



SIJOT – STPA-Informed Journalism Tool

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Introduction



Oktoberfest accident 2024

Background

- Oktoberfest in Munich: world's largest Volks fest (6-7 million visitors)
- It hosts a big amusement park
- The "Olympia Looping" – world's first mobile rollercoaster with five loopings – was brought from Vienna to the Oktoberfest

Accident

- A worker was hit by an empty car during a test ride
- The accident was covered by various news teams (both private and publicly funded)
- Accident happened just days from the opening of the Oktoberfest
- Officials were glad that they could quickly identify the root cause of the accident:
→ **Human error:** The fatally injured worker overheard a warning signal



Oktoberfest accident 2024

News coverage

- A comparison of over ten news reports shows a consensual judgement about the cause of the accident
- Further, the press cites the Oktoberfest management stating that all construction sites fulfill the "highest safety standards"

Not the first accident involving this particular rollercoaster

- In 2022 a female worker was hit by an empty car during a test ride when the mobile rollercoaster was in Vienna
- The worker entered a fenced off area (the vehicle was not stopped automatically)

“An accident where innocent people are killed is tragic, but not nearly as tragic as not learning from it.”

– Nancy G. Leveson (CAST Handbook)



merkur.de – Translated by Google Translate

Accident news coverage

Accident news coverage is sometimes hard to process for system safety professionals, and especially as STAMP practitioners

- News coverage is perceived as short sighted and incomplete
- Systemic factors not evaluated
- E.g., no considered article or report asked
 - Why the worker overheard (?) the signal
 - Investigated into the systemic shortcomings within the organization

Incomplete news coverage has impact on public opinion

- The killed worker is blamed for the accident
- Anon-professional audience is likely to think that if the worker had not failed to hear the warning signal (and maybe had been more attentive) this accident would not have occurred → failure based thinking

Introducing SIJOT - STAMP-Informed Journalism Tool

We believe:

With knowledge of STAMP the news coverage would be more profound

Our goal:

- Improve news coverage on accidents and incidents
- Replacing failure based thinking by establishing STAMP basics in journalism
- Give journalists a tool to implement STAMP basics in their work

Why addressing journalism?

- Best case: Incomplete news coverage
- Worst case: Public is misled about safety and relevant causal factors
- Consequence: Potential negative impact on the public's understanding of system safety and the acceptance of system safety legislation and rulemaking.



Obligatory AI-generated image

SIJOT – STAMP-Informed Journalism Tool

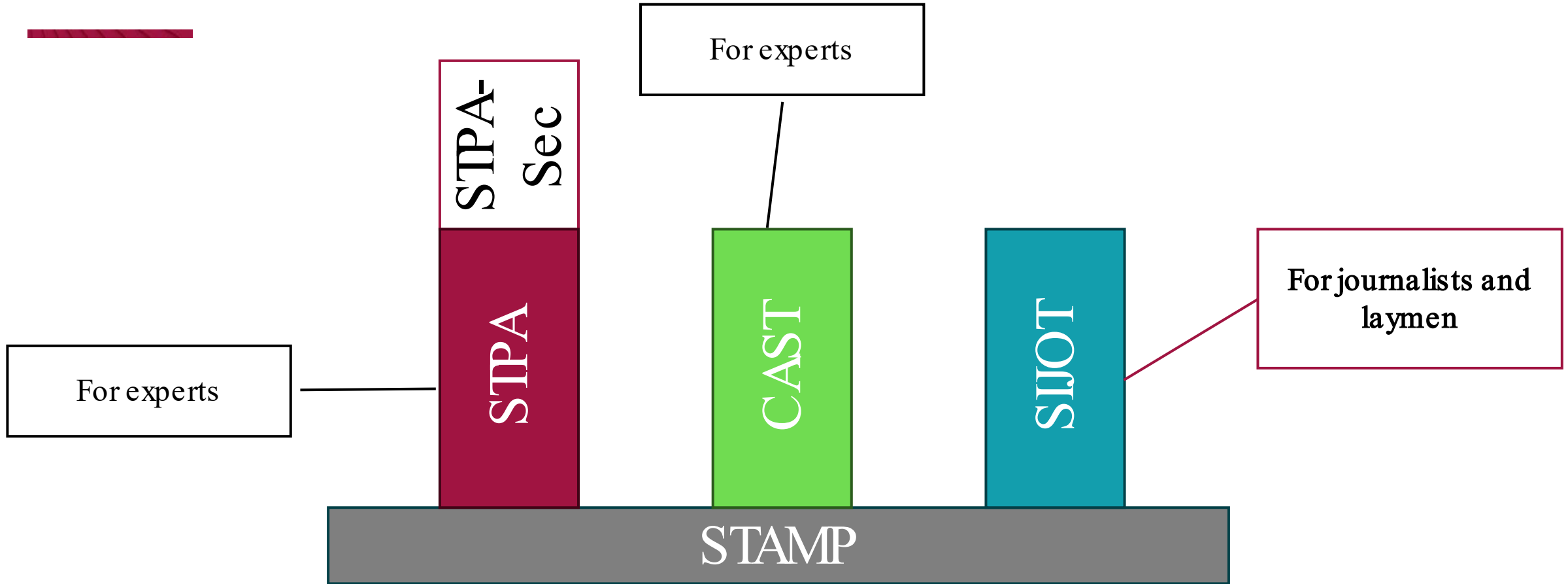
Key ideas and goals of SIJOT

Overview: How SIJOT works

Differences to CAST and STPA

Learnings from the workshops with journalists

Why not using CAST?



SIJOT – STAMP-Informed Journalism Tool

Key ideas of SIJOT

- Developed for journalists (often non-expert), not trained for conducting engineering methods (as not being their main task)
- A means of introducing STAMP concepts to a broader audience
- Explaining terms and definitions in an easier understandable form, employing elements of STAMP, CAST and STPA
- Also helpful for communicating system safety (or other system properties as e.g., cybersecurity) to management

Challenges

- Risk of being too vague
- Lack of acceptance if too formal

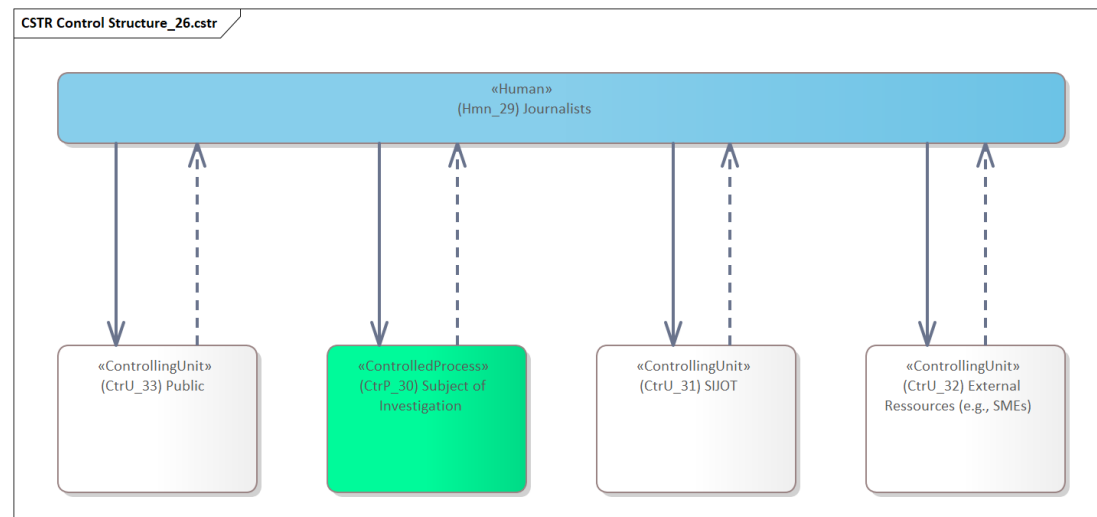
Claim / expectancy: With SIJOT, journalists can identify 20 questions not being asked!

How we developed SIJOT

STPA analysis conducted based on the initial concept

- Identification of loss scenarios as base for tool development
- Base for requirements on SIJOT
- Starting with a black-box view, evolving into a white-box view in following iterations when SIJOT was defined

Identifier	Name	Description
1 StkG_10	Justice	including - Fairness - Accountability - Responsibility - Holism - Blame - Awareness
2 StkG_11	Quality	- Fairness - Transparency - Balance - Superficiality (neg) - Profundity - Holism
3 StkG_12	Reader Engagement	- comprehensibility - entertainment
4 StkG_13	Tool acceptance	



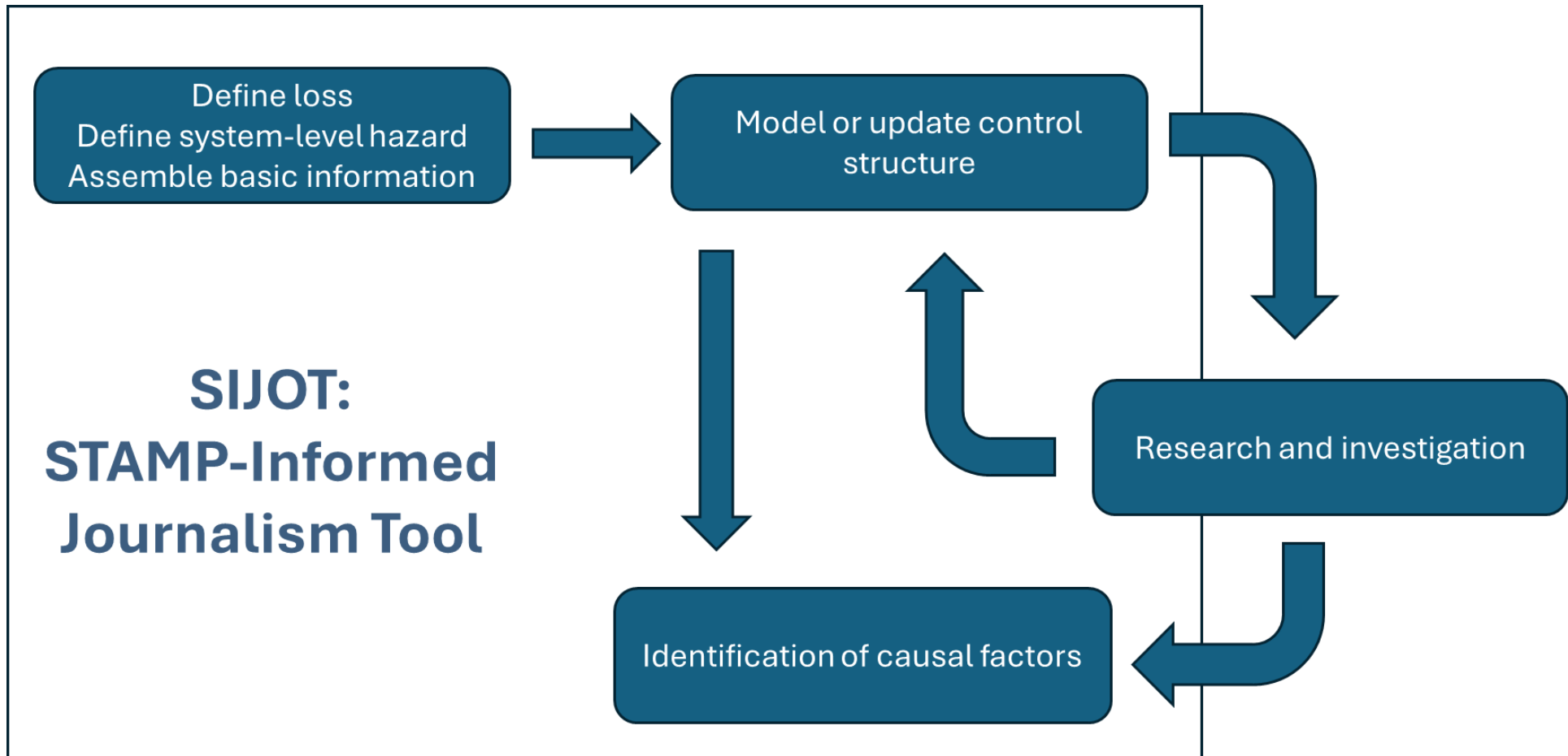
Identifier	Name
1 Loss_15	Loss of Justice
2 Loss_16	Loss of (journalistic) Quality
3 Loss_18	Loss of Reader Engagement
4 Loss_19	Loss of tool acceptance

How we developed SIJOT

STPA summary and key take-aways

- A fundamental (because often identified) causal factor for incomplete news coverage is the journalists' dependability on people and organizations involved in the subject of investigation (who are therefore biased)
- Thus, SIJOT shall enable non-expert journalists to discuss with informants, witnesses, officials, etc. on eye-level
- SIJOT shall be accessible to non-experts and easier to learn while delivering reproducible results
- The goal is not to identify causal factors in detail just by applying the tool but to raise explanatory approaches to what happened in order to give new clues

How SIJOT works



Disclaimer:

This is a report of our workshops.

The shown results (e.g., control structures, control actions, etc.) are as formulated in the workshops by participants without prior knowledge of STAMP, STPA and/or CAST.

Losses and hazards in SIJOT

Definition of losses and hazards

- Same as in CAST and STPA
- „Triad“ approach to support the definitions and enhance results

Triad – three steps to support understanding of definitions

1. Formal definition (from STPA handbook, SAE J3307)
2. Examples
3. Casual definition
 - Loss: „The reason (event, incident, or accident) to begin journalistic research”
 - Hazard: „Condition that should not occur because it has led to loss.”

Surprisingly good results!

- 9 out of 10 losses were correct losses at first try
- 7 out of 10 hazards were completely correct hazards at first try

Control Structure

In SIJOT

- Control structure remains basically unchanged (why should it be changed?)
- Addition 1: Identification of the (human and technical) controllers involved and naming the immediate event leading to the loss
- Addition 2: Iterative guidance to build-up the control structure (by applying elements of the UCA keyword analysis)

Motivation for additions

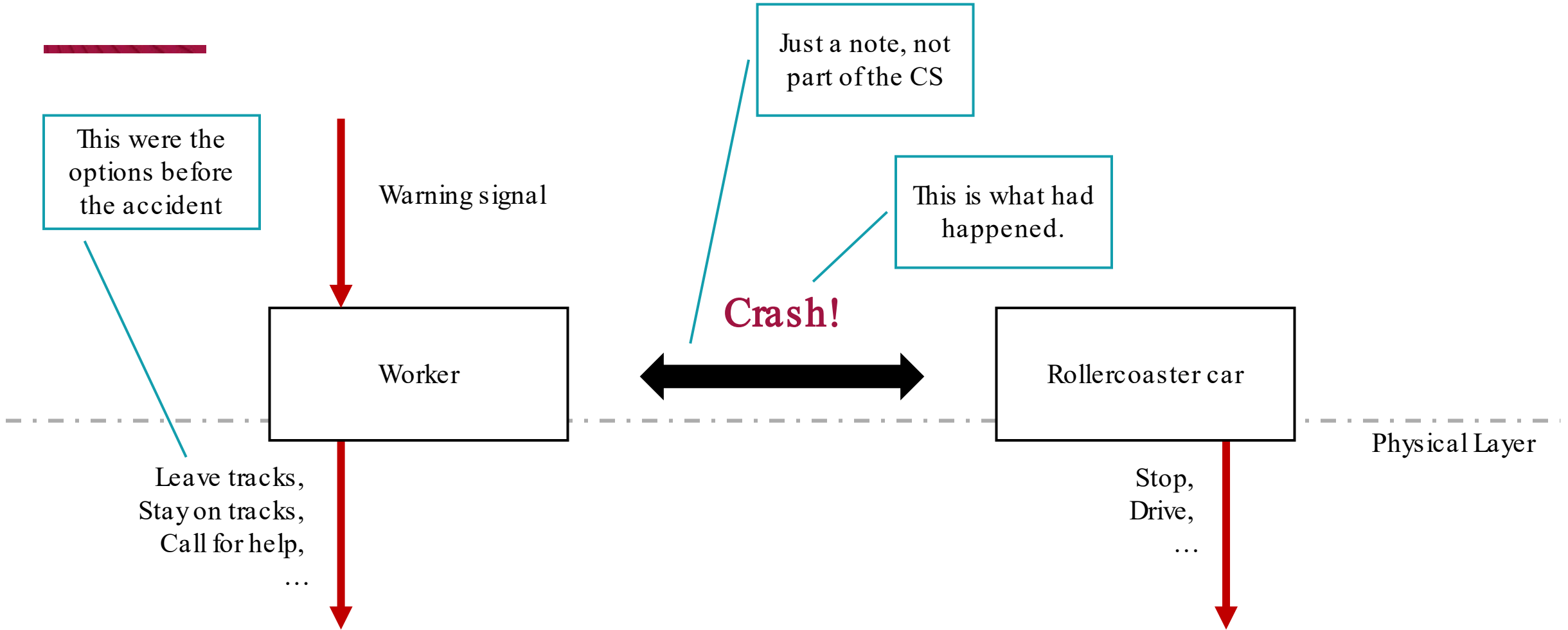
- Teaching to think in controllers and controlled processes to people without technical background and/or knowledge of control theory can be challenging
- Establish a bridge between non-technical vocabulary to control structure

Control Structure and keyword analysis

SIJOT steps for control structure

- Identification of the involved human and technical controllers
- Naming the immediate incident (e.g. crash)
- Identification of possible courses of action (safe and unsafe) in the moment of and prior to the event
- Determination of safe actions in the context:
 - Which action would have avoided the event (safe control action)
 - Of course: Shall not be intended to assign blame
- UCA keyword analysis on safe actions

Control Structure (CS) in SIJOT – Oktoberfest accident example



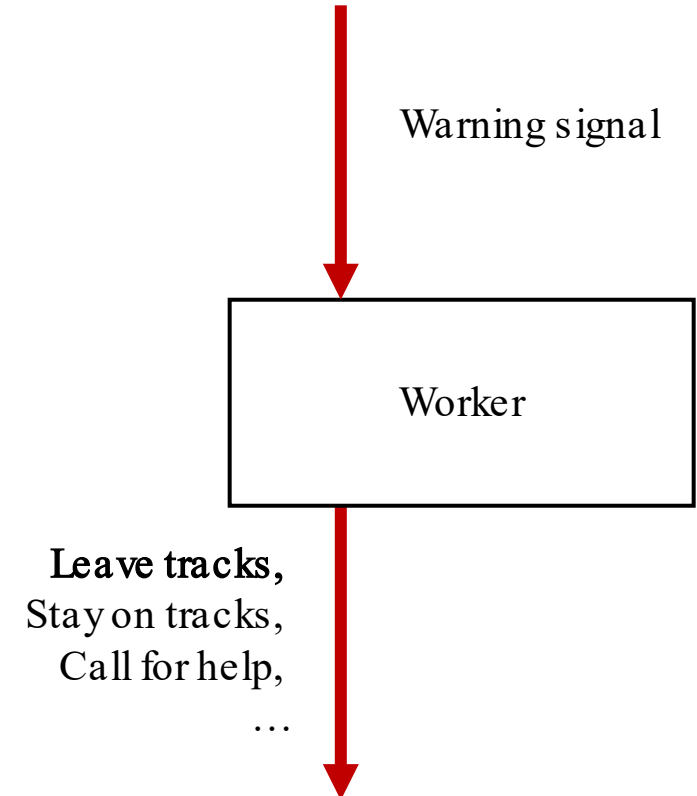
Key word analysis in SIJOT – Oktoberfest accident example

Example: „leave tracks“ as safe control action

- Biased thinking: did not leave (after warning signal)
- Alternative explanations after keyword analysis:
 - Could not leave
 - Did leave, but too late
 - Did intend to leave, but fled to an unsafe spot
 - Did leave the tracks, but took too long
 - ...

→ First “aha moments” among the participants in the workshop

→ Showing more than “the obvious” explanation on what happened



„5 Principles of Human Performance“, Todd Conklin, 2019

„The problem with being wrong is that before you know you are wrong it feels exactly like being right.“

Mental models and process models

Decision making and control algorithms

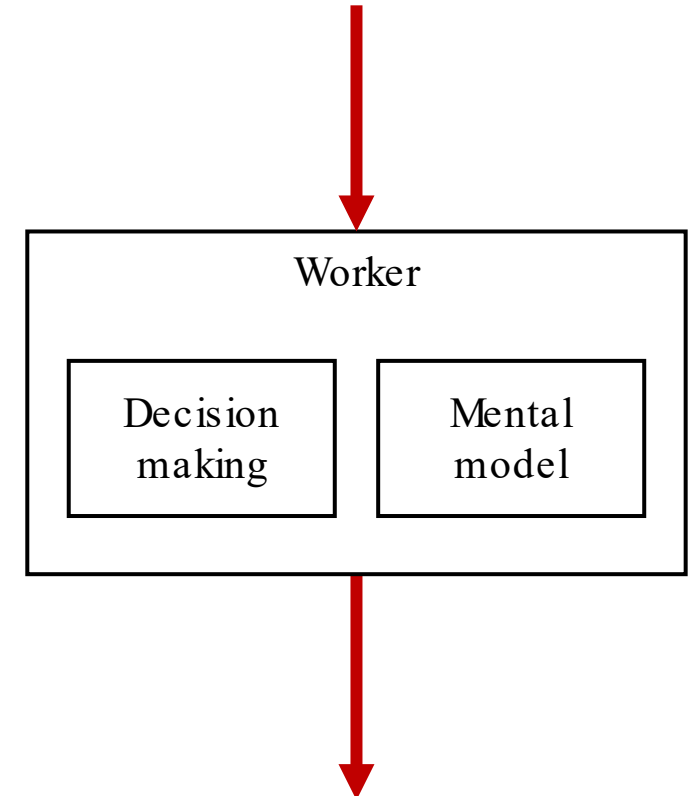
In the workshops, this has shown to be the right moment to introduce (or refresh the knowledge on) the concepts of

- Mental models and process models
- Decision making and control algorithms

This opened the minds for the questions:

- What was the base for the decision made?
- Where did the inputs for the decision come from?
- Was the intended action carried out (correctly)?

→ **The answering of these questions is supported by the new approach for loss scenarios!**



Identifying potential causal factors using the new loss scenario approach

The 4 classes of loss scenarios (as officially introduced last year) are very illustrative

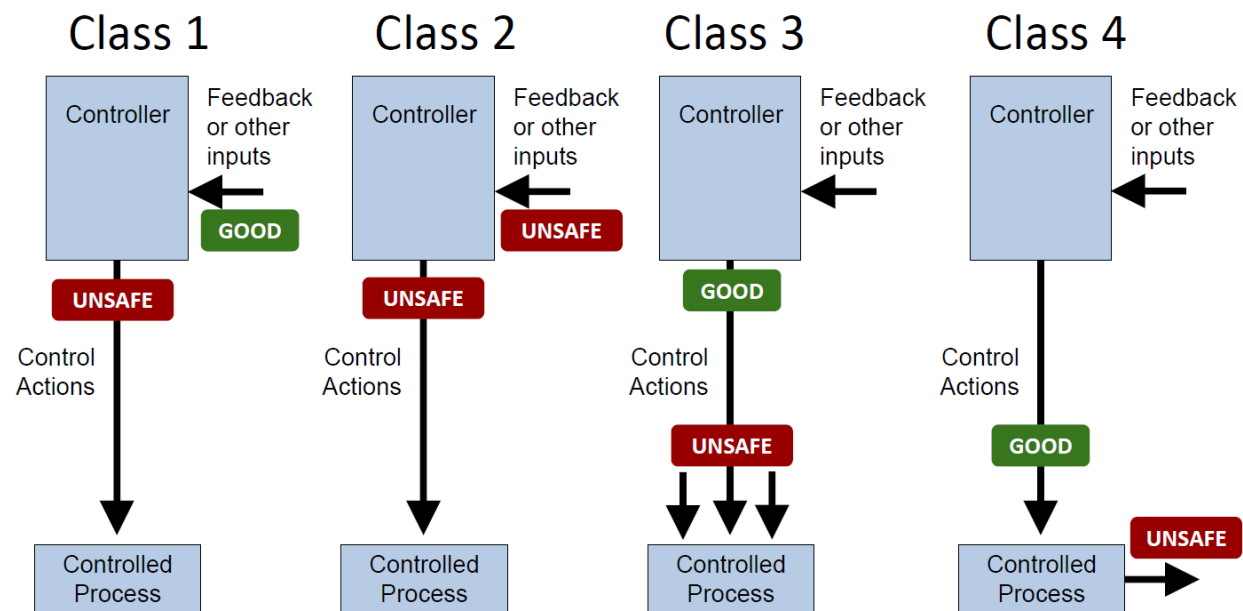
- Overview picture (see right) is almost self-explanatory
- Detailed syntax not needed for SIJOT as goal is only to give hints for further investigation

Workshop observations

- Seen as vital guidance
- No hard time to teach

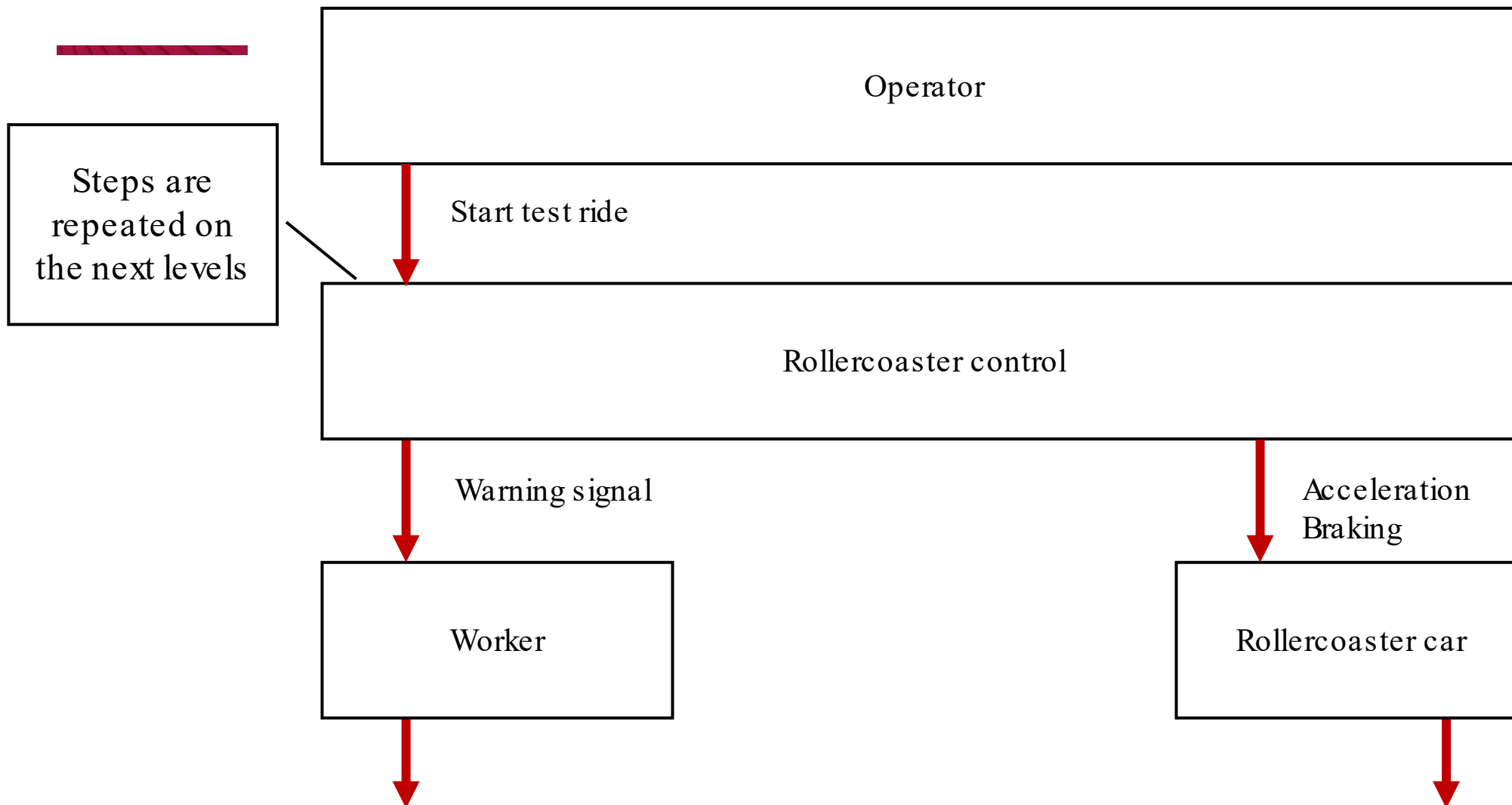
Next step: Update of control structure

STPA: Four Classes of Formal Scenarios



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Control Structure in SIJOT – Oktoberfest accident example



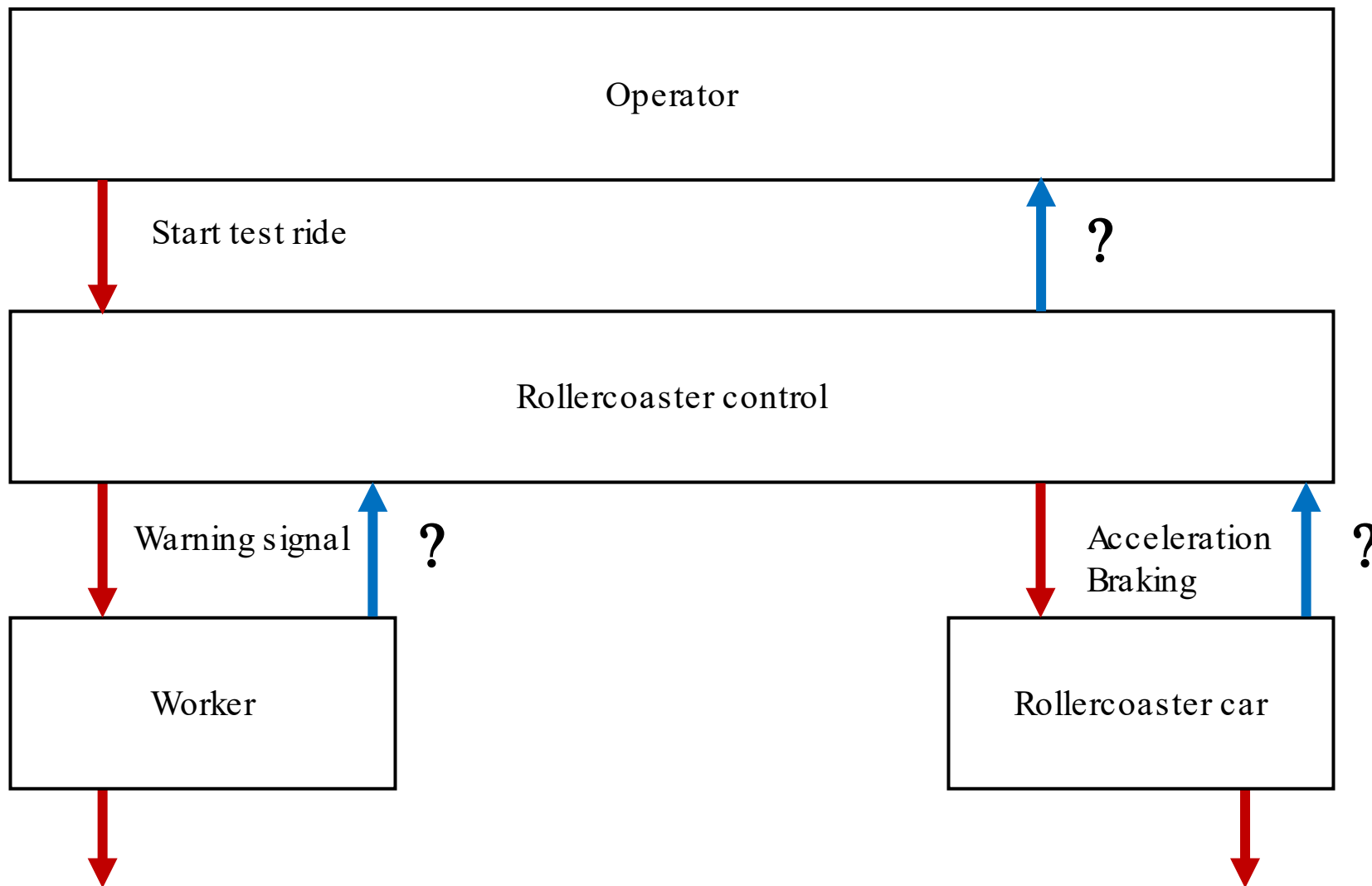
(Missing) feedback in the control structure

In most cases, the participants created control structures only showing control actions but no feedback

We asked the participants of the workshops to draw feedbacks in the control structure reason / investigate if

- feedback was exchanged between the entities
- a particular feedback could have been beneficial to avoid the event under investigation

Control Structure in SIJOT – Oktoberfest accident example



20 (+1) questions not being asked in reports (identified in the workshops)

Grouped by category

20 (+1) questions not being asked in reports (identified in the workshops)

Questions on the audibility of the warning sound:

- Was the warning sound loud enough? Also considering the surroundings.
- Was the sound audible in the spot the worker was at?
- Was the speaker working?

Questions on the possibility and ability to flee:

- Was the time to flee too short?
- How much time was between the warning sound and sending the cart?
- In which position was the worker (remark: they are often on high altitude positions and/or secured by climbing equipment, which makes fleeing harder / taking longer)?
- Did the worker trip while fleeing?
- Was the worker physically able to flee (e.g., unconsciousness due to high altitude, injury, etc.)

20 (+1) questions not being asked in reports (identified in the workshops)

Questions on the observability of the event and the potential to avoid the event:

- Was there a possibility to make sure no-one is on the track (e.g., LOTO?)
- Was there a possibility for the worker to call attention to oneself?
- Was there a possibility to to emergency stop the trains?
- Where the trains stopped but the braking took too long?

Questions on „unusual“ processes which could have have been in contrast to mental models and process models of the system's entities:

- Was the cart faster than usual?

Questions on responsibility and accountability:

- How could this accident happen again after two years?
- Who was sending the carts on the track?
- What needed to be done and checked before sending carts on the track?
- Why is the company not hold more responsible?

20 (+1) questions not being asked in reports (identified in the workshops)

Questions on the knowledge, training and beliefs of the staff:

- Maybe the worker fled to a spot he was thinking to be safe (e.g., he was trained on safe spots)?
- What were the instruction to the worker when hearing the sound?
- Was the worker underestimating the speed of the cart?

Other questions:

- What is the TÜV check really meaning?

TÜV... Technical Inspection Association, in some cases acting as certification and assessment body

Conclusion & Results

Key take-aways from the workshops

Feedback from the participants

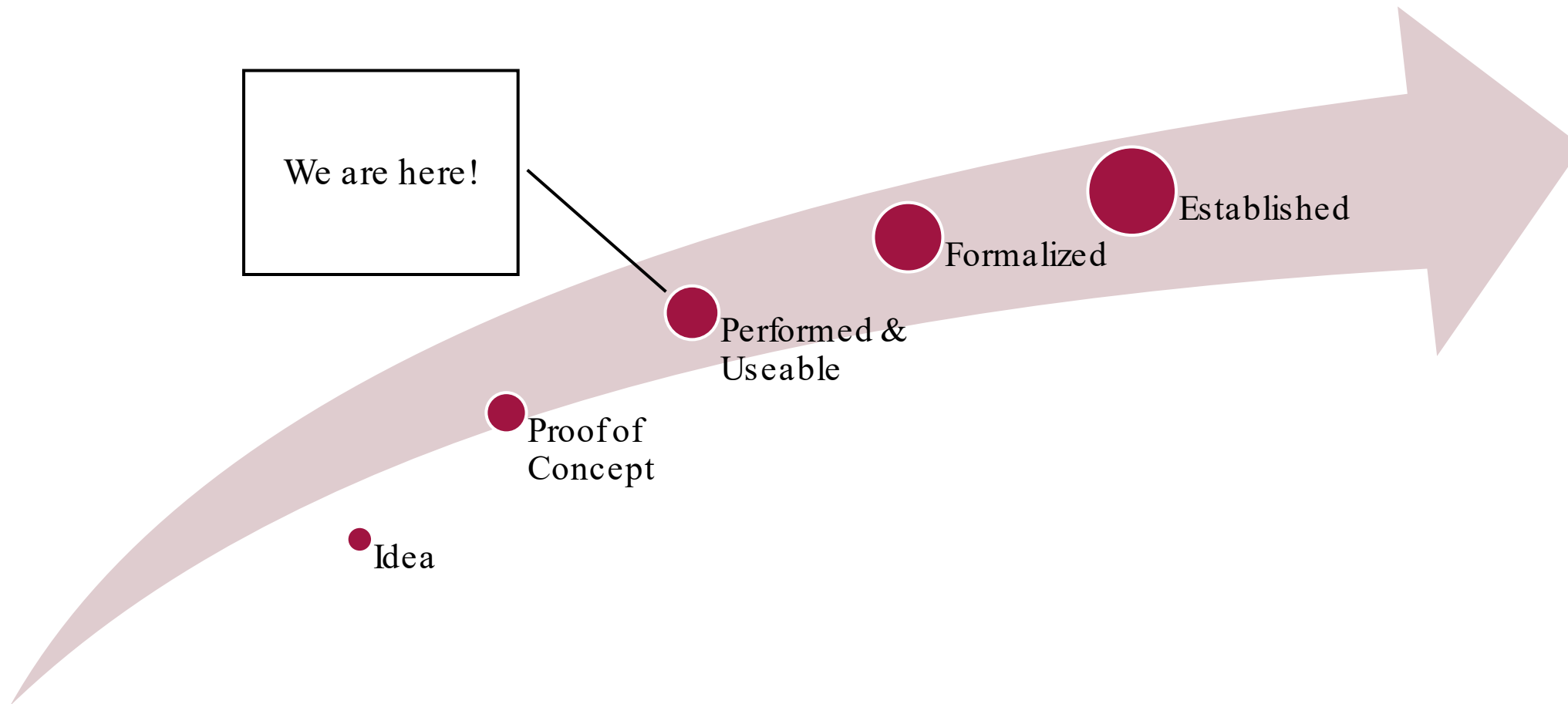
Key take-aways

- SIJOT enables non-experts to identify relevant questions to discuss on eye-level with SMEs, officials, witnesses, etc.
- Despite its less formal nature, SIJOT is uncovering repeatable results (on the necessary level)
- Nevertheless, still a proper training needed: It took some time and guidance for participants to fully inhale the STAMP way of thinking

Feedback from participants

- „I will be using this for novel writing“ - a participant who is also a writer
- A participant repeatedly uncovered use cases for STAMP-based thinking in the days after the workshops
- „Now I understand what ‚people don‘t fail‘ means“ – a participant who thought the saying is just a phrase

Maturity of SIJOT



Outlook

Next steps:

- Formalize approach
- Establish the tool in journalism training and education: Yet alone in Austria, there are numerous journalism training programs.



Thank you!

Contact



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