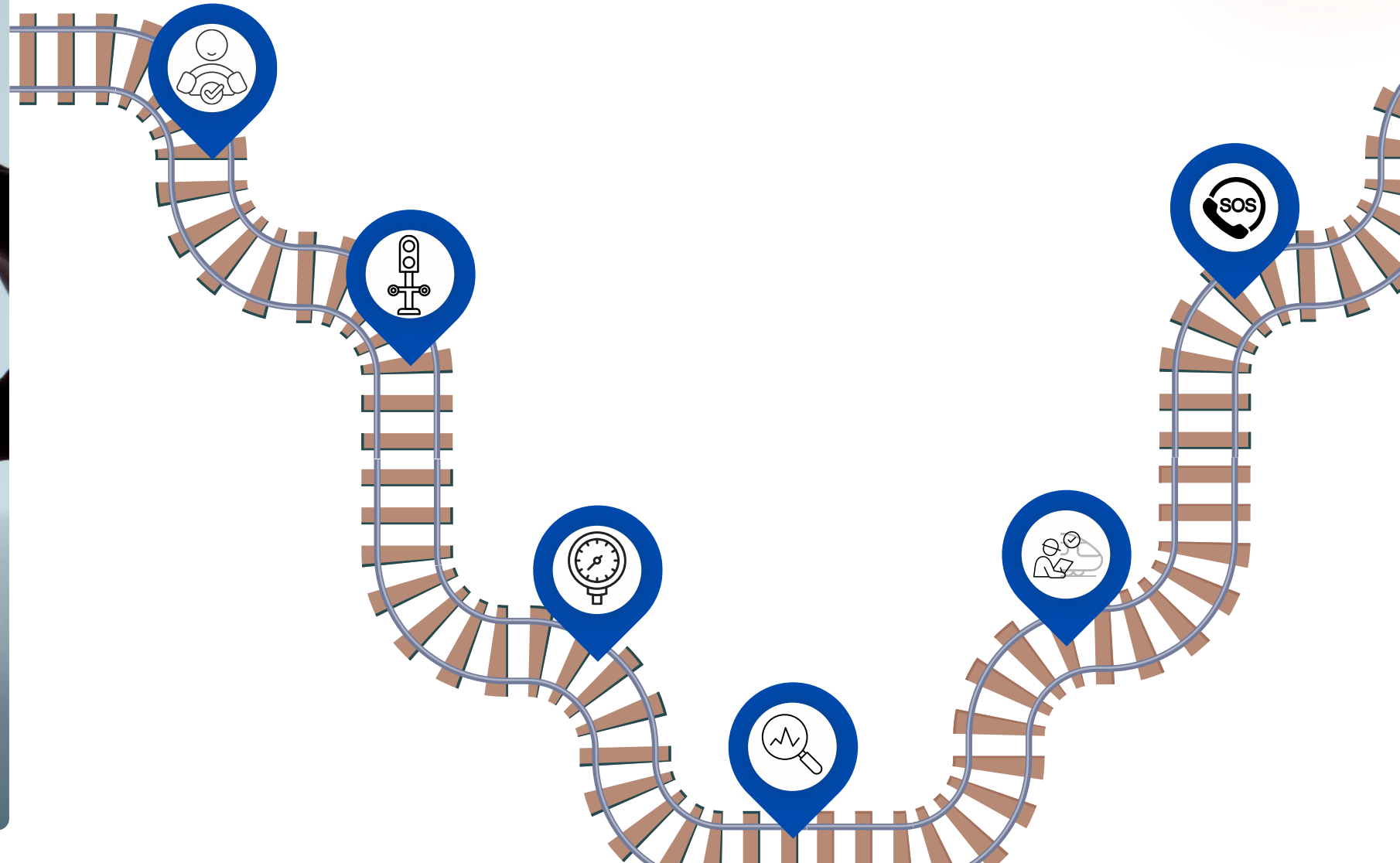
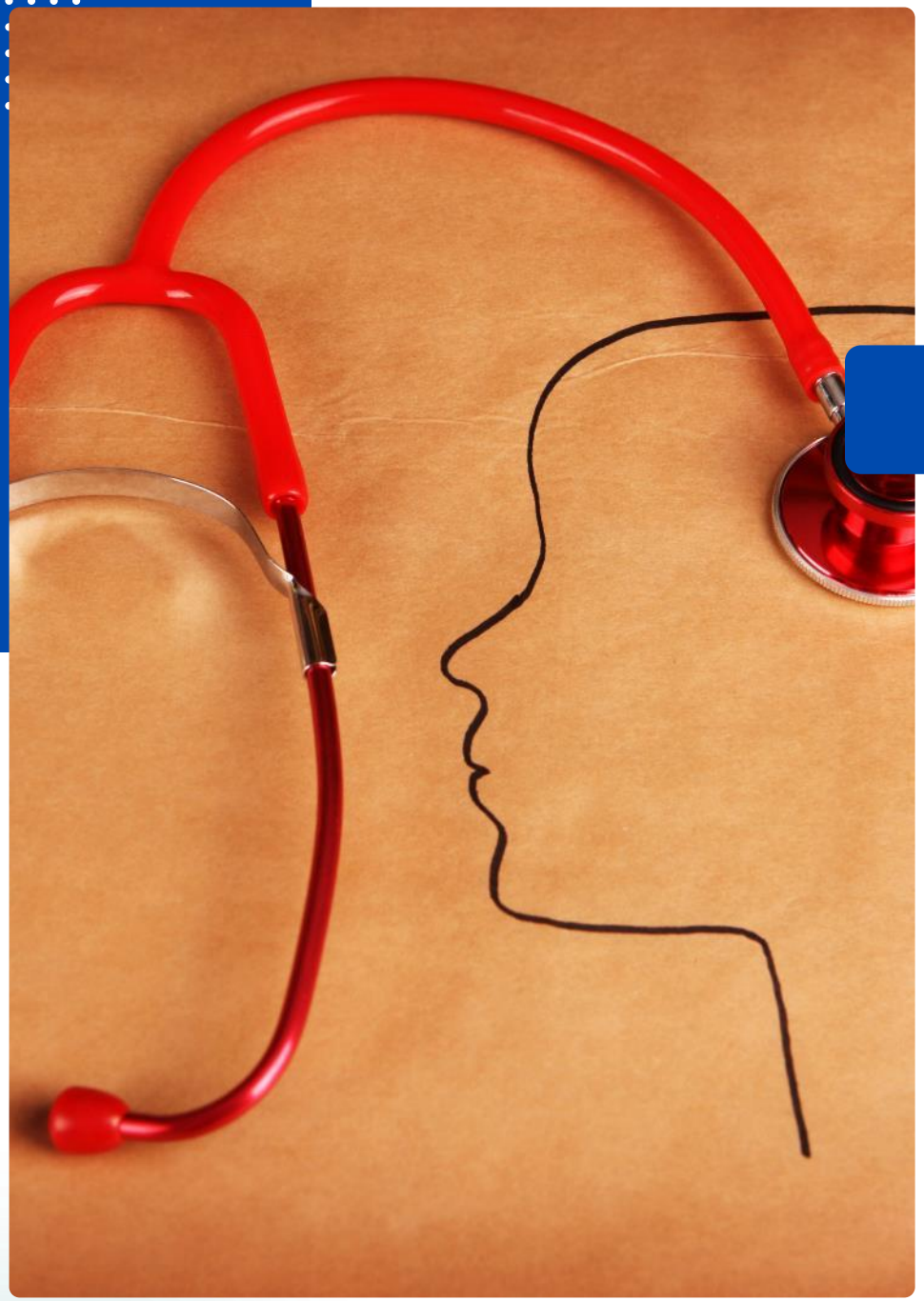
A KEY ROLE





PHYSICAL AND MENTAL BALANCE

Train Driver Directive

PSYCHOLOGICAL ASPECTS IN TRAIN DRIVERS

Cognitive Skills

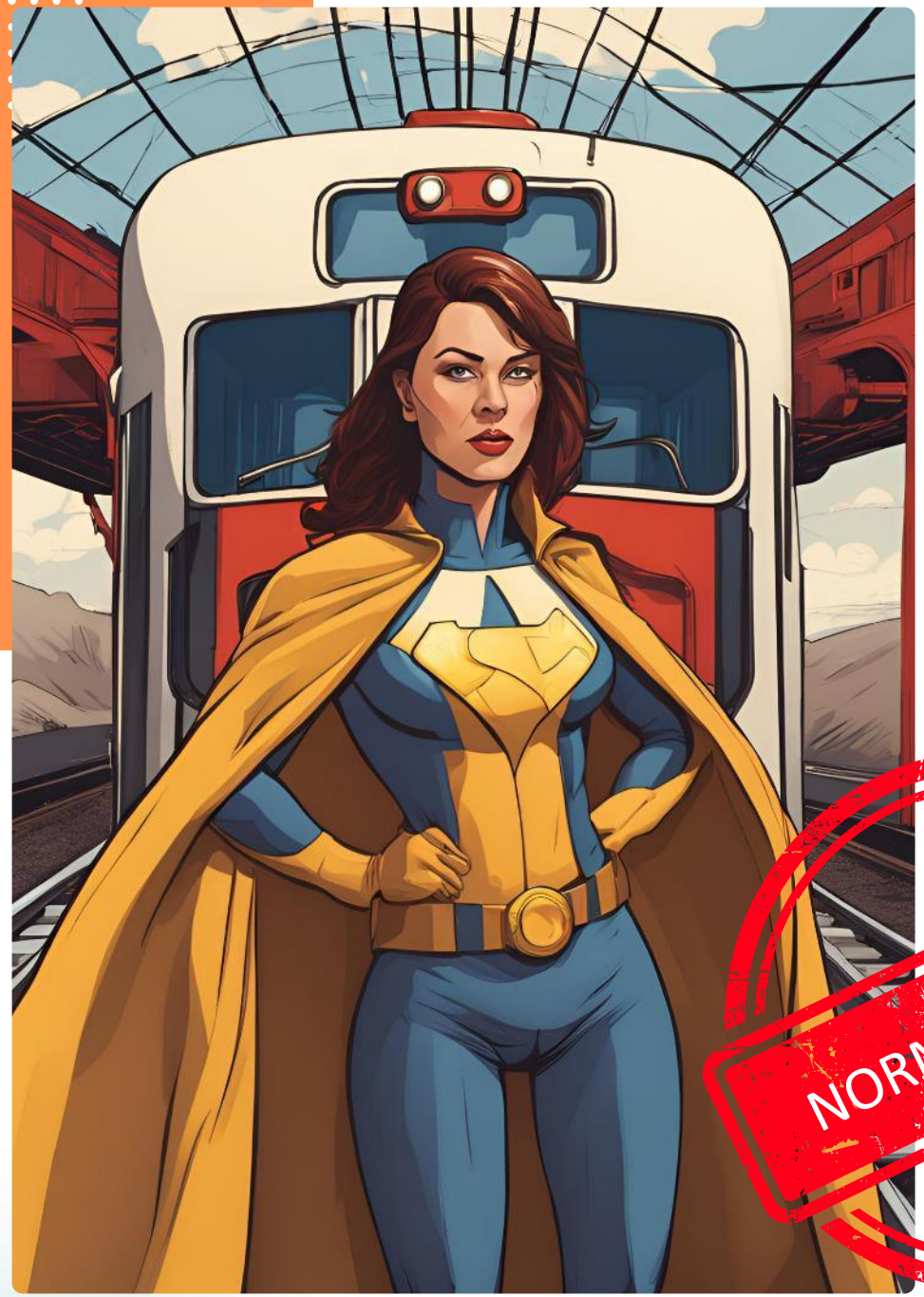
Memory, speed reaction, spatial attitude, psychomotor coordination, mental capacity, situational awareness, executive functions.

Personality

Sensation-seeking, risk-taking, perceived control, responsibility, friendliness.

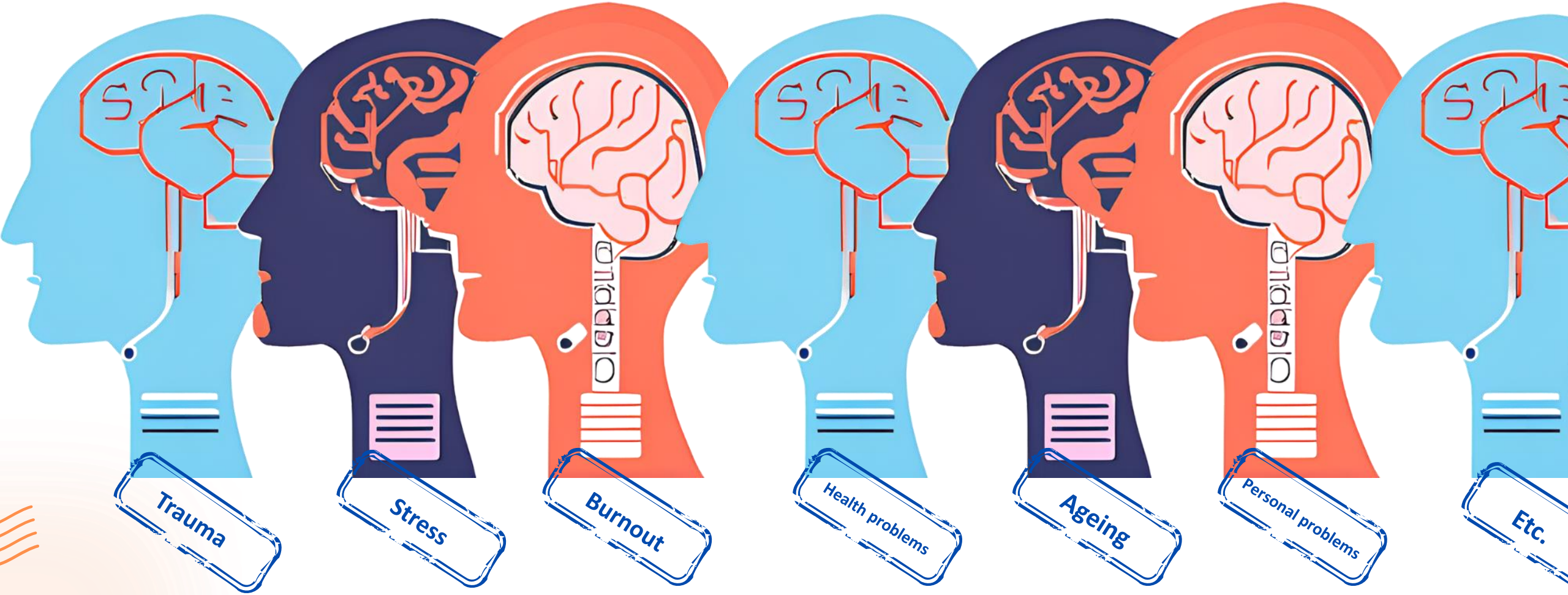
Psychoticism

Mood disturbance, anxiety, sleep disorders, emotional instability..



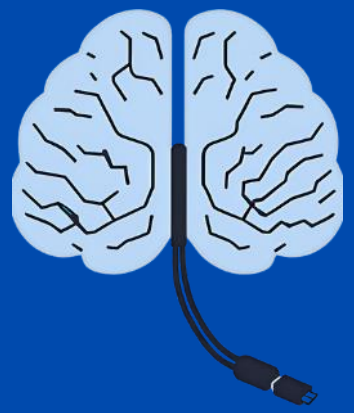
WITH GREAT POWER COMES GREAT RESPONSIBILITY

PSYCHOLOGICAL WELL-BEING IS NOT STATIC



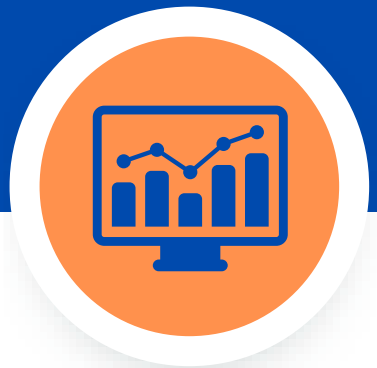
HOMOGENEOUS ASSESSMENTS

APP FEATURES



1	Reliability	4	Scientific evidence
2	Intuitive	5	Holistic assesment
3	Data Security	6	NON-diagnostic

RESULTS

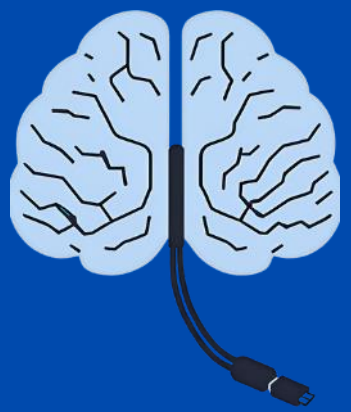


REPORT

INCIDENT RISK

VERIFY

A PICTURE IS WORTH A THOUSAND WORDS



UNITY MAKES STRENGTH

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CENTRO EUROPEO DE FORMACIÓN FERROVIARIA

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Applying Human and Organisational Factors to better manage change

Paul Leach

Head of Human Factors at the Rail Safety and Standards Board (RSSB)

HUMAN & ORGANISATIONAL FACTORS (HOF) CONFERENCE

22-23 OCT 2024
VALENCIENNES, FRANCE

RSSB Human Factors Team

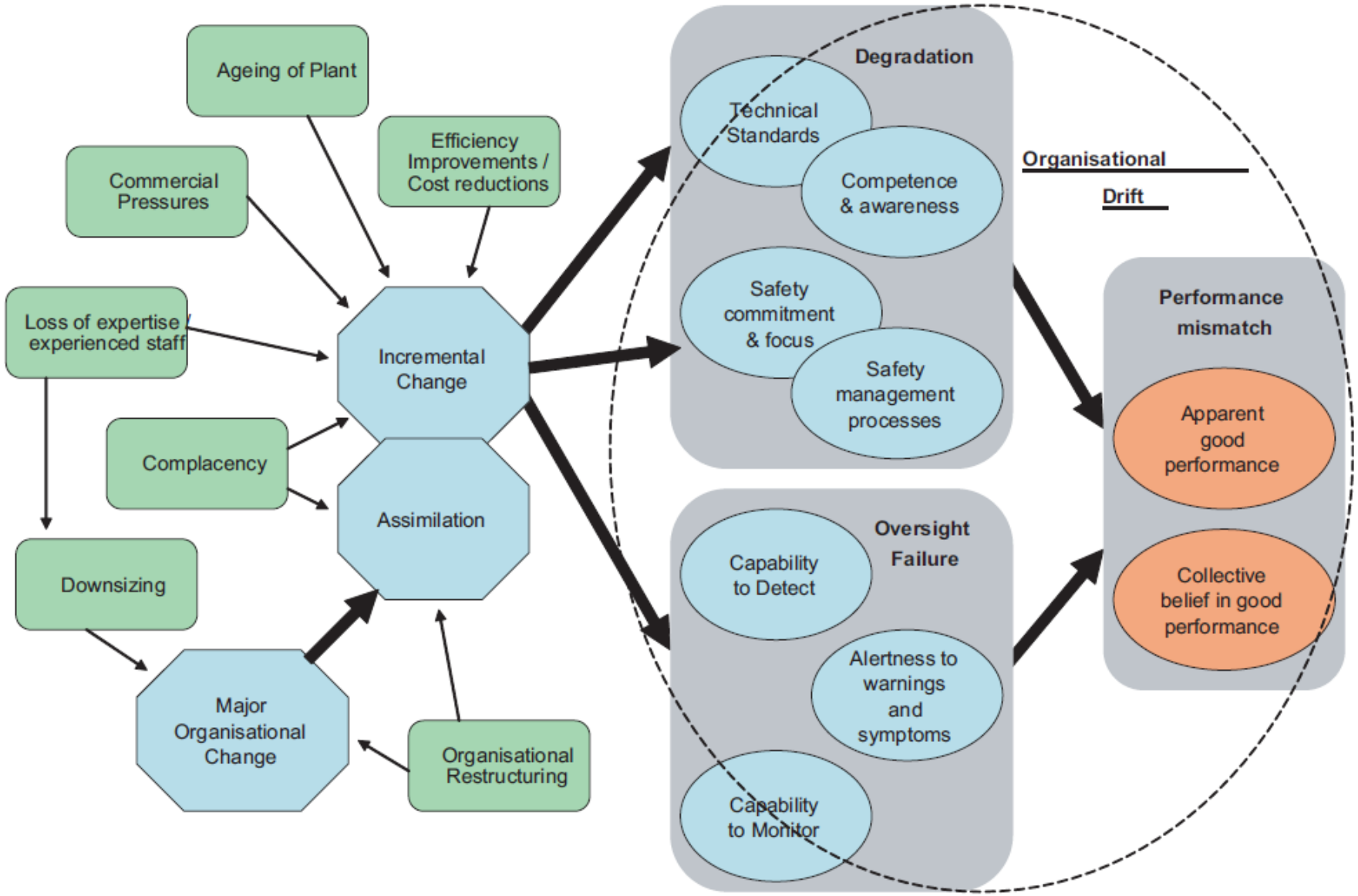
- Set up when RSSB began
- 12 team members
- Professions: Psychologists, Ergonomists, PHD, Chartered professionals
- Experience in many sectors: rail, aviation, defence, transport
- Cover all the railway: passenger, freight, infrastructure, supply chain, heritage, operations, design, maintenance
- Services:
    - Rail operations
    - R&D
    - Standards
    - Training
    - Consultancy

Today's talk

Putting people at the heart of change

People focused change process

Building psychological safety


Ageing of Plant
Efficiency Improvements / Cost reductions
Commercial Pressures
Loss of expertise / experienced staff
Incremental Change
Complacency
Assimilation
Downsizing
Major Organisational Change
Organisational Restructuring
Degradation
Technical Standards
Competence & awareness
Safety commitment & focus
Safety management processes
Organisational Drift
Oversight Failure
Capability to Detect
Alertness to warnings and symptoms
Capability to Monitor
Performance mismatch
Apparent good performance
Collective belief in good performance

Background: People Change Process

Rail infrastructure organisation was changing their procedures and safety rules around managing possessions.

They were concerned that they were not managing people well enough during this change.

Required a HOF review of their change management plans and materials

Checklist for managing people through change

Policy

- Statement of change & benefits
- Objectives
- Change teams & engagement
- Risks & Human Centred Design

Leadership

- Responsibilities for decision making
- Behaviours expected
- Training and support
- Culture to support change

Staff

- Human performance impacts (tasks etc)
- Work as done vs work as imagined
- Staffing requirements

Emergencies

- Operation in normal, degraded and emergency
- Impact on existing arrangements for these conditions

Involvement

- Involvement and engagement
- Feedback and listening
- Anxiety and fear
- Decision making

Procedures & equipment

- Task and job change
- Work as done
- HOF factors
- Equipment changes

Checklist for managing people through change.

Training & competence

- Task & job change
- Job analysis
- Blended learning
- Trainers & assessors

Wider business

- Changes in the business
- Change fatigue
- System approach
- Other roles, tasks and equipment

Decision making

- What decisions?
- When to make them?
- Decision making process
- Participative decision-making

Communication

- Hearts & minds
- Champions
- Communication vacuums
- Feedback & measurement

Measuring & monitoring

- Planning
- Success criteria
- Making changes
- Monitoring management behaviours

Lessons for managing people during change

- Change can have a technical focus – but you need to win over hearts and minds
- Can be many different change documents and people – you need one version of the truth
- Leaders and managers may not be prepared - formalise leadership and management behaviours, responsibilities and accountabilities
- Can focus on employed workforce - consider contractors and outsourced resource
- Is the technical, behavioural, equipment and staffing impact fully understood? Assess and fully understand how the change affects tasks, roles, competence, resourcing & equipment
- Briefing doesn’t equal training – blend the learning and train the trainers.
- Engagement vs participative decision making
- Remember the wider business and other organisations affected
- People will fill communication vacuums
- Activity and outcome measures

Background: Developing psychological safety

A rail infrastructure organisation wanted to develop a more collaborative approach to managing safety.

Wanted to develop psychological safety by improving their leadership safety conversations.

We created a safety conversation aide memoir for the senior team supported by scenario-based training.

Psychological safety

”belief that one will not be punished or humiliated for speaking up with ideas, questions, concerns, or mistakes”

Edmondson (2019)

Why build psychological safety?

- Greater staff engagement and wellbeing
- Better organisational learning
  - Better decision making and ability to make proactive improvements
- Better performance outcomes
  - Reduced employee errors
  - Enhanced safety
  - High-performing teams
  - Staff speaking up and challenging

What Lucy Letby tells us about the NHS culture of secrecy and denial

Leadership behaviours

1. State and demonstrate during safety conversations that safety is a priority
2. Communicate it is acceptable to make mistakes and errors, and these are opportunities to learn
3. Seek to understand staff perspectives and rationale for their actions
4. Facilitate reflection and growth through coaching questions during the safety conversation.
5. Admit that you do not know all the answers and want to learn and understand
6. Look to dismantle hierarchy within the conversation
7. Take a coaching style to safety conversations
8. Talk to staff at all levels
9. Thank staff and show appreciation for honesty
10. Take actions away from the conversation and be transparent in what will happen next.

Goal – where do we want to be?	**Step 1: Set the Scene** - Introduce self, explain what you are doing and why **Step 2: Invite participation** - Empower and include - Promote growth mindset - Destigmatise failure
Reality – where are we now?	**Step 3: Grow understanding of workforce reality** - Open questions - Explore and acknowledge successes - Understand challenges - Encourage discussion and others view
Options – what could we do to reach our goal?	**Step 4: Explore options** - What help do they need? - Empower to identify solutions
Way forward – what will we do?	**Step 5: Reinforce and empower** - Discuss next steps - Empower them to act - Thank and acknowledge

The intervention

Aide memoir

- Core leadership behaviors
- Coaching framework
- Practical suggestions

Leadership evaluation questionnaire

- Self-reflection
- 360 feedback

Training session

- What good looks like
- Operational scenarios
- Discussion and reflection

Helped to break down hierarchy and make leaders more approachable

Supports continual improvement

It has changed mindsets

Key messages

- People will deliver change, so they need to be at the heart of the change
- Really understand the change, its impact and HOF factors
- Win the hearts and minds – technical, knowledge and behaviours
- Psychological safety enables open and honest conversations during change
- Safety conversations provide the opportunity to communicate and understand impact of change
- Coaching culture enables effective change and learning

RAIL SAFETY AND STANDARDS BOARD

Paul Leach

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Collaborative engagement on HF integration: The case of DART+ Fleet

N.Balfe, F.Florek, V.Pargade

22/10/2024

Iarnród Éireann
Irish Rail

ALSTOM
• mobility by nature •

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Introduction

- Good HF integration avoids the risk of human errors or minimizes their impact.
  - Operational & safety risks (railway operation)
  - Project management & procurement risks (railway business)

- Irish Rail impose a guideline on the change management (procurement) process for Plant, Equipment, Infrastructure and Operations (PEIO), including the integration of HF

- Both Irish Rail & Alstom have in-house HF/E teams that agreed to work together for the success of the DART+ New Fleet project

- This presentation provides highlights of this HF program.

01

DART+ Project

DART + program

1. **Fleet**
2. 2/3 West- DART service to Maynooth/M3 parkway
3. 4 Southwest- DART service to Hazelhatch
4. 5 Coastal North- Dart between Connolly and Drogheda
5. 6 Coastal South- Enhanced DART to Bray/Greystones
6. 7 Underground

DART+ Rolling Stock

- **10 year framework** to supply commuter trains for Dublin Area Rapid Transit, DART
- New trains needed operate new services on the expanded network AND to replace old trains.
- Orders spread over 10 years in line with the infrastructure expansion and fleet replacement needs.
- Submission 7th AUGUST 2020. Alstom identified as preferred bidder 18th May. Contract finalisation by August.

TENDER REQUIREMENTS

- Commuter trains: 1500V DC (overhead), 84m (HLU) and 168m (FLU)
- Quantity to be considered under the Tender Evaluation : **52 trains**
  - Initial order of 19 trains including 13 Battery BEMU's = 95 cars
  - Year 2 order 10 trains = 100 cars
  - Year 4 order 15 trains = 120 cars
  - Year 6 order 8 trains = 80 cars
- 15 year TSSSA

Iarnród Éireann
Irish Rail

02

Human Factors Integration Process

HF Scope

- Irish Rail Human Factors Impact Assessment Tool (H-FIT) used to assess the HF scope
- The tool rates the change for end users across 14 factors on a scale of 0 (none) to 3 (high)

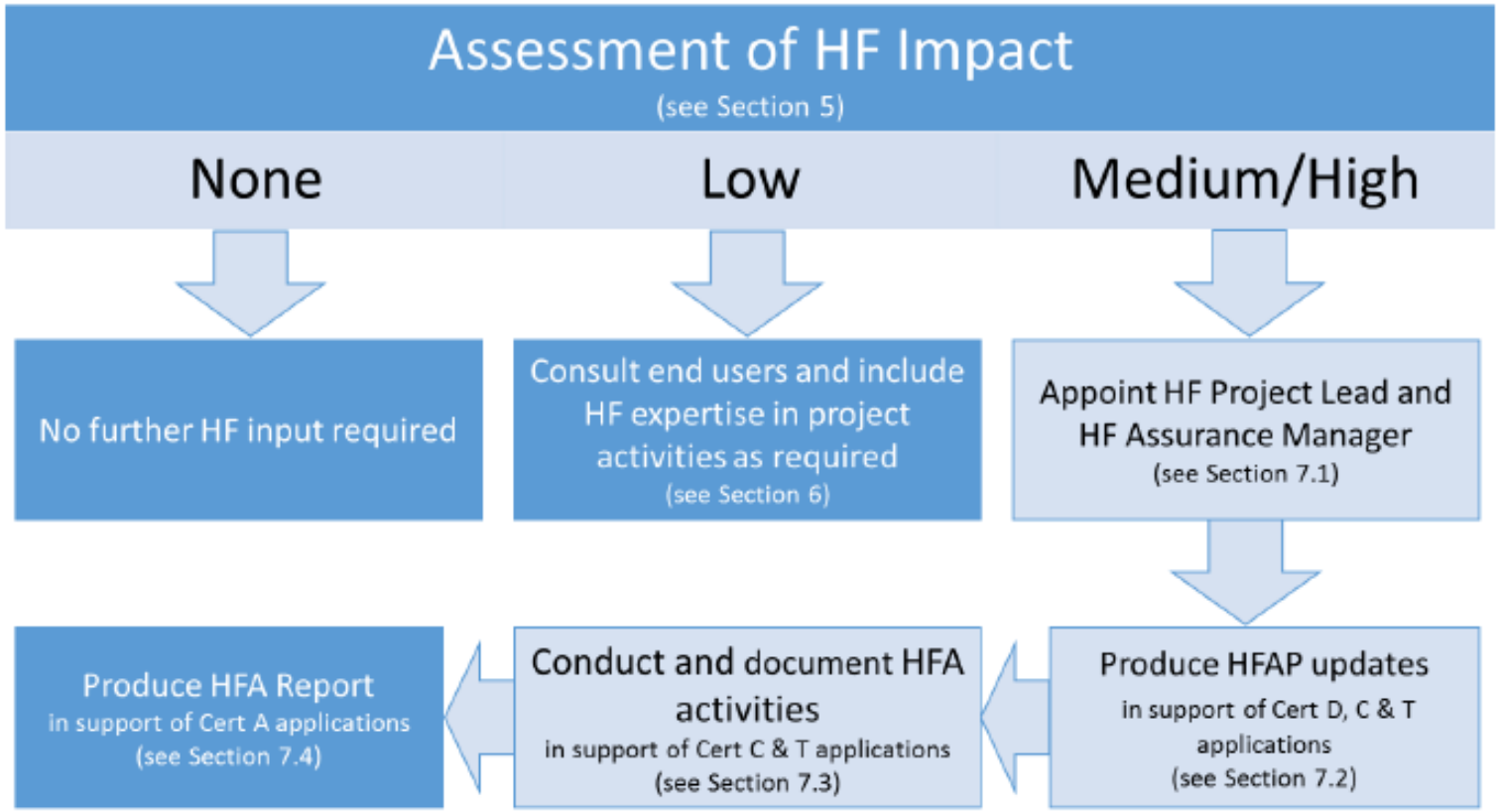
#	Factor	Rating
1	Environment	3
2	Tasks	3
3	Tools/Equipment	3
4	HMIs	3
5	Alarms	3
6	Automation	2
7	Procedures	2

#	Factor	Rating
8	Communication Protocols	0
9	Staffing levels	1
10	Resource availability	0
11	Roles and responsibilities	0
12	Information provision	2
13	Leadership and supervision	0
14	Working time	0

Iarnród Éireann Irish Rail

HF Integration Process

- Irish Rail Guideline RU-SMS-014-OP1: Guidance on integration of Human Factors in PEIO Change Process describes the HF integration process



IE Guidance of Integration of Human Factors in PEIO Change Process

RU OP 23 Human Factors Assurance

Iarnród Éireann Irish Rail / ALWAYS SAFE	Reference No.	RU OP 23
	Issue No.	1
RU Safety Department Operating Procedure:	Operative Date	23/03/2023
	Status	Live
	Prepared by	NB
RU OP 23: Human Factors Assurance	Checked by	KB
	Approved by	JS
	Location	RU SharePoint

This Operating Procedure describes the procedures for Human Factors Assurance within the RU Safety Department for Operations.

The principles in this Operating Procedure are approved by the Head of Health and Safety RU and therefore constitute mandatory standard practices, which apply throughout the RU Safety and Operations Department.

Signed

Joseph Sullivan

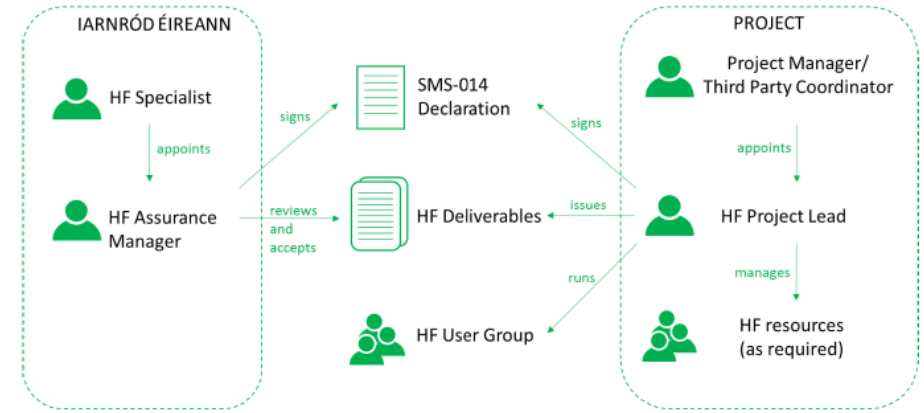
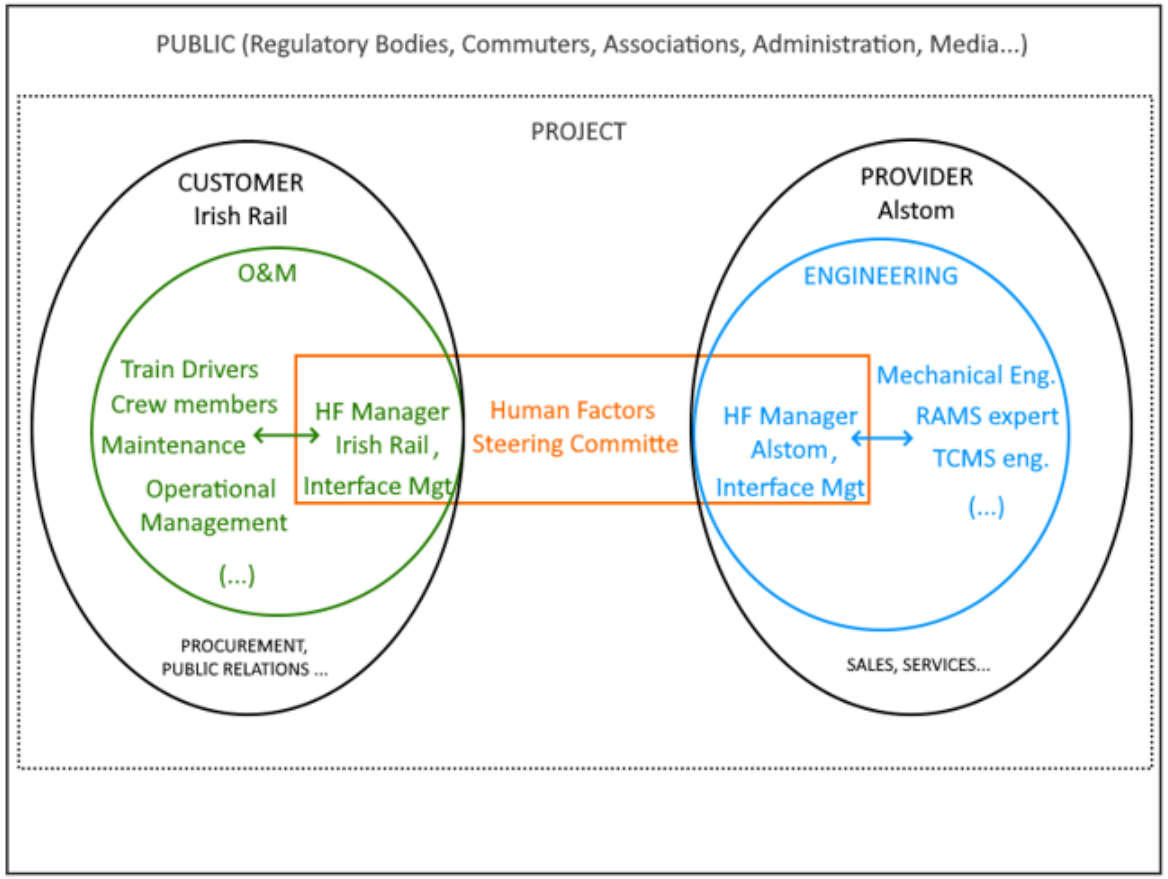


Figure 3: HF Assurance structure

- The objectives of the HF Assurance process are:
  - To ensure that when a PEIO change is proposed the change **appropriately considers the impact on human performance**.
  - To optimise human performance, through the **systematic consideration of human capabilities and limitations** during the PEIO process, thereby enhancing operational performance
  - To **identify and mitigate HF/E related risk** and ensure that human interactions within the system are optimised for system performance and safety, minimising the impact of human error and rule violations on the safety and reliability of the rail system.
  - To ensure that PEIO provided is **easy, efficient and safe to use** by staff and the public.
  - To **improve system acceptance** among end users.

Iarnród Éireann Irish Rail

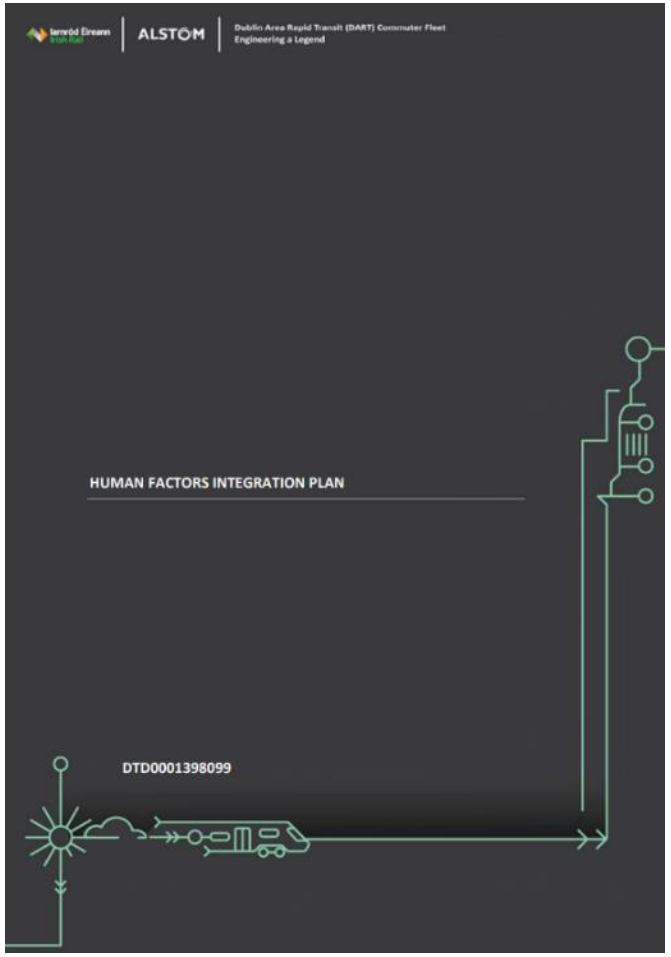
Human Factors Steering Committee in DART+ Fleet Project



- Forum for discussion of HF agenda, in close collaboration with Operations and Maintenance stakeholders (Irish Rail) and the O&M and Irish Rail Engineers
- HF Issues Register open points are reviewed and progressed
- Operational tests, interviews and presentation are organised

Human Factors Assurance Plan

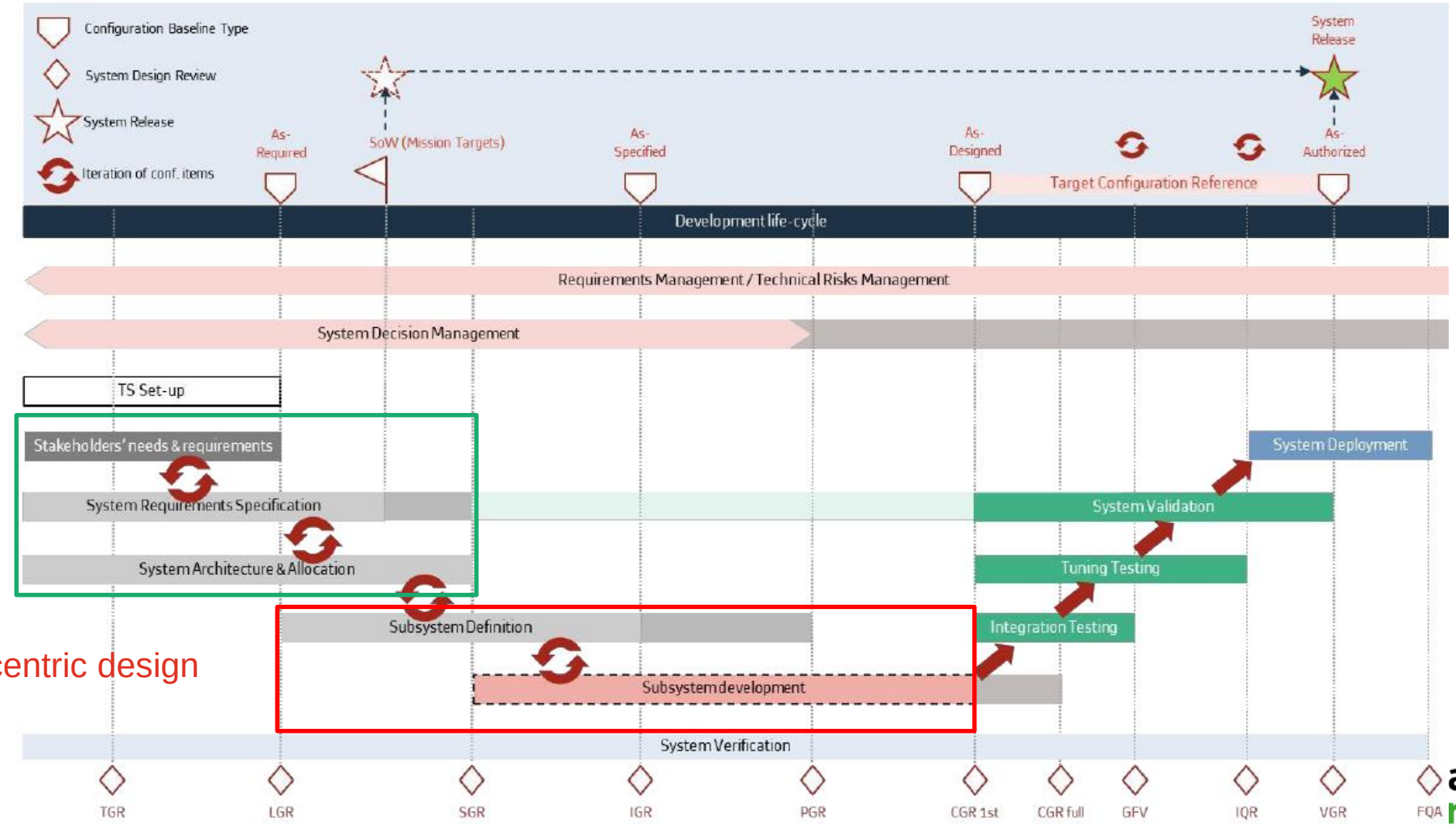
- Developed by Alstom, and accepted by Irish Rail
- Describes the Human Factors and Ergonomics (HF/E) program to be applied for the project
- To ensure that the human-system interfaces of the train set are designed according to end-users needs and capacity
- Describes of all Human Factors activities to be performed
- Applies state of the art practices in HF in product design and in compliance with Customer, Regulatory and applicable standards requirements



Integration of HF in the design process

Early stages & requirement management

User-centric design



03

Technical activities

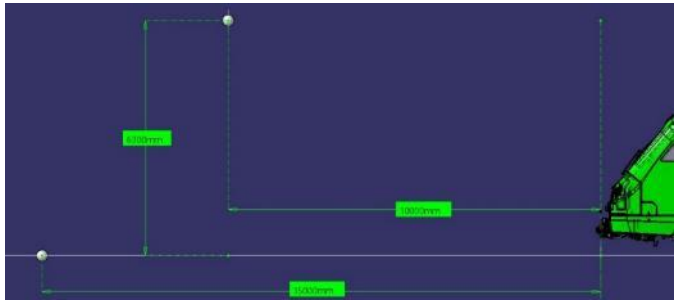
Example Activity 1: Return on Experience

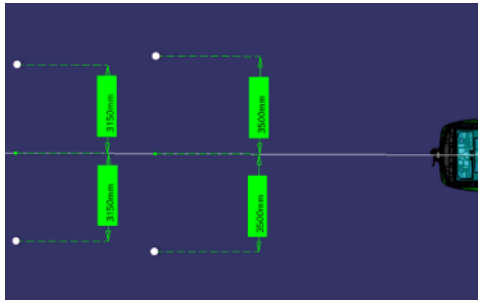
- Start of the project:
  - Visit to Irish Rail facilities in Dublin (depots)
  - Presentation of ergonomics of existing fleets
  - Driving & Maintenance

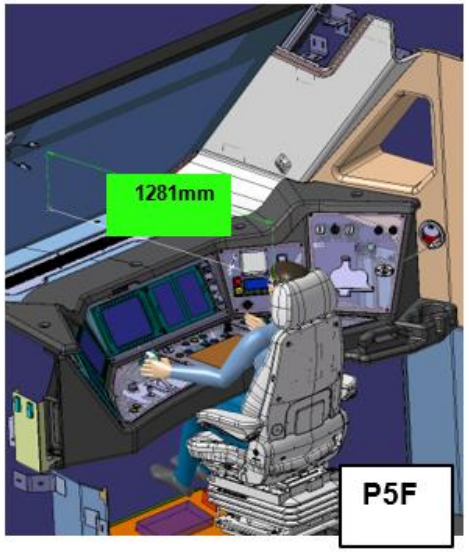
- Benefits
  - Understanding current ways of working
  - Pros & Cons of designs according to front line operators
  - Replication of local customs and practices
  - Example: Blue light indicator in cab

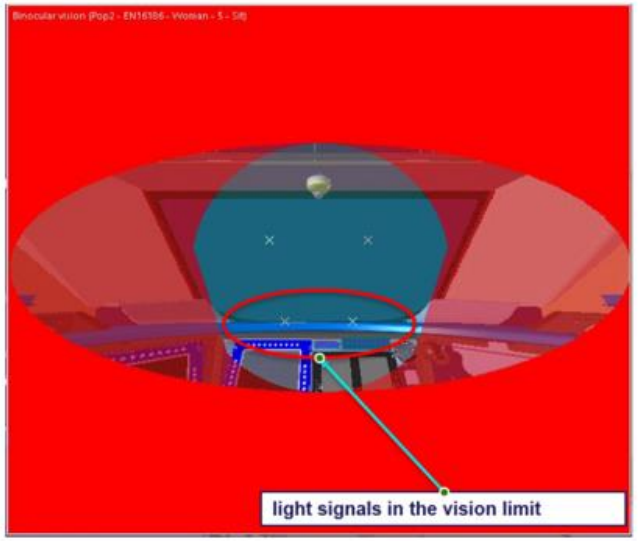
Example Activity 2: HF Assessment of Cab Design (computer simulation)

- External signal visibility study (TSI / EN 16186-1)
  - Geometrical & ergonomic simulation with CATIA v5

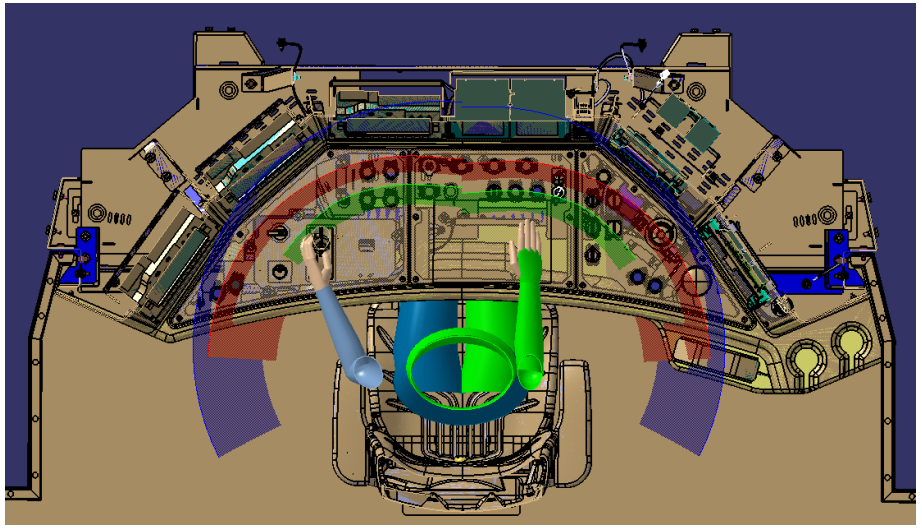




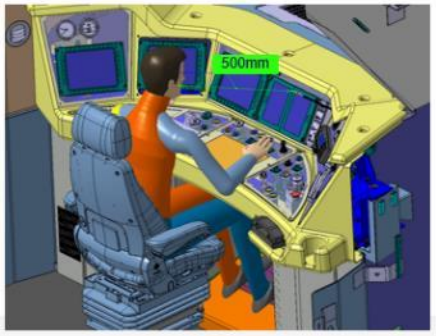


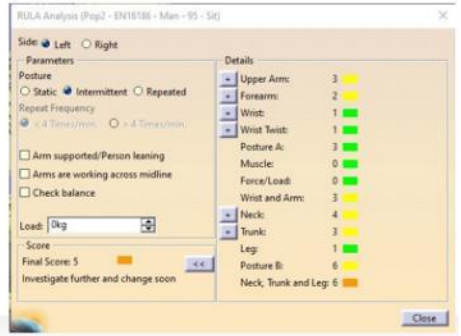


- Driver desk accessibility study



- Biomechanical analysis using RULA



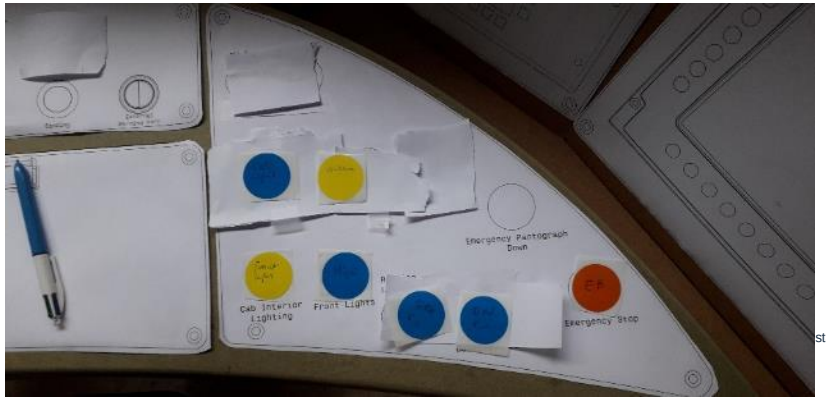


Example Activity 2: HF Assessment of Cab Design (mock-up verification with drivers)

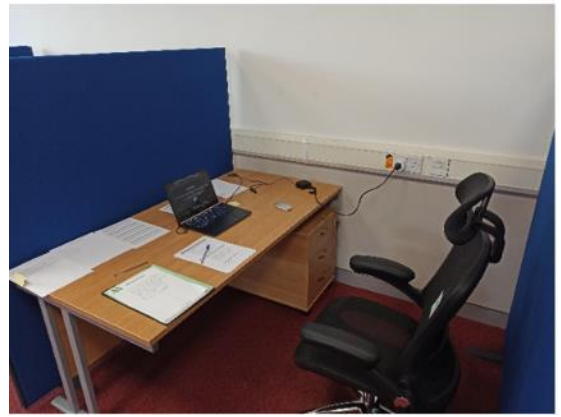
- End-users consultation using full scale cab mock-up (14 drivers, including 2 women)
- Low fidelity mock-up (2022)
  - General space, circulations, physical ergonomics at seated and standing driving position,
  - Screens, actuators and pushbutton layout, grouping and relative position,
  - Arrangement of communication HMIs, tablet holder, cupholder,
  - Comfort of the assistant seat
- High fidelity mock-up (2023)
  - Verification of evolutions (driver seat adjustments) push-button layouts…
- Results & design evolutions
  - Pushbuttons layout
  - Communication HMI & handset position
  - Screens arrangement
- Task based simulation of work, within the physical environment

Embedded cognition theory:

The Embodied Mind: Cognitive Science and Human Experience (1992) by F.J. Varela, E.Thompson, E.Rosch)



Example Activity 3: UX Assessment of Driver Machine Interfaces

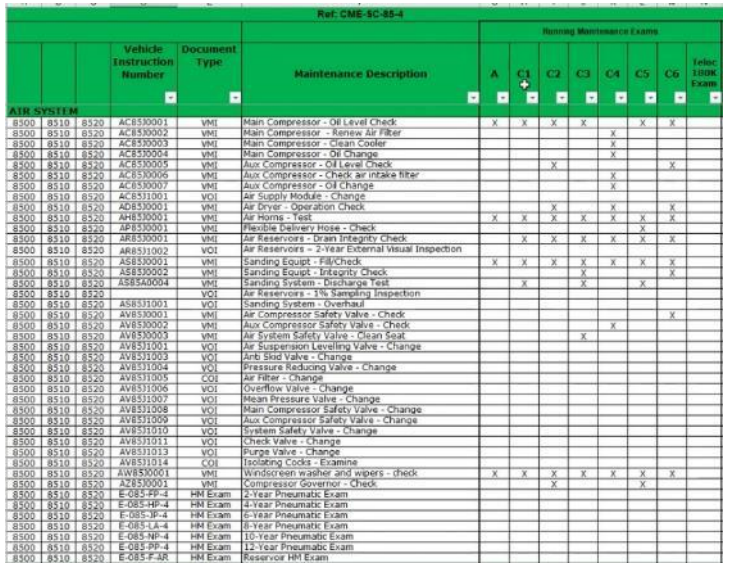


- Laptop-based software simulation
- Panel of users: 10 drivers
  - 3 women, 7 men
  - 3 to 30 years experience
  - Low to medium experience in computerised driving HMIs
  - First exposure to Alstom HMI product
- Scenario-based approach on dynamic mock-up
  - Adjusting cab temperature
  - Checking bypass
  - Checking CCTV
  - Passenger Announcement
  - Door fault
  - ….
- UX assessment
  - NASA TLX
  - Time assessments
  - System Usability Score (IBM)
- Results: List of improvement items for HMI evolution

Perception of the CCTV menu and use of the navigation button	OK
Perception of the possibility to consult the details of each unit	OK
Understanding and using the car access button	Could be improved
Perception and use of the backspace button	OK
Understanding and use of the car access button (including the exterior view)	Must be reviewed
Understanding and using the tab	OK

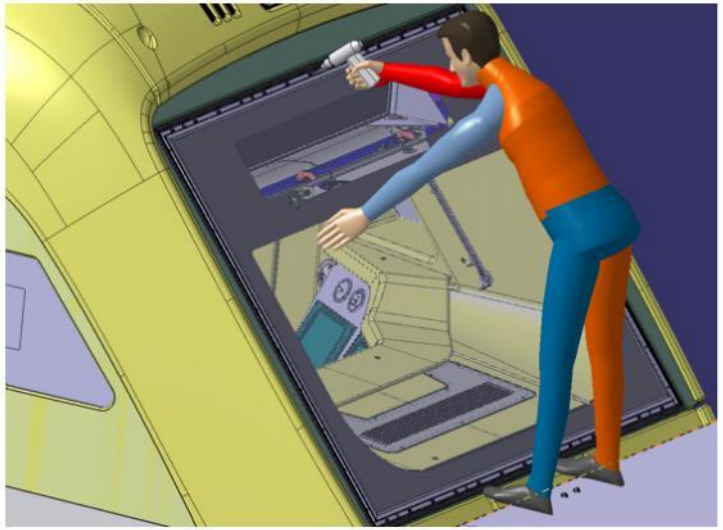
Example Activity 4: Maintainability Assessment

- Maintainability of existing Rolling Stock was captured during REX campaign
- Tasks to be studied were prioritized based on frequency, safety & importance for Irish Rail technical & project teams
- RULA assessment using CAD simulation were performed & design adjustments made



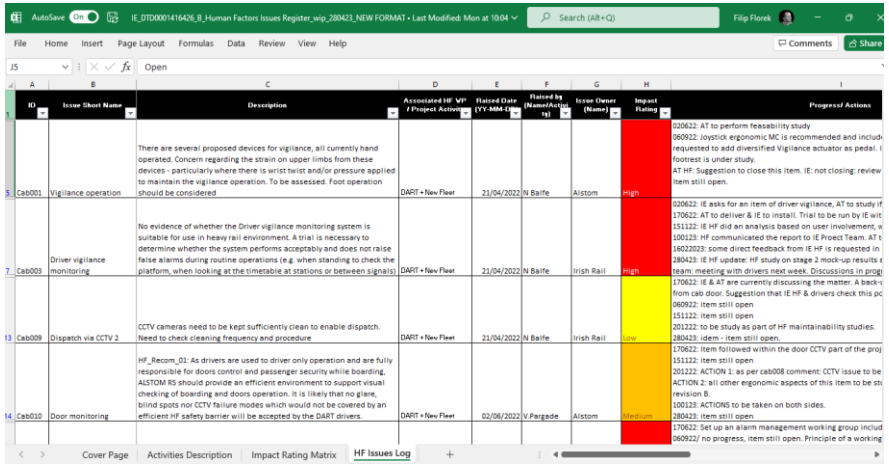
Ref: CME-SC-85-4

			Vehicle Instruction Number	Document Type	Maintenance Description	Running Maintenance Exams						
						A	C1	C2	C3	C4	C5	C6	Telec 180K Exam
AIR SYSTEM													
8500	8510	8520	AC8530001	VMI	Main Compressor - Oil Level Check	X	X	X	X		X	X	
8500	8510	8520	AC8530002	VMI	Main Compressor - Renew Air Filter					X			
8500	8510	8520	AC8530003	VMI	Main Compressor - Clean Cooler					X			
8500	8510	8520	AC8530004	VMI	Main Compressor - Oil Change					X			
8500	8510	8520	AC8530005	VMI	Aux Compressor - Oil Level Check			X				X	
8500	8510	8520	AC8530006	VMI	Aux Compressor - Check air intake filter					X			
8500	8510	8520	AC8530007	VMI	Aux Compressor - Oil Change					X			
8500	8510	8520	AC8531001	VOI	Air Supply Module - Change								
8500	8510	8520	AD8530001	VMI	Air Dryer - Operation Check			X		X		X	
8500	8510	8520	AH8530001	VMI	Air Horns - Test	X	X	X	X	X	X	X	
8500	8510	8520	AP8530001	VMI	Flexible Delivery Hose - Check						X		
8500	8510	8520	AR8530001	VMI	Air Reservoirs - Drain Integrity Check		X	X	X	X	X	X	
8500	8510	8520	AR8531002	VOI	Air Reservoirs - 2-Year External Visual Inspection								
8500	8510	8520	AS8530001	VMI	Sanding Equipt - Fill/Check	X	X	X	X	X	X	X	
8500	8510	8520	AS8530002	VMI	Sanding Equipt - Integrity Check				X			X	
8500	8510	8520	AS85A0004	VMI	Sanding System - Discharge Test		X		X		X		
8500	8510	8520		VOI	Air Reservoirs - 1% Sampling Inspection								
8500	8510	8520	AS8531001	VOI	Sanding System - Overhaul								
8500	8510	8520	AV8530001	VMI	Air Compressor Safety Valve - Check							X	
8500	8510	8520	AV8530002	VMI	Aux Compressor Safety Valve - Check					X			
8500	8510	8520	AV8530003	VMI	Air System Safety Valve - Clean Seat				X				
8500	8510	8520	AV8531001	VOI	Air Suspension Levelling Valve - Change								
8500	8510	8520	AV8531003	VOI	Anti Skid Valve - Change								
8500	8510	8520	AV8531004	VOI	Pressure Reducing Valve - Change								
8500	8510	8520	AV8531005	COI	Air Filter - Change								
8500	8510	8520	AV8531006	VOI	Overflow Valve - Change								
8500	8510	8520	AV8531007	VOI	Mean Pressure Valve - Change								
8500	8510	8520	AV8531008	VOI	Main Compressor Safety Valve - Change								
8500	8510	8520	AV8531009	VOI	Aux Compressor Safety Valve - Change								
8500	8510	8520	AV8531010	VOI	System Safety Valve - Change								
8500	8510	8520	AV8531011	VOI	Check Valve - Change								
8500	8510	8520	AV8531013	VOI	Purge Valve - Change								
8500	8510	8520	AV8531014	COI	Isolating Cocks - Examine								
8500	8510	8520	AW8530001	VMI	Windscreen washer and wipers - check	X	X	X	X	X	X	X	
8500	8510	8520	AZ8530001	VMI	Compressor Governor - Check			X			X		
8500	8510	8520	E-085-PP-4	HM Exam	2-Year Pneumatic Exam								
8500	8510	8520	E-085-HP-4	HM Exam	4-Year Pneumatic Exam								
8500	8510	8520	E-085-JP-4	HM Exam	6-Year Pneumatic Exam								
8500	8510	8520	E-085-LA-4	HM Exam	8-Year Pneumatic Exam								
8500	8510	8520	E-085-NP-4	HM Exam	10-Year Pneumatic Exam								
8500	8510	8520	E-085-PP-4	HM Exam	12-Year Pneumatic Exam								
8500	8510	8520	E-085-F-AR	HM Exam	Reservoir HM Exam								



HF Issues Management

- HF/E studies identify design flaws at various stages and consider them as HF open issues
- HF Issues are logged in a spreadsheet called Human Factors Issues Log (HFIL), allowing traceability along with their resolution proposals and closure date
- HFIL includes a column identifying safety related issues, that are transferred to the Hazard Log of the project, in order to be followed by the safety engineers
- HFIL is regularly reviewed between Irish Rail and Alstom



On-going: Validation plan & activities

- As a new design, there are elements that we need to test in practice to fully understand
  - HF testing will be incorporated into the validation phase of the project when the first unit arrives
- Examples:

DOO testing	Finalise alarm design	Operabilitiy testing	Maintainability
• In-cab DOO in normal and degraded operations • Check visibility on different platform types • Assess timing of operations	• Workshops to agree allocation of alarms • Check volume levels • Feedback from drivers during testing	• Close out open points on cab and saloon design • Check signal visibility in real conditions • Use of DAS	• Check CAD results against real accessibility • Work with depot design team to match maintenance requirements

04

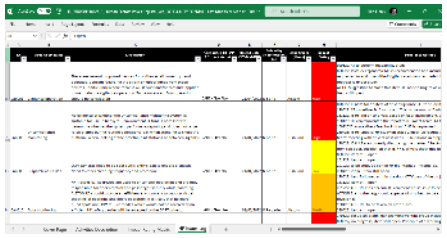
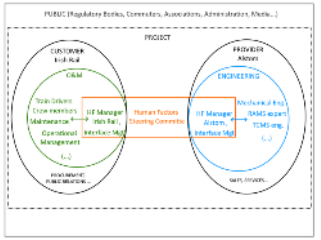
Conclusion

Conclusion & take-aways

Entirely integrated and in-house management of HF for the project





Shared access facilitated collaboration during design and testing

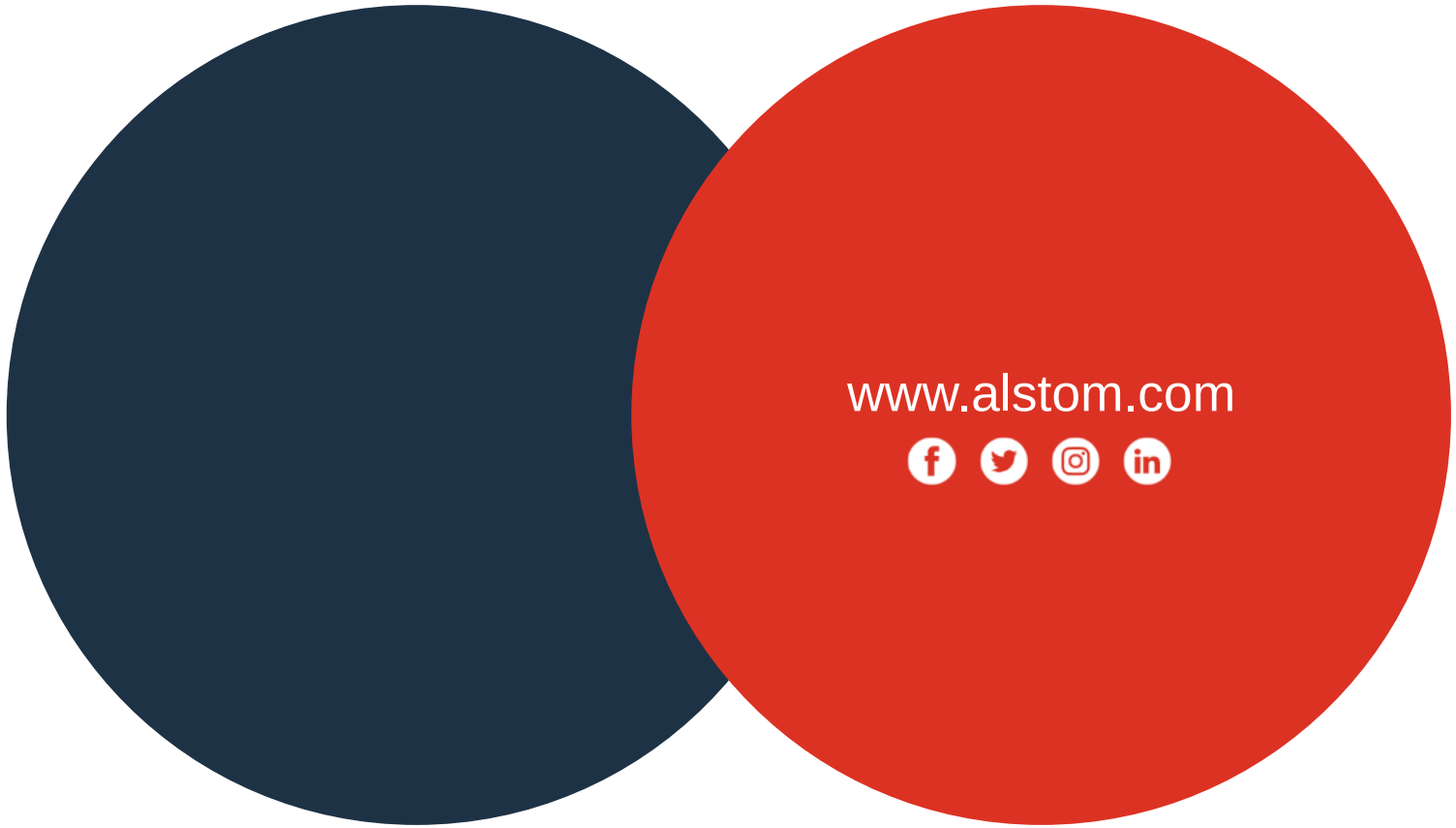
Business Wins

- ✓ The design freeze of the train was achieved for HF with no blocking points
- ✓ Increased user acceptance of the final design
- ✓ Better operational and safety performance
- ✓ Lower risk of re-work to meet unanticipated user needs

End User Wins

- ✓ The first Irish Rail train to be designed around end user needs
- ✓ Initial driver feedback is very positive, both about the final design and how their needs have been considered

Iarnród Éireann Irish Rail



Iarnród Éireann
Irish Rail

ALSTOM
• mobility by nature •

EUROPEAN
UNION
AGENCY
FOR RAILWAYS

EUROPEAN UNION AGENCY FOR RAILWAYS

Human & Organisational Factors (HOF) Conference

Coffee Break

22-23 Oct 2024 Valenciennes, France

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Human & Organisational Factors

22 October 2024

HOF Conference 2024

Human & Organisational Factors

Michiel
Tom

Independent Occupational and organisational expert
At Shuntingyard

Researcher and graduate student

Rutger
Den Drijver

Health & Safety Officer at Swietelsky Rail Benelux BV

Graduation Supervisor

AGENDA

1 Introduction

2 Research

3 Results

4 What can the sector learn from this?

5 Company, author and supervisor

SWIETELSKY

Introduction
We are Swietelsky

1

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Human & Organisational Factors

Swietelsky Rail Benelux BV;

Active in the BeNeLux countries;

Part of the Austrian „Swietelsky AG“ organisation, one of the leading European railway construction companies;

Swietelsky is expert in track renewal with high-output renewal trains;

These renewal trains are continuesly working. Not just in the BeNeLux, but in most of the North-, Central and Eastern European countries;

A permanent group of Engineers and Operators travels across Europe with the machines. Expertise and experience is thus secured.

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Issues;

- Staff deployed across various countries;
- What goes well and what could be better in cross-border deployment of skilled workers? Are local workers better qualified and motivated than international workers?
- Language and cultural differences;
- Safety awareness is not at the same level across Europe;
- Is the existing safety awareness programme (*BSAFE, specific designed for BeNelux*) adequate and suitable to be used for other nationalities and cultures?;
- What is the impact of cross-border deployment of professionals on psychosocial workload, e.g. work pressure and work stress in connection with travelling and working abroad?
- ***Conclusion: there was a need for a Graduation Study***

Research

2

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Human & Organisational Factors

Graduation research;

- Swietelsky asked Michiel Tom (Shuntingyard) and working on an in-depth study on human factors to do a graduation research to cultural and safety awareness differences of skilled workers;
- 6 nations (NL/DE/AT/UK/HU/RO);
- Research started in 2022 and was completed early 2023;
- Research included literature research, interviews and observations on construction sites of Swietelsky Rail Benelux;
- The research led to Graduation of Michiel Tom as Occupational and Organisational Expert

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Human & Organisational Factors

Research targets;

- How does intercultural communication function in the workplace?
- Can it be said that behaviour of foreign work crews is now not in line with the BSAFE programme and what is the evidence of this?
- What perception exists regarding language and cultural differences?
- Within the context of deploying international work teams, what can be said about psychosocial workload.
- What interventions can be used to align behaviour and safety awareness of foreign teams with the safety awareness programme.

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Human & Organisational Factors

Intercultural communication in the workplace (1)

- Essential conditions to understand cross-cultural communication
  1. *Others are different from us*
  2. *We don't know what these differences exactly are*
  3. *We are responsible for dealing with the other*
- Empathy in developing methods of communication
- Selection of employees: consideration of intercultural competencies and language skills
- Cultural education: prepare people for any kind of 'culture shock'

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Human & Organisational Factors

Intercultural communication in the workplace (2)

Pros and cons of intercultural teams

Pros	Cons
Different views: more innovative ideas	Building understanding and trust takes time
Other paradigms: alternative problem solving	Communication issues can lead to stress and risk of fatigue
Starting point for development of verbal and nonverbal communication	Risk of speech confusion and incorrect task execution
Reduces risk of ‘group thinking’ and conformity pressure	More time needed for clarification. Processing details in second language is more difficult
	Frustration or dissatisfaction may arise

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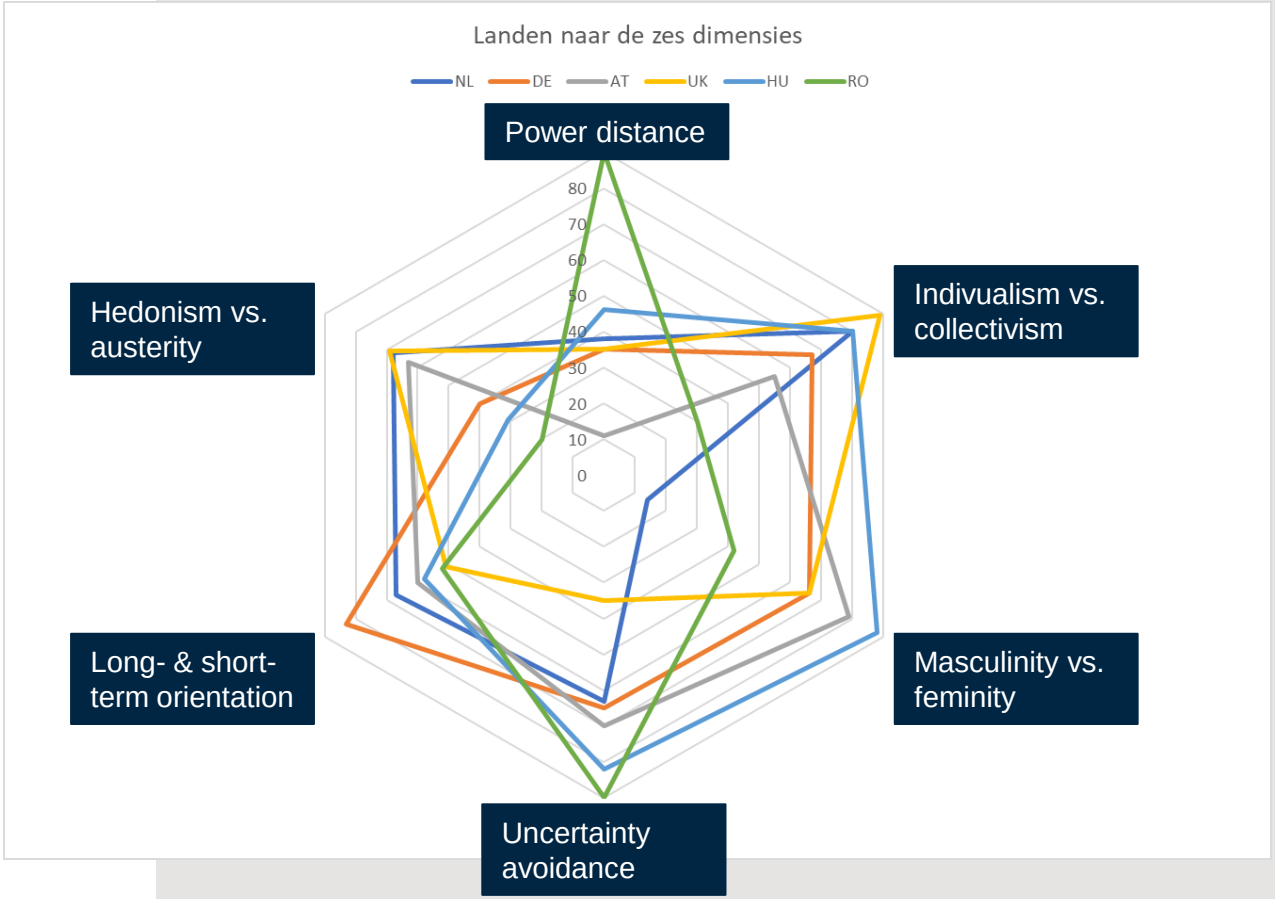
Human & Organisational Factors

The research included the use of Hofstede's culture model '*six dimensions of national culture*';

1. Power distance;
2. Individualism vs collectivism;
3. Masculinity vs femininity;
4. Uncertainty avoidance;
5. Differences in long- and short-term orientation;
6. Hedonism vs. austerity.



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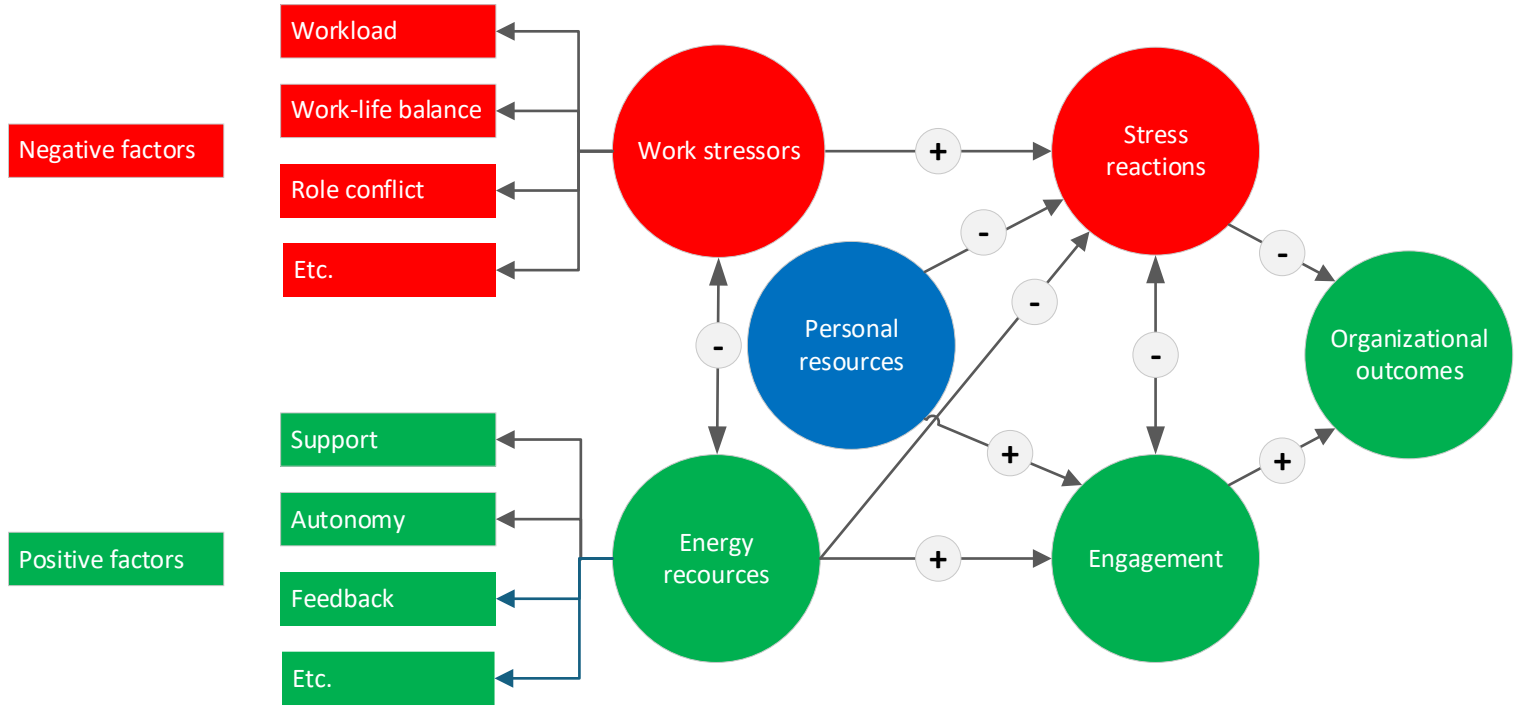
Human & Organisational Factors

The research also included factors when travelling to and staying abroad for work and the JD-R Model:

- Negative factors are **work stressors** and **stress reactions,** like workload, work-life balance and role conflicts;
- Positive factors are **energy sources** and **enthusiasm**, like support, feedback and autonomy.



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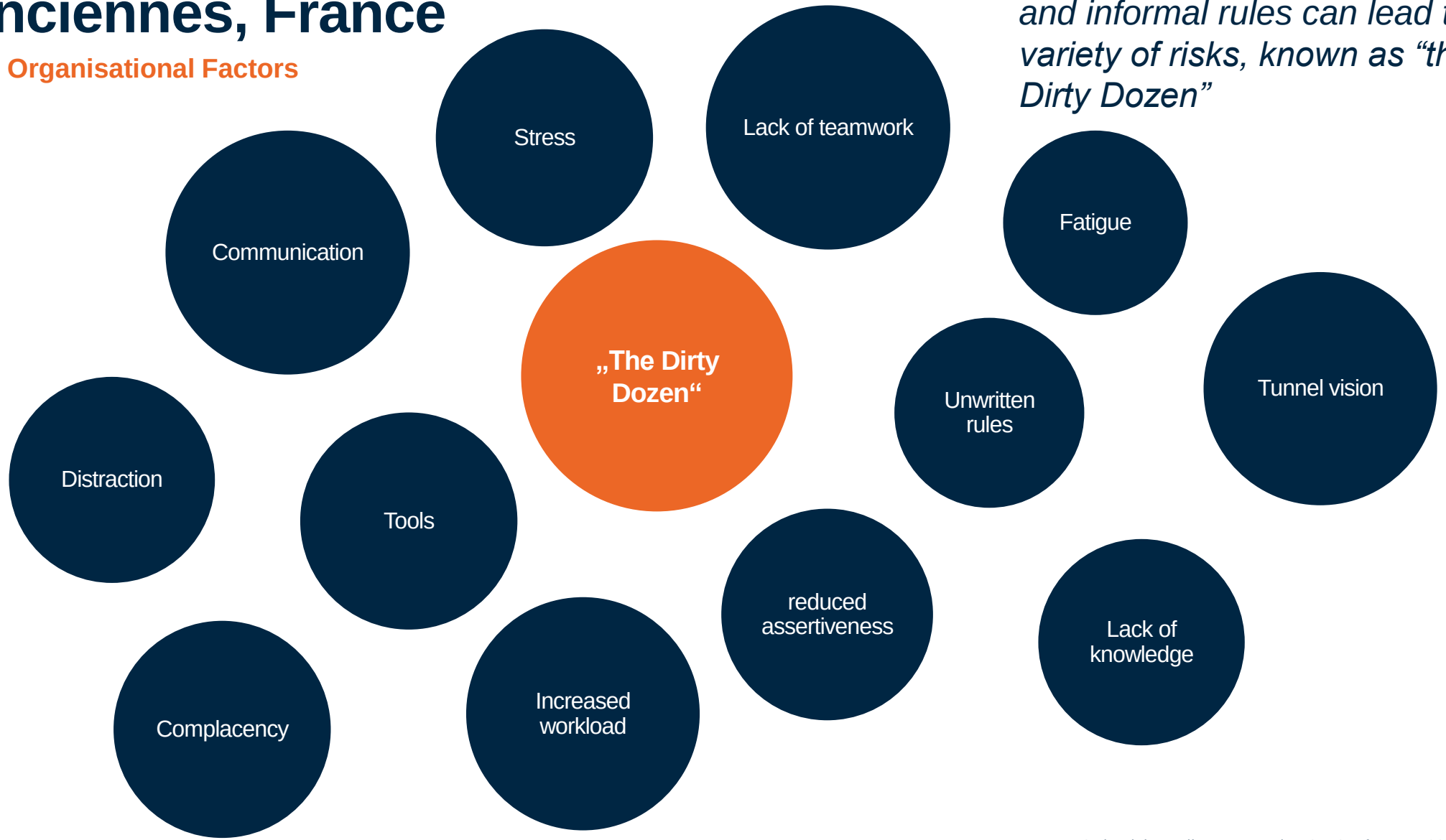
Human & Organisational Factors

Cultural differences, miscommunication, local habits and informal rules can lead to a variety of risks, known as “the Dirty Dozen”



Results

3

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Human & Organisational Factors

Research conclusions;

1) A Safety awareness program must be internationally orientated in order to succeed and be futureproof;

2) The BSAFE programme is suitable for further change and improvement to accommodate usage internationally;

3) Intercultural communication comes with pitfalls. *“Others are different from who they see as others”.*

4) Despite language and cultural differences, foreign employees are well suited for tasks in the BeNelux.

5) Skilled foreign employees are better valued than unmotivated local staff.

6) Motivated and skilled professionals are often offered from so-called masculine countries rather than from the Netherlands.

7) Providing continuity is the key to finding the right and motivated people. An exclusive national orientation is no longer tenable.

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Human & Organisational Factors

Orientation on interventions

Options for essential topics in a training

- Cultural awareness
- Language training
- Briefing on national customs, habits and procedures
- Scenarios for emergencies and incidents

What have we done with this knowledge?

4

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Human & Organisational Factors

Learning points in practice

The knowledge and experience from this graduation is already used within Swietelsky:

- 4 Theme sessions within our company *(approximately 100 collegues already took part, ranging from executive staff to projectmanagers and board)*;
- Specific 4 hour training called „*BSAFE in the Netherlands*“. A Safety and Cultural training for cross-border workers when coming to the Netherlands for work. *(approximately 400 workers already took part).*
  - *One of the topics was cultural differences;*
- Safety Walks and coaching on-the-job;
- Designed specific footage to support training and coaching.

Companies, author and supervisor

5

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Risk management by simulating ERTMS signaller / system / driver interaction

For better implementation and education of ERTMS

Reinoud Liefting

reinoud.liefting1@ertms.nl

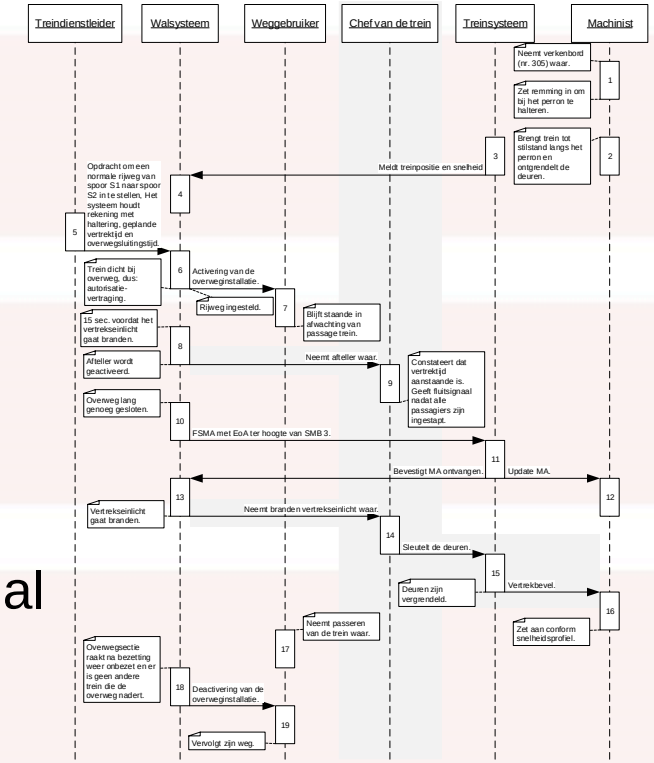
22-23 OCT 2024

Valenciennes

ERTMS

Introduction: Role Operational Processes ERTMS

- **Operational Processes ERTMS Level 2 (OP's)** describe ERTMS **signaller / system / driver** interaction (and some other users)
- **OP's ERTMS approach used since 2007 in the Netherlands**
- **Paper review is performed (TSI-OPE / ISO-25010)**
- **Simulating combined sets of OP's in scenario's identify** potential safety, reliability and user satisfaction risks which can than be mitigated



(OP = Operational Process comparable with Operational Scenario within *System Pillar Operational Design*

In this presentation: Scenario = combined set of Operational Processes

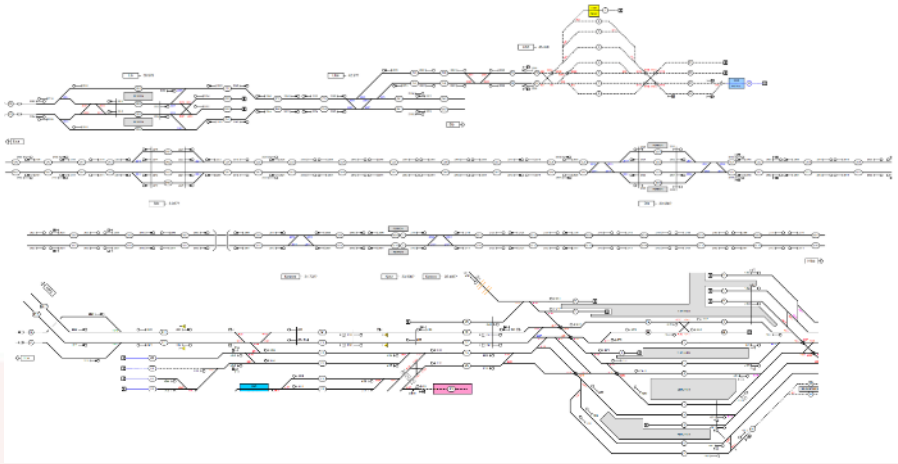
Simulating scenario’s




- Scenario **more representative** than individual OP’s
- Scenario includes **multiple OP’s** so that ~90% OP’s are tested
- Scenario includes up to 2 OP’s for **degraded or emergency** operation
- Scenario duration ~ 40 minutes
- Run scenario if possible **> 10 times, this starts statistics**
- Run with **different users**; personal influence decreases

ERTMS

OP’s in Scenario 6



OP-13 Transition from level NTC ATB to level 2

OP-08 Driving on a set route

OP-06 Short stop

OP-87 **Temporary Speed Restriction set by signaller with European Instruction 5 (EI5)**

OP-56 **Shortening MA with train tripping by passing EoA (with EI2)**

OP-35 Handling of a brake intervention due to a **balise reading error**

OP-09 **Turning/Reversing**

OP-89 Entering a Not Centrally Controlled Area with a Stop sign on the border

OP-65 Shunting within Not Centrally Controller Area

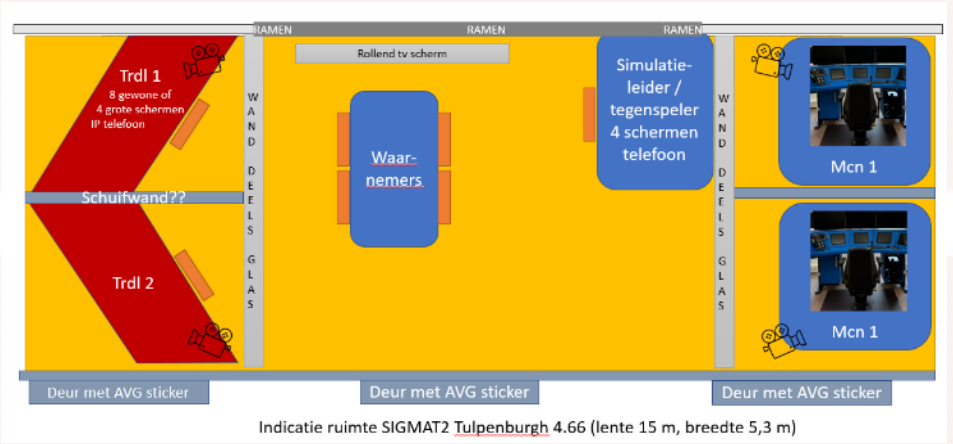
OP-07 Ending a journey

Simulation environment SIGMAT2

SImulatie **G**ebruikersprocessen **MA**chinisten en **T**reindienstleiders

Signaller & observer

Simulation leader / Game master



Indicatie ruimte SIGMAT2 Tulpenburgh 4.66 (lente 15 m, breedte 5,3 m)

Driver & observer

ERTMS

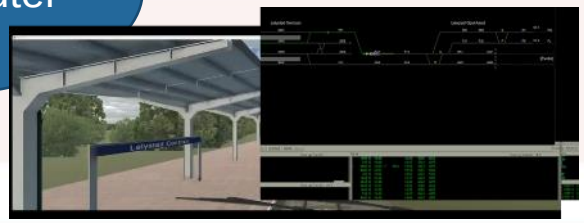
Information based on executed scenario's

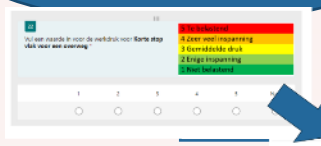
2. Survey Human Factors

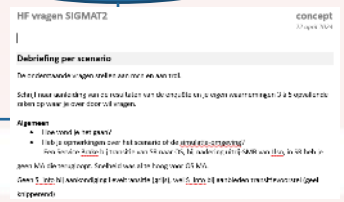
3. Survey conversation report

4. Telephone and computer logfiles

1. Observer report



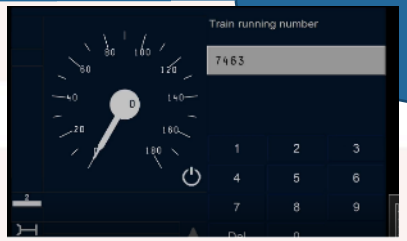




GP-40	Omschrijving	Waarneming	Begintijd	Eindtijd
6-1	**Trdl geeft opdracht om een normale rijweg in te stellen**	nvt	Alleen relevant indien handmatig door TRDL ingesteld: geel of rood worden	Alleen relevant indien handmatig door TRDL ingesteld: geven rijweginstelcommando
6-4	Machinist neemt verlengde MA waar	nvt	~~Tonen MA tot aan SMB (voor)bij~~ halte	Inzetten remming
6-5	Machinst zet remming in en brengt trein tot stilstand	nvt	Inzetten remming	Stilstand langs perron
6-6	Machinist Zet weer aan	nvt	Geplande vertrektijd en verlengde MA aanwezig	MCN zet aan

Analyse (by scenario)

5. Screencapture/ camera images



List of findings for System Analysis Report (SAR)

ERTMS

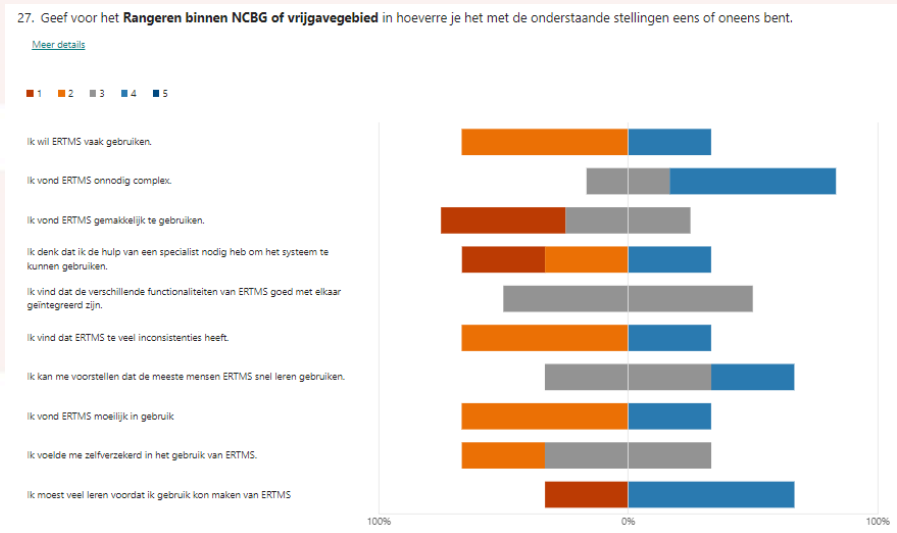
2. Survey Human Factors (ISO-25010)

22

Vul een waarde in voor de werkdruk voor **Korte stop vlak voor een overweg** *

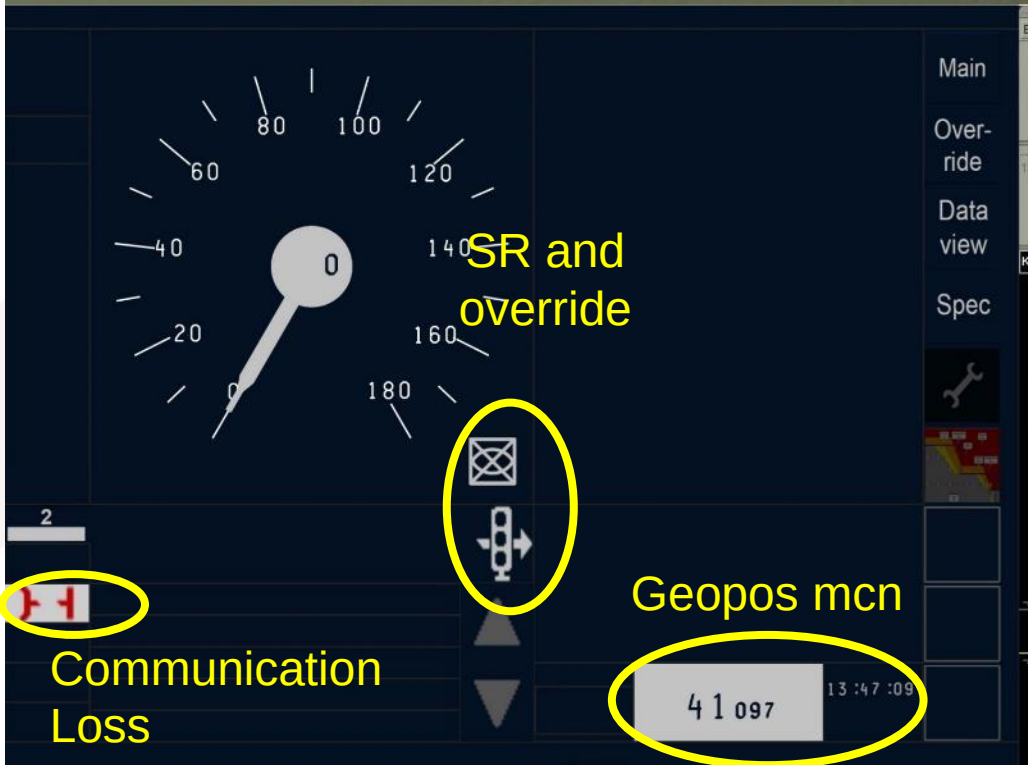
5 Te belastend
4 Zeer veel inspanning
3 Gemiddelde druk
2 Enige inspanning
1 Niet belastend

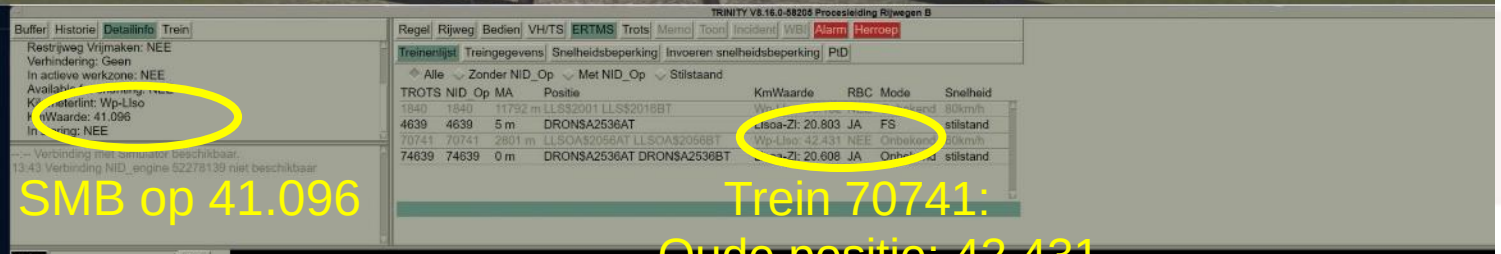
1	2	3	4	5	N
○	○	○	○	○	○

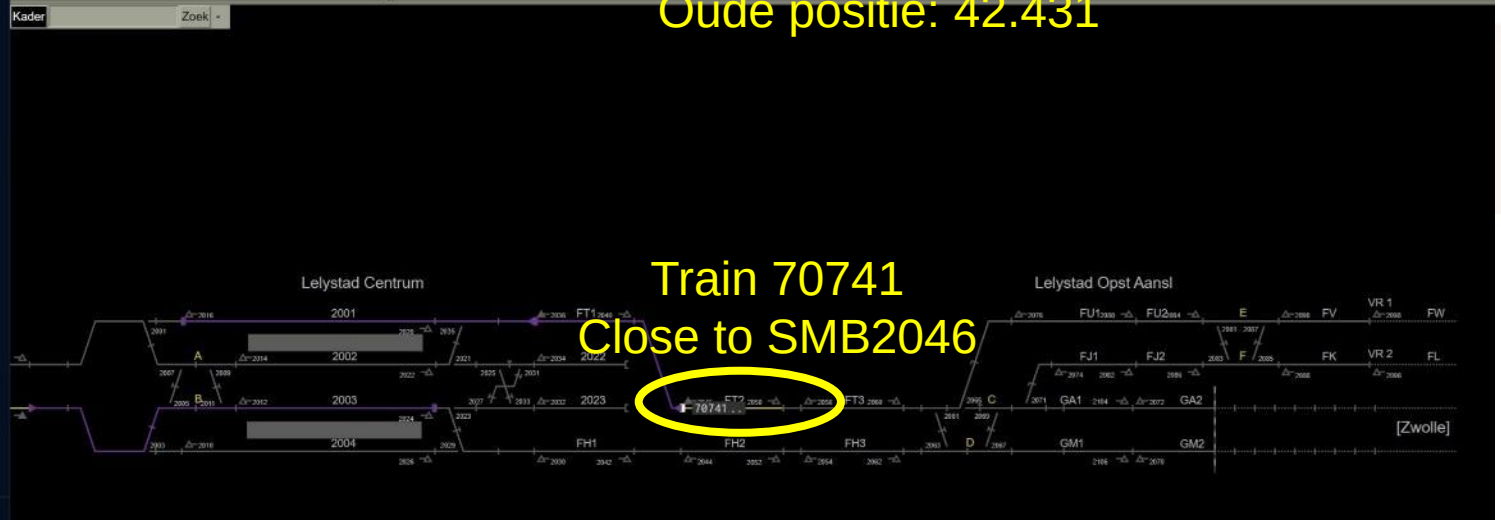


Combined operational signaller and driver analysis:

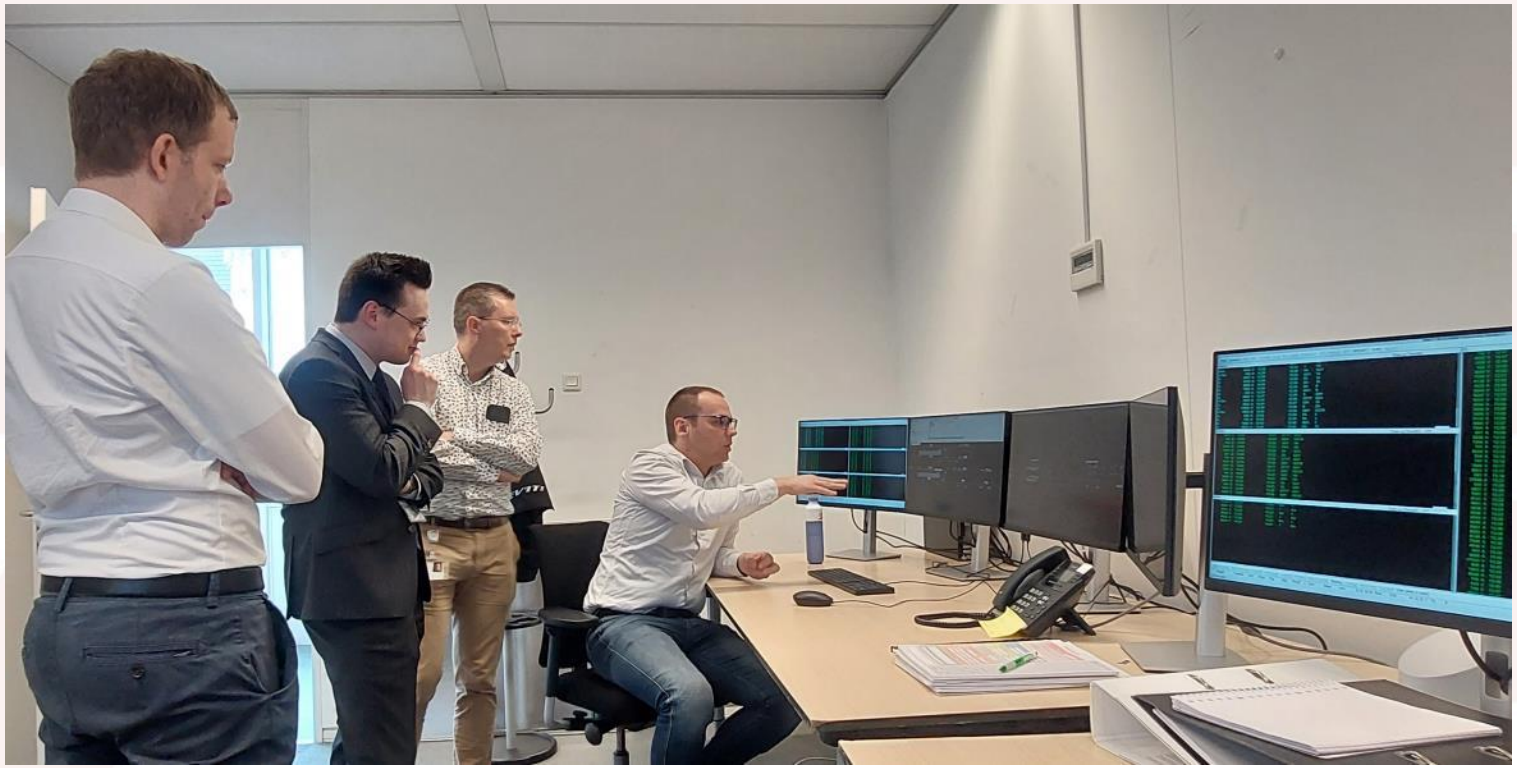
Train with communication loss and position close to transition to Non Centrally Controlled Area







Bonus: having a simulation environment enables (international) user alignment



Reinoud Liefting

And many others

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Lokaltog

A Safety U-turn

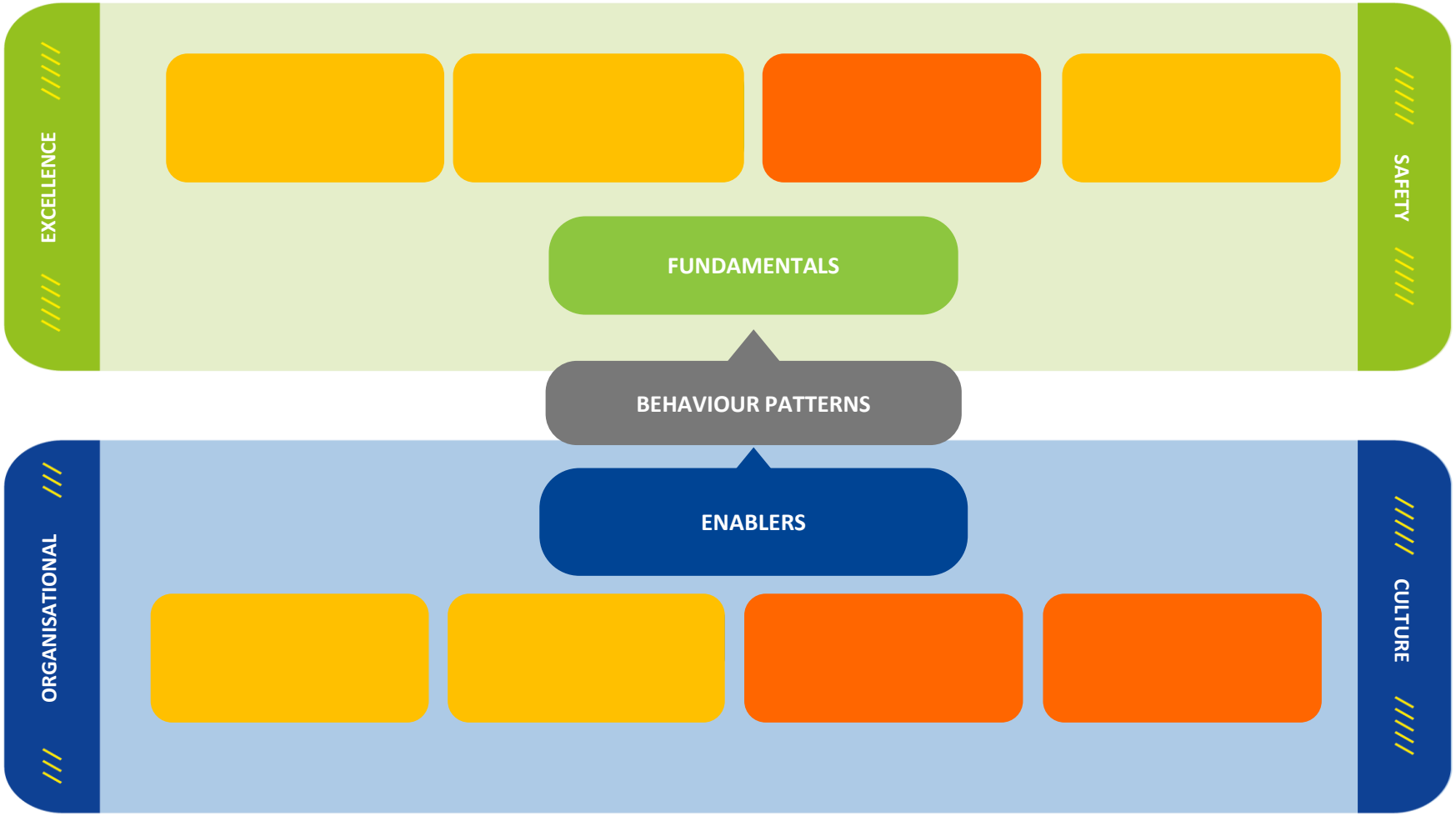
From random culture to HOF-integration in the SLS

Practical tools

Mette Bomholt, Safety & Culture Manager

22. september 2024

Examine the Safety Culture



Objectives

Prevent railway accidents and occupational accidents

Understand the reality of the workplace and the employee in safety

Create a learning organisation, better well-being and working environment

” "The top management shall demonstrate leadership and commitment to the development, implementation, maintenance and continual improvement of the safety management system by:

… promote a positive safety culture”

EU Regulation 2018/762 CSM SMS
2 LEADERSHIP
2.1 Leadership and commitment
2.1.1 (J)

Implementing in SMS

Framing Safety culture

Safety Vision *Everyone home safe*

Safety policy

Leadership

Safety Leadership & HOF

Core competence *(All)*

Just Culture

Fair and Just Assessment

Identification of Human and Organisational Factors

Risk Assessment

Observations

Accidents and other reporting

Data

Monitoring Safety Culture

Structured investigation of the Safety Culture

Safety & Culture Manager

Human and Organisational Factors in Risk Management

Identification of Human and Organisational Factors

- Risk Assessment
- Observations
- Incidents, Accidents and other reporting
- Data

Stage of the project

Project planning	Conducted	Operations

End users

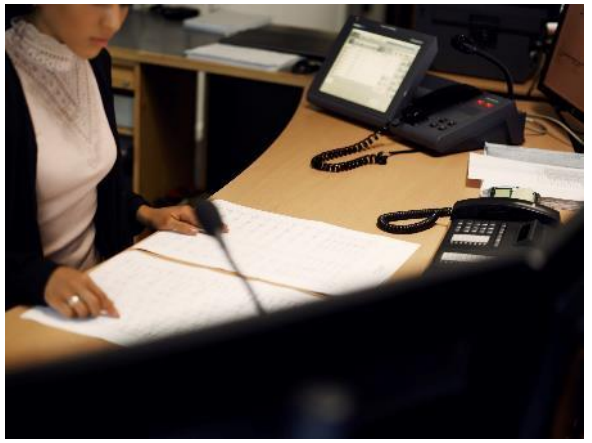
- **Organisation of the work**
  - Planning, the right informations, time
  - Work load
  - Breaks in operations covering basic needs
  - New staff in unusual situations
- **Procedures**
  - The right competencies for procedures rules, standards etc.
  - Effect from dispensations
- **Appropriate resources in relation to the activities**
  - Number of staff to carry out the task
  - Approved and updated tools
  - Aids and protective equipment

Competencies

Human and Organisational Factors in Risk Management

Identification of Human and Organisational Factors

- Risk Assessment
- Observations
- Incidents, Accidents and other reporting
- Data



Human and Organisational Factors in Risk Management

Safety Leadership & HOF

Core competence
All

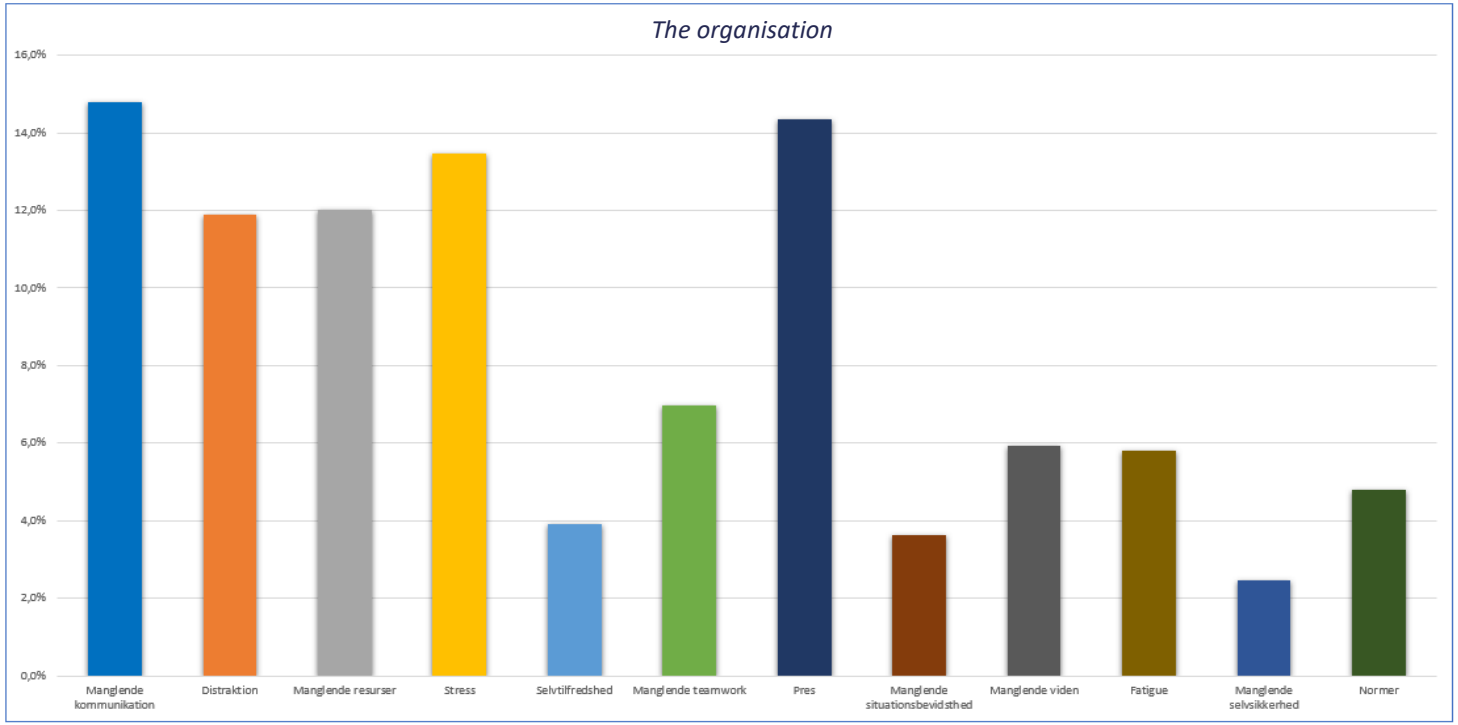
Identification of Human and Organisational Factors

Risk Assessment

Observations

Incidents, Accidents and other reporting

Data



15% Lack of communication
14% Pressure
13% Stress

POINT OF NO RETUR

The U-Turn

MANAGEMENT COMMITMENT
ERA Safety Climate Survey
2021

PHASE 1
Create common language
Focus on Safety Leadership

SAFETY LEADERSHIP (all)
Roll out 2021-2025

FRAME FOR SAFETY CULTURE IN SLS

2023

SAFETY VISION
Leaders ownership
Staff ownership

2024

HUMAN FACTORS IN TECHNICAL EDUCATION
Classroom and e-Learning

SUPERVISION ON WELL-BEING,
A structured chat on how the driver thrives in the job (no-technical)

COFFEE AND A CHAT
Human and Organisational Factors

HOF IN PRACTICAL EDUCATION
Mandatory dialogs in the cabin
(Trainee and instructor)

THE LEARNING ORGANISATION
Channels to the organisation

ORGANISATIONAL JUST CULTURE
Leaders

SAFETY LEADERSHIP
New staff (All)

2025

PHASE 2
Reinforce
Merge HOF technical skills

SAFETY CLIMATE SURVEY
No.2

Lokaltog

Everyone home safe

Thank you for your effort

EUROPEAN UNION AGENCY FOR RAILWAYS

HOF Conference

Human & Organisational Factors

22-23 October 2024 - Valenciennes, France

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Nuovo Trasporto Viaggiatori

HOF awareness and development in ITALO

22 October 2024

.italo

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ITALO Organization & Network

NETWORK

- 118 railway services a day in 2023
- 55 cities and 62 stations connected

NUMBERS

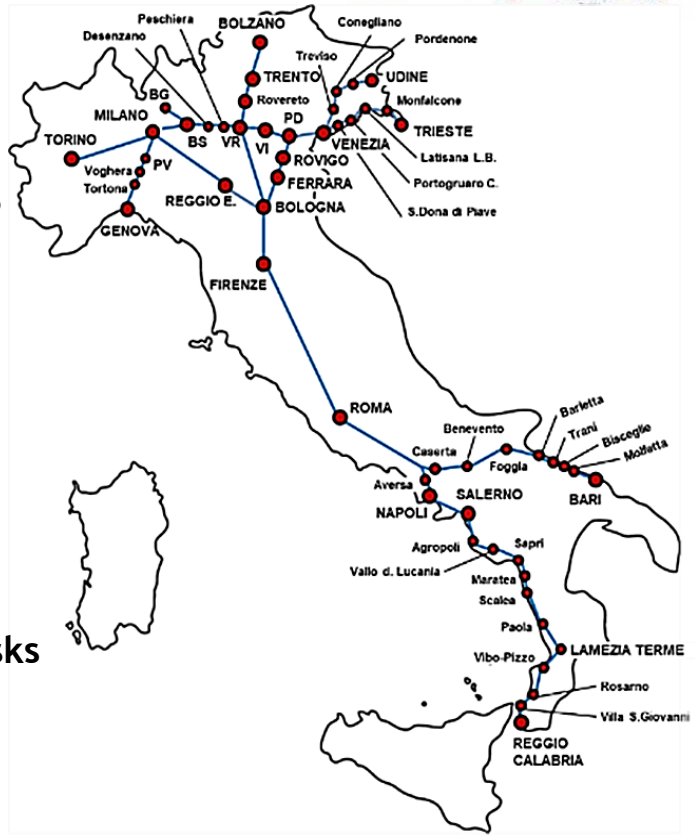
- 29 million trains*km/year
- 22,7 million total passengers carried in 2023

FLEET

- 25 AGV575
- 26 ETR675

EMPLOYEES

- 1.519 employees (average age: 32 years)
- 653 employees involved in safety-related tasks



HOF - balance between people, technology and environment

Project objectives

Improving the interactions between humans and the elements of the context in which they operate - to increase the level of safety, the well-being of individuals and the performance of the system.

Promoting the safety culture in Italo and increasing everyone's responsibility for collective improvement.

HOF Strategy development – 5 pillars

Safety culture

Promoting a positive and safety-oriented work environment through governance mechanisms, as well as highly-qualified internal and external management resources.

Involvement

Promoting a work environment that enhances mutual trust. Ensuring that employees (both staff and operational) are active part of improving the company culture, involving project resources. Generating greater risk awareness, and correcting ways to manage work.

Positive behaviours

Highlighting and rewarding positive behaviour from individuals - citing them as example. Ensuring feedback on safety performance is provided with continuity, impartiality and transparency to staff.

Communication

Promoting open and free communication on work-related issues. Ensuring that workers feel listened to, and encouraged to provide input on improving working conditions - for their own benefit, as well as for the benefit of the entire company.

Learning from mistakes

Using errors as a source of learning to improve the organization's safety level and improve its objectives. Promoting «just culture», not «blame culture», to facilitate knowledge of problem causes - and for the sole purpose of prevention.

HOF Deployment

Risk Management
HOF integration

Skills
Model review

Training
Skill acquisition

Sharing Experiences
Service reports, Voluntary reports, Focus Group

Risk Management - HOF integration

Activities:

Gap analysis for the HOF integration

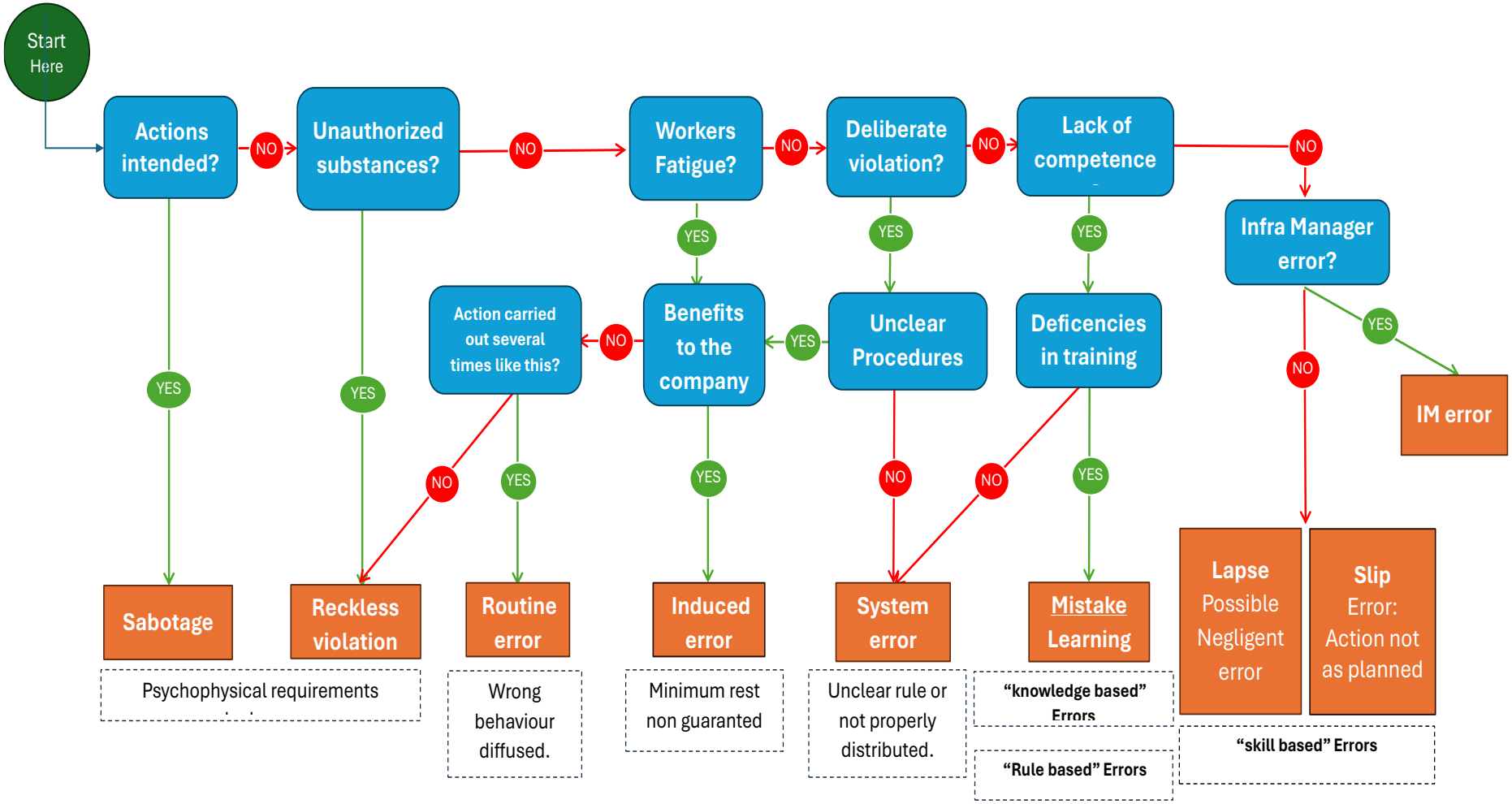
Focus on Driving and Accompanying processes by comparing what is observed in the field and what is described in the operating procedures.

New Hazard identification through application of methods for the HOF integration

NEXT

Development of new risk models with the Bow Tie Analysis

Italo Just Culture Decision Tree



Training
HOF knowledge acquisition

ERA Safety Leadership Training - February 2024

Training in partnership with ITA Airways

80 hours of training for all organizational level:
- 11 Manager Executives
- 18 Middle Managers
- 28 Instructors and Tutor (Train the Trainer)

Role-playing with a high emotional/cognitive impact:
- Flight simulator
- Emergency simulator
- Multimedia classrooms

Learnings will be transferred from the Italo instructors to the operational staff.

Training in partnership with ENAV

Skills - Model review

HOF Integration into Italo SMS

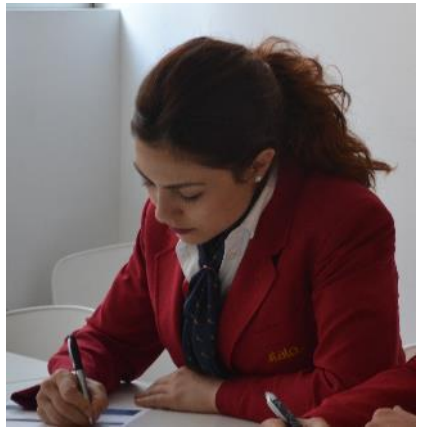
LEADERSHIP
SITUATIONAL AWARENESS
COMMUNICATIONS
WORKLOAD MANAGEMENT

NEW RATING SCALE

UNSATISFACTORY | ACCEPTABLE | ADEQUATE | **GOOD** | VERY GOOD

- Initial and on-going training
- Performance evaluation
- Accident investigation

Sharing Experiences
Service Reports



Goals

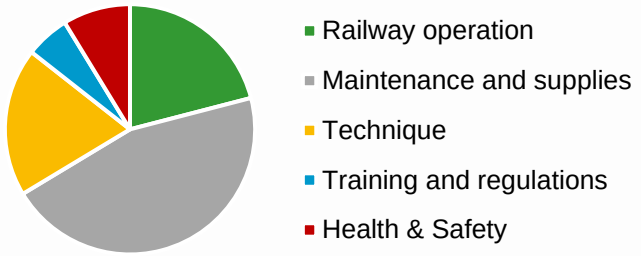
- Analyse system experiences and identify improvement/corrective actions;
- Bring the issues identified by the operational staff to the attention of the staff structures, which constitutes as a high-value observation tool.

Staff can report significant events for safety purposes (for example, dangerous events, inconveniences, train or circulation anomalies, non-compliance with rules and procedures).

From the third quarter, voluntary reporting was established.

2023

- **5591** Service Reports received
- **416** Service Reports deemed sensitive



italo … *thanks you!*

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Human & Organisational Factors (HOF) Conference

Panel Discussion

22-23 Oct 2024 Valenciennes, France

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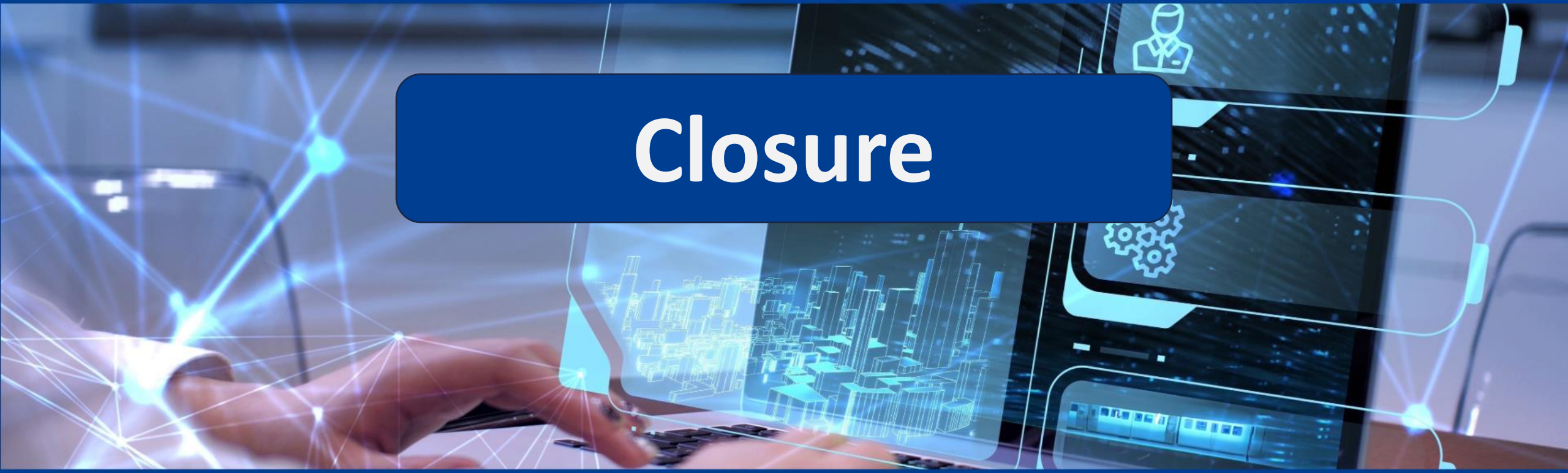

Closure

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Human & Organisational Factors (HOF) Conference

Thank you!

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Human & Organisational Factors (HOF) Conference

Networking Cocktail

22-23 Oct 2024 Valenciennes, France

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