MTO Safety

The future of System Safety – How to apply HTO Human - Technology - Organisation

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Lena Kecklund, PhD, CEO
Lena.kecklund@mto.se
www.mto.se
www.mtotools.se

MTO Säkerhet

Welcome!

Lena Kecklund
CEO, MTO Säkerhet AB
PhD in Psychology
HTO expert

Services

Safety culture

Safety management

Risk analysis

Accident investigation

Usability

Health and Safety (HSE)

Research

Education and training

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Den (o)mänskliga faktorn

MTO
Digitalisering och automatisering för säkerhet och hållbarhet

Lena Kecklund
Bengt Sandblad

The complexity of modern society needs the HTO approach

An example

- An accident 2 October 2023 led to suspension of driveless vehicle for all General Motors Cruise vehicles
- Self-driving vehicle striking and dragging pedestrian
- Causal analysis include a "Comprehensive review" of safety systems and technology
- Outside safety expert to review the company's safety operations and culture
- Lawmakers: "Unproven and pose safety risk"

- Source: https://www.reuters.com/business/autos-transportation/gms-cruise-suspends-supervised-manual-car-trips-expands-probes-2023-11-15/

Reasons – System design

- System design
  - Not taking into account the interactions between Humans, Technologies and Organisations?
  - System models incomplete?
  - Design without taking usability and human performance characteristics into account

Reasons – Risk management and safety culture

- Safety fundamentals not applied?
- Risk acceptance criteria not defined
- Highly competitive business environment - focus on taking products to the market fast

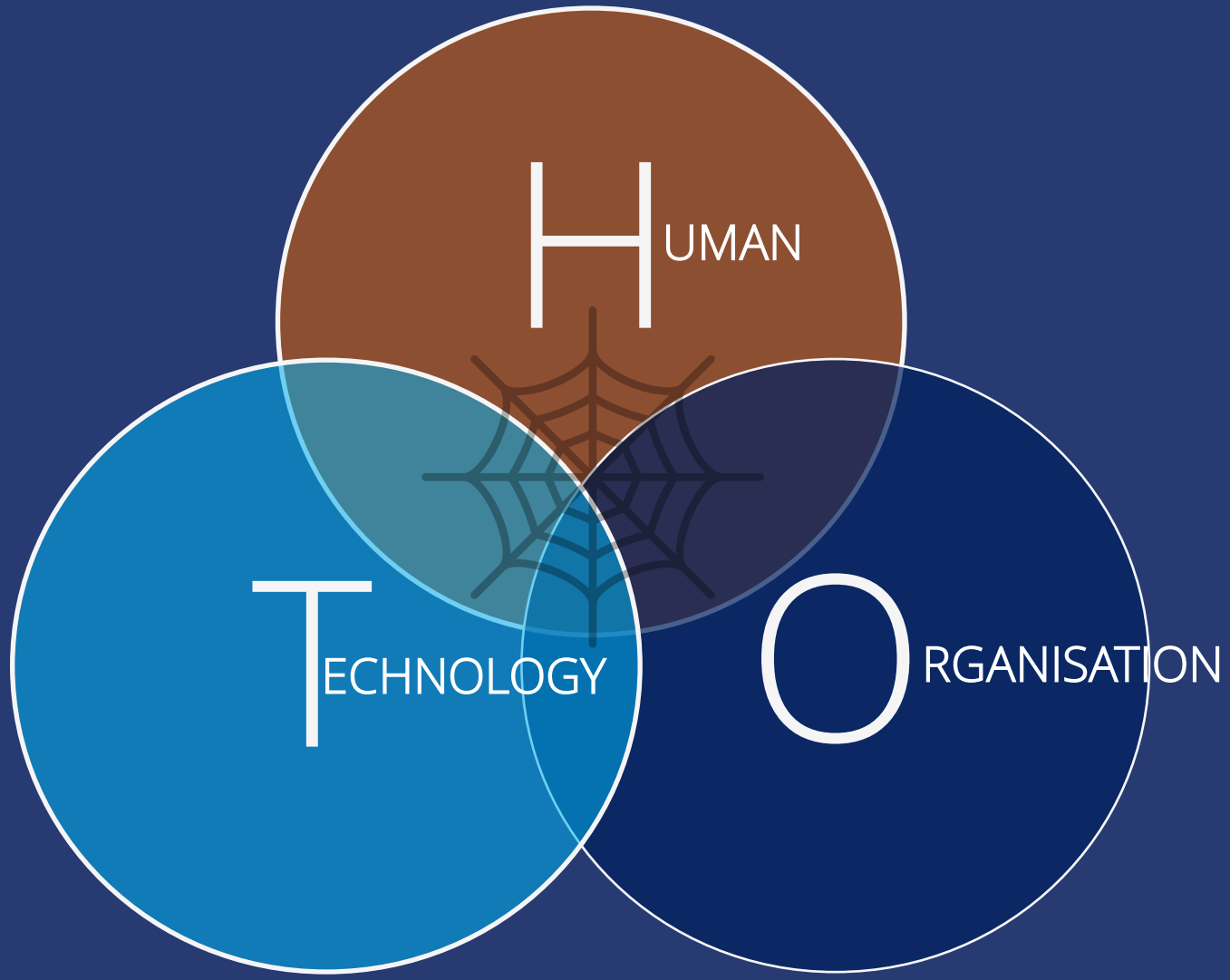
- Poor safety culture?
- Poor safety operations?

Earlier in October, the California Department of Motor Vehicles ordered Cruise's driverless cars to be removed from state roads, calling them a public hazard and alleging the company had "misrepresented" the safety of the technology

Safety fundamental:
If you do not know and cannot explain what has caused the problem you must stop operations, since safety cannot be assured

HTO – What is it?

- The interaction between **H**uman – **T**echnology – **O**rganisation



HTO > H+T+O

Costa Concordia
13 January 2012

Why didn’t anyone in the team intervene and question the Captain’s decision to deviate from the planned track?

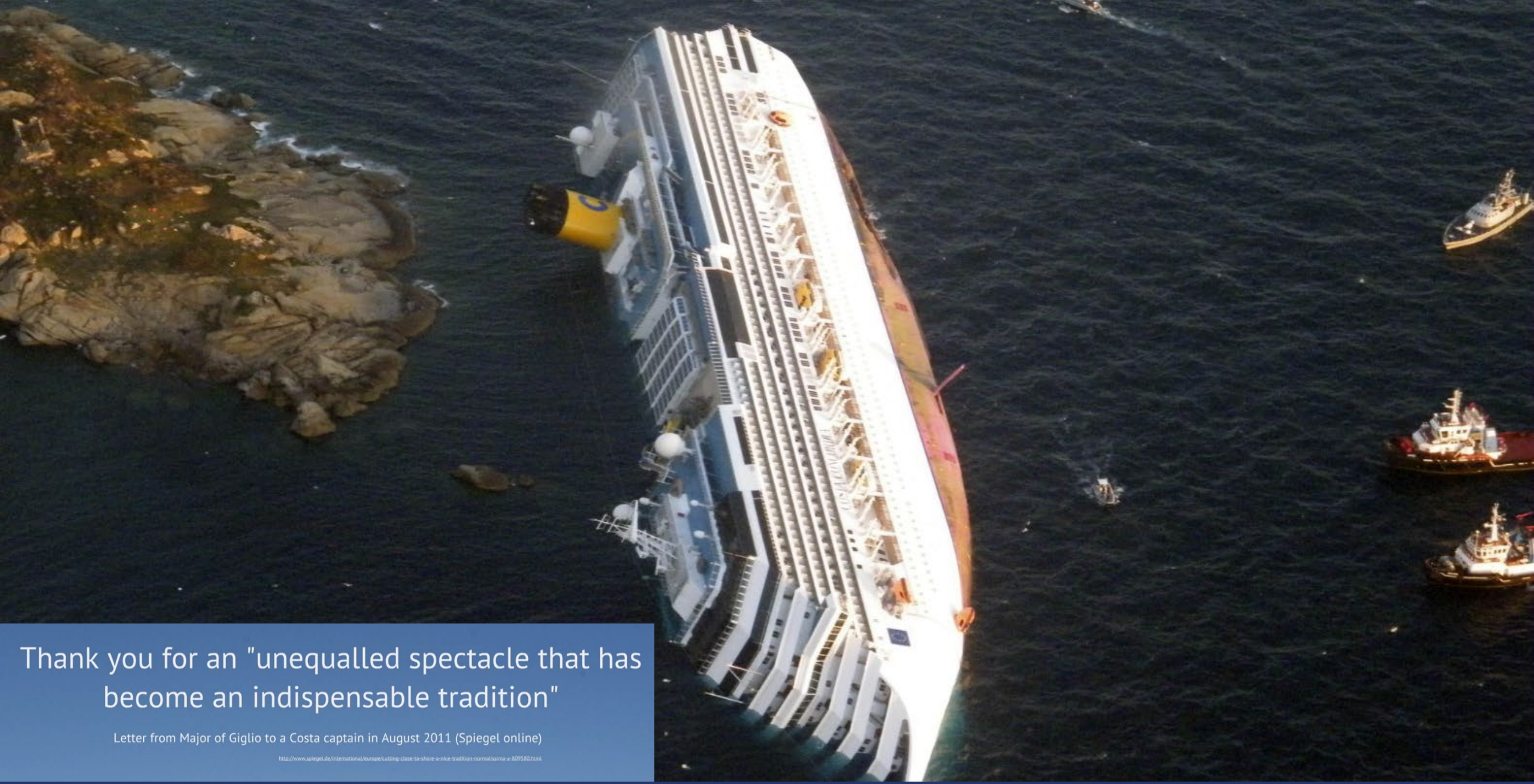
- Prevailing culture in most Italian ships
- Fear of being punished in some way
- Lack of psychological safety turns team members into passive bystanders
- Poor leadership deprives team members of effective use of teamwork (BRM) tools
- Lack of proper briefing before departure with invitation to speak up if safety margin is used

Main Contributing Circumstances at Operational Level

- The Captain's decision to take control of the vessel and **ignore:**
  - **the Pre-planned track**,
  - the Integrated Navigation System including Radar, Electronic Chart System and Track Control System and instead base the navigation on his experience and skills
- Inadequate teamwork after the Captain took control
- Team members did not question the deviation from the planned track
- Distractions from the use of mobile phones and the presence of hotel staff
- Many alarms going off at the bridge – information overload

Main Latent Conditions

- Inadequate training in the operation of the Integrated Navigation System
- Lack of training in leadership to create trust and psychological safety
- Lack of training in bridge resource management to enhance teamwork
- Absence of company policy and operating procedures for sail pasts and deviations from pre-planned track



Thank you for an "unequalled spectacle that has become an indispensable tradition"

Letter from Major of Giglio to a Costa captain in August 2011 (Spiegel online)

http://www.spiegel.de/international/europe/cutting-close-to-shore-a-nice-tradition-normalisaima-a-809580.html

Consequences – When HTO interactions fail

- Accidents and incidents
- Suspended operations
- Lack of public trust
- Lack of fulfilling safety fundamentals and legal requirements
- Low customer satisfaction

How can human performance be explained?

- Social processes
- Information processing
- Activity, rest and recuperation
- Adaption
- Feedback
- Drifting

How can we build safe systems?

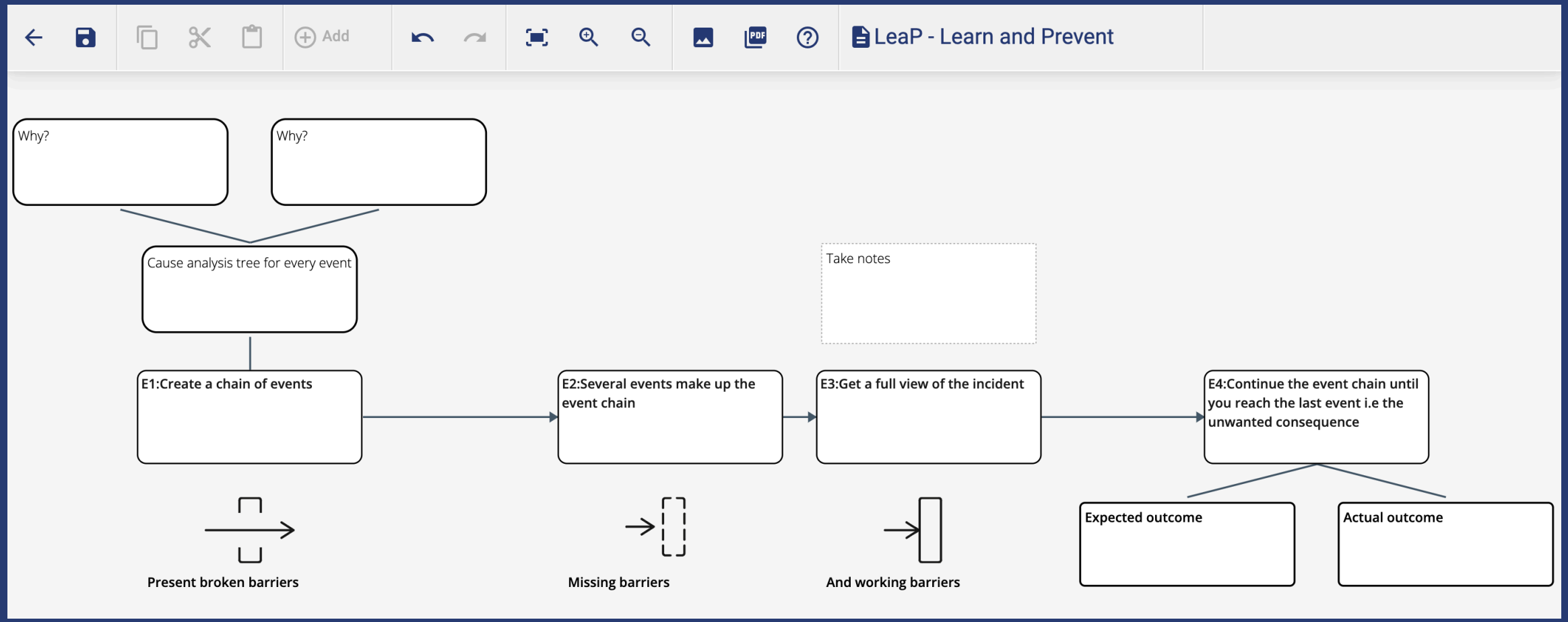
- Apply the HTO systemic view
- Consider the HTO interactions
- Use HTO Toolbox

The Toolbox | MTOTools

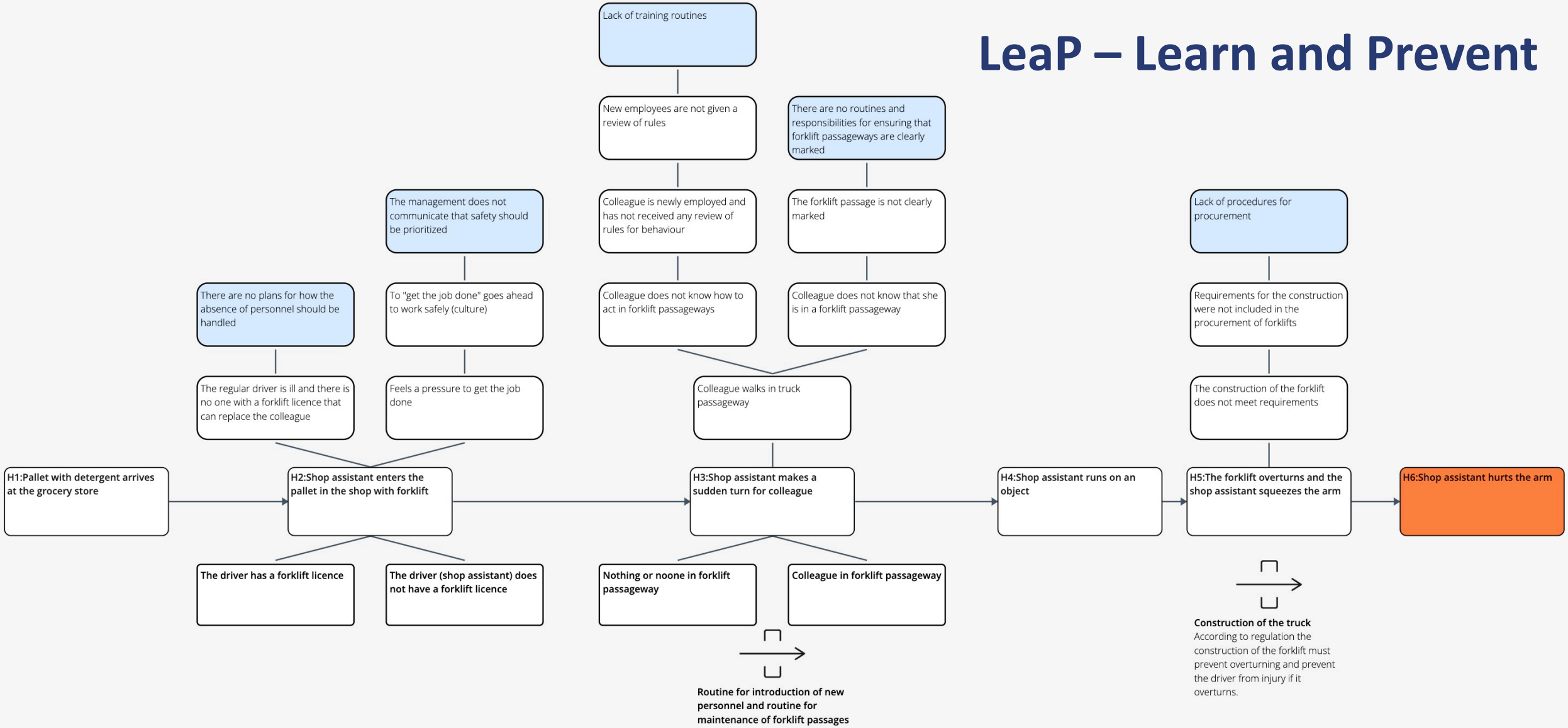
- Accident investigation - LeaP
- Risk analysis - Bowtie

- Risk management in change
- Safety management
  - Safety processes
- Safety culture
- Design and automation
  - Task analysis
  - User centered design

MTOTools | LeaP – Learn and Prevent
www.mtotools.se



LeaP – Learn and Prevent



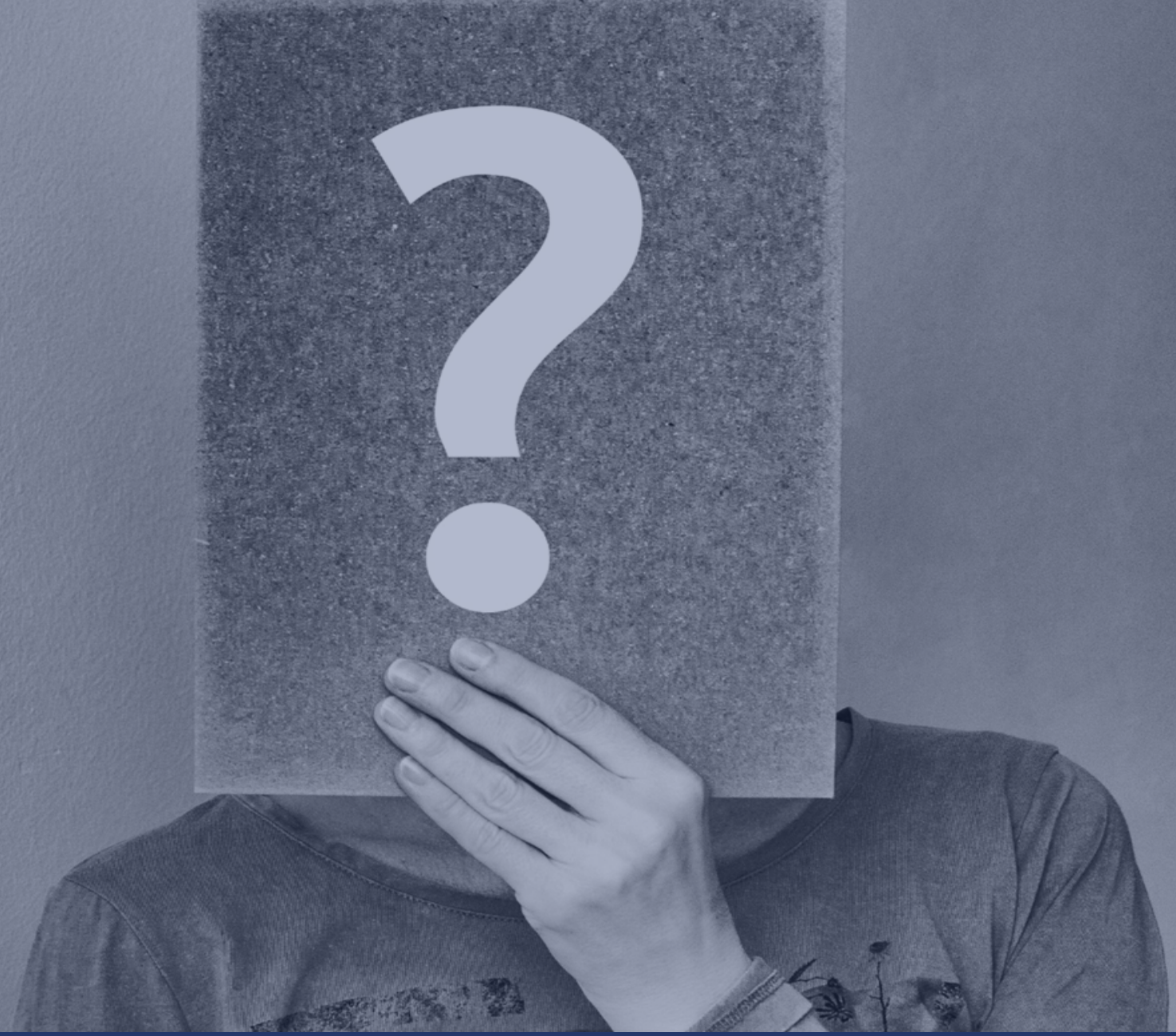
In summary

- Apply the HTO systemic safety view
- System design and operation must support human performance
- Use HTO Tools
- Safety must be part of the business case
- High risk systems must apply safety fundamentals

Questions?

Contact us!

Info@mto.se
Lena.Kecklund@mto.se



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Thank you!

Suggested reading?
Order the book! –> www.studentlitteratur.se