

Safe Autonomy Group, WMG, University of Warwick

# Managing Technical Project Risks using STPA

## (2024 Virtual MIT STAMP Workshop)

Shufeng Chen

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# Background




- **Sustainable transportation research project.**
- **Multiple project partners.**
- **New teams with >70% new members.**


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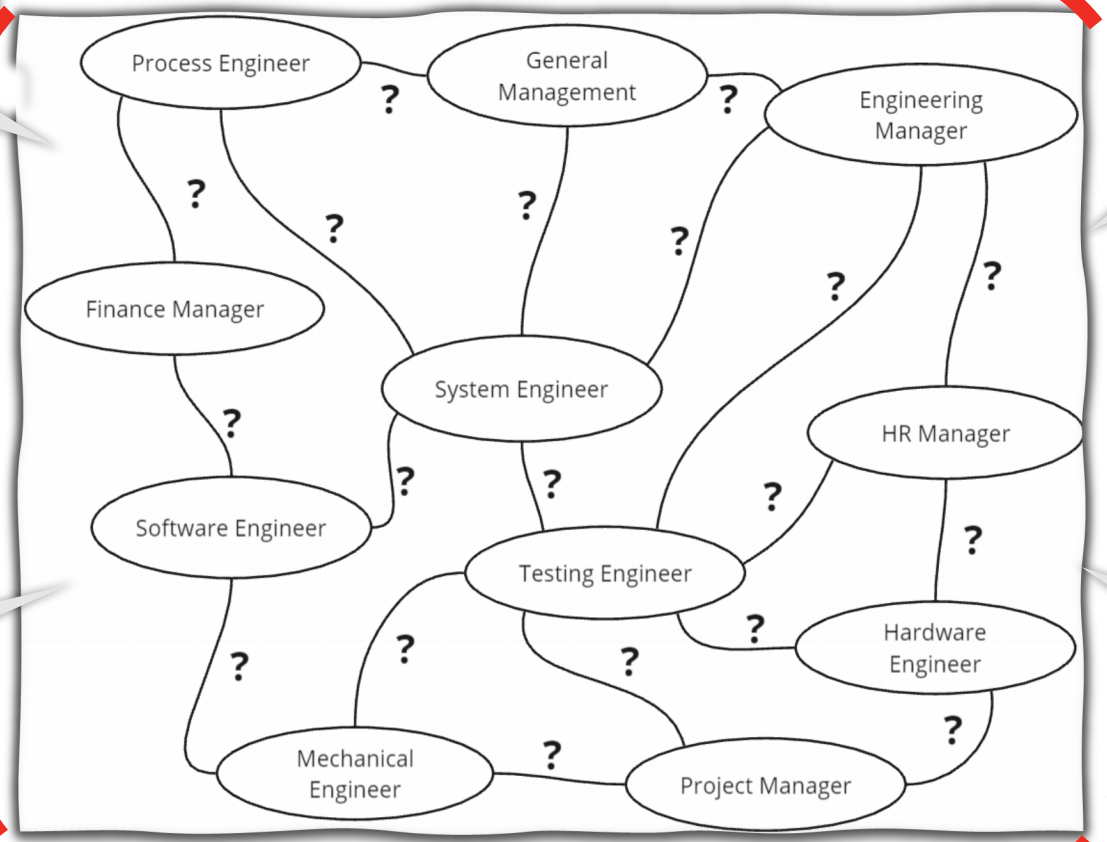
# Challenges

*From safety team:*
*'Hey, I am looking for the new list of data dictionary for BMS, who should I speak to?'*

*From HW team:*
*'Oh WTF! When were the new requirements released? I didn't even know that. I have to change the design again!'*

**Project Goals**

## System




**Project Deliverables**

*From almost **every team**:*
*'I need to book for an urgent travel, who should I reach out?'*

*From almost **every team**:*
*'I can't see the value of my work as I just follow the procedure to complete tasks.'*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# Motivations

## Use STPA

**To provide:**

Project stakeholders insights into the project structure

**To identify:**

Existing or potential flaws in the project structure

**To improve:**

Both efficiency and accuracy of project works and communications

**To create:**

A blame-free working culture


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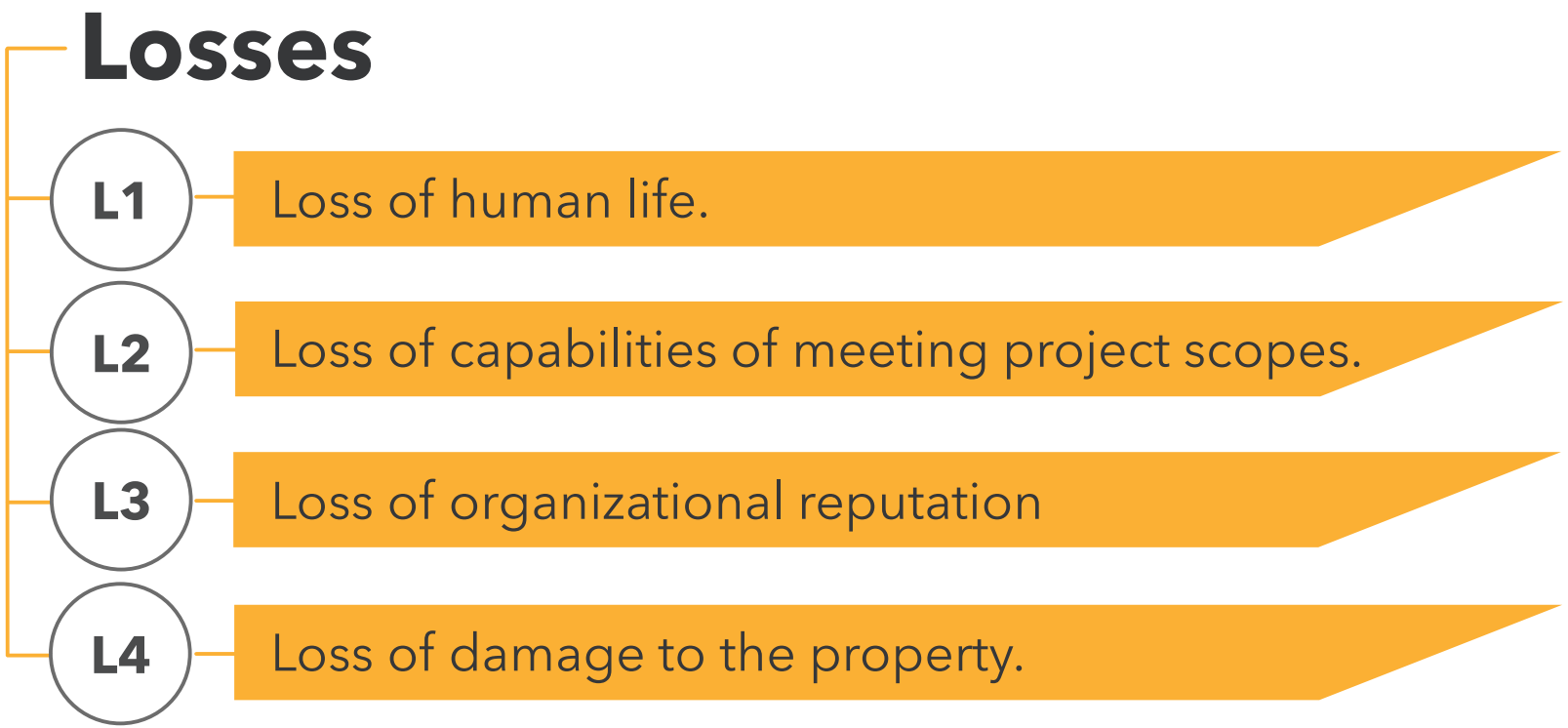
# Define Analysis Purposes





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# Define Analysis Purposes

## Losses

- L1 — Loss of human life.
- L2 — Loss of capabilities of meeting project scopes.
- L3 — Loss of organizational reputation
- L4 — Loss of damage to the property.

## Project Team Level Hazards

- H1 — Project stakeholders resign. **[L2, L3]**
- H2 — Project stakeholders lose trackers. **[L2]**
- H3 — Project operations do not meet H&S policy. **[L-all]**
- H4 — Project budgets were overspent. **[L2, L3]**
- H5 — Project data were lost. **[L2, L3]**


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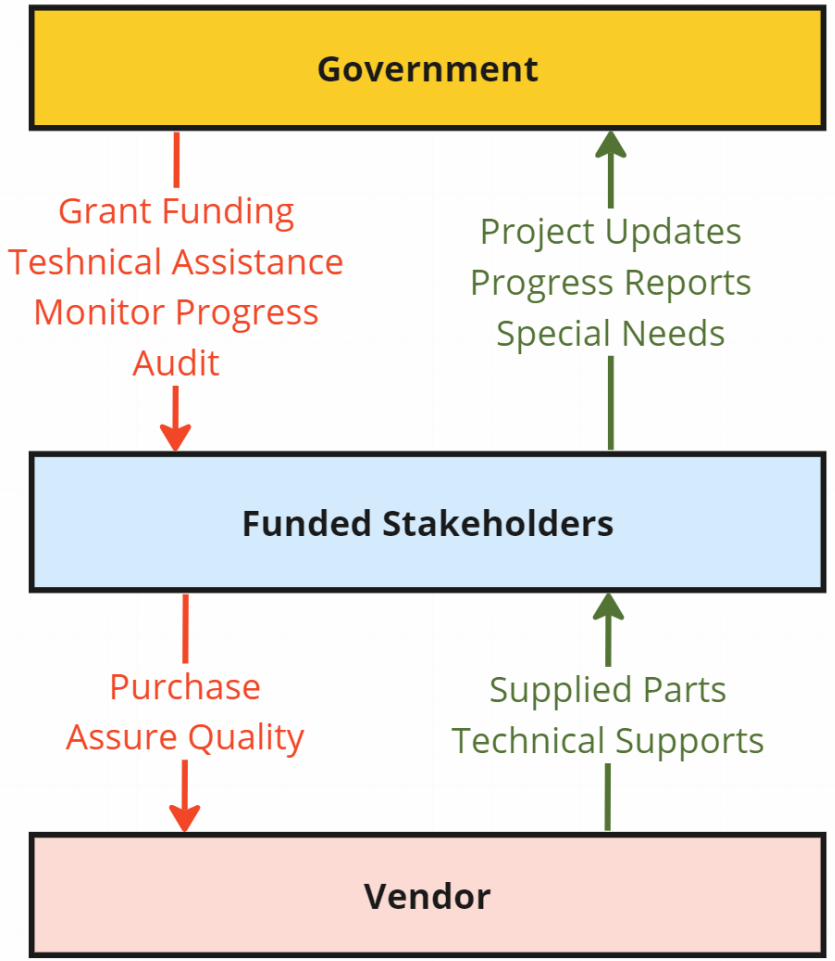
# Control Structures (Level 1)





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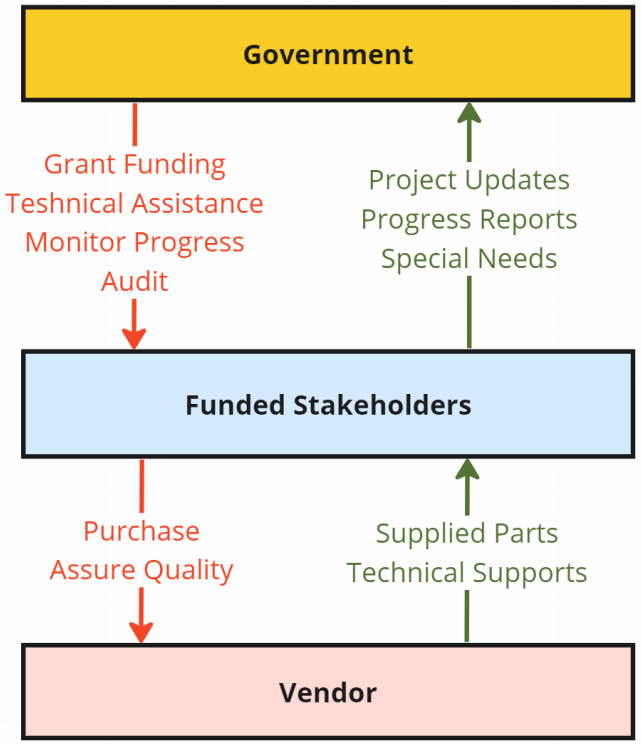
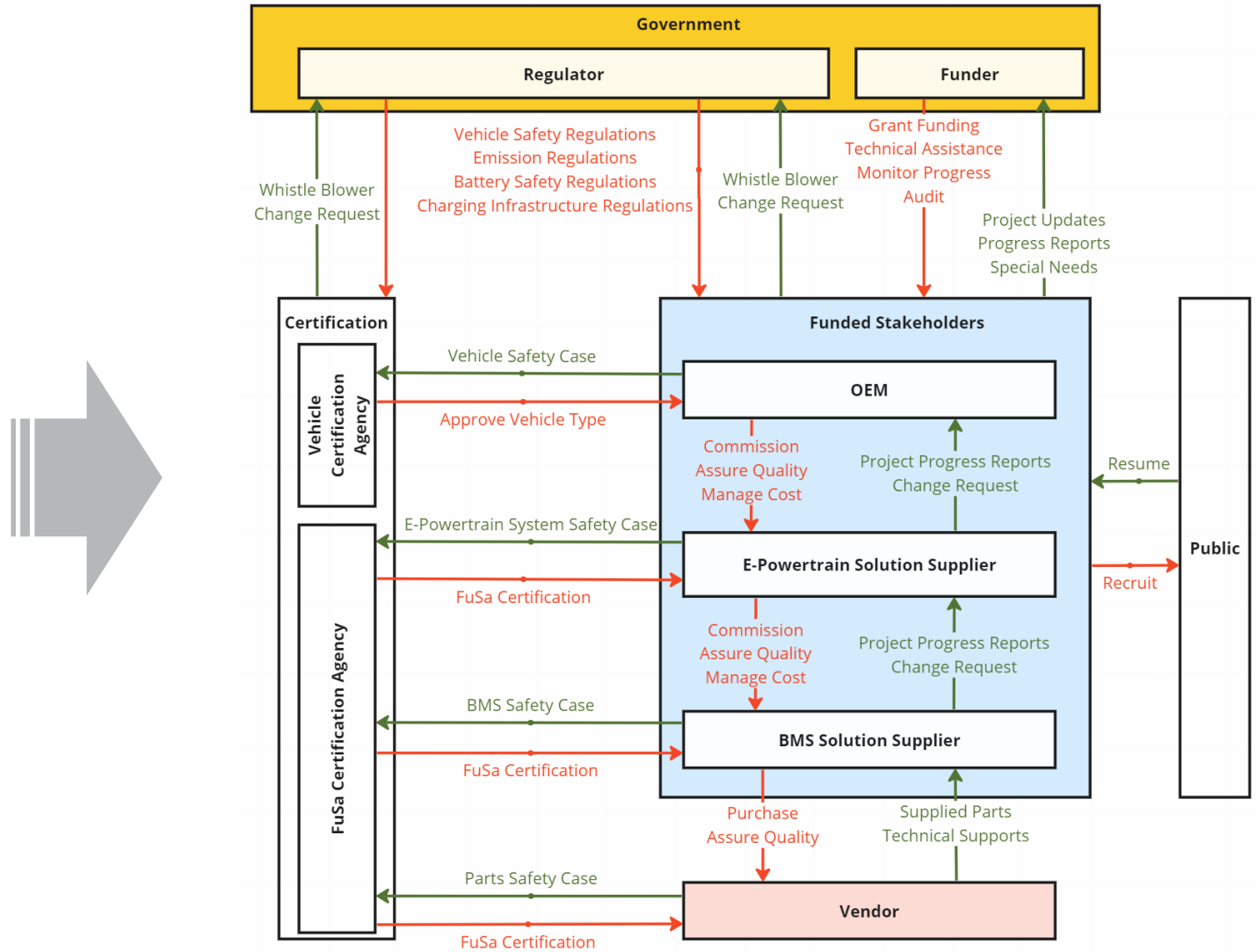
# Control Structures (Level 2)





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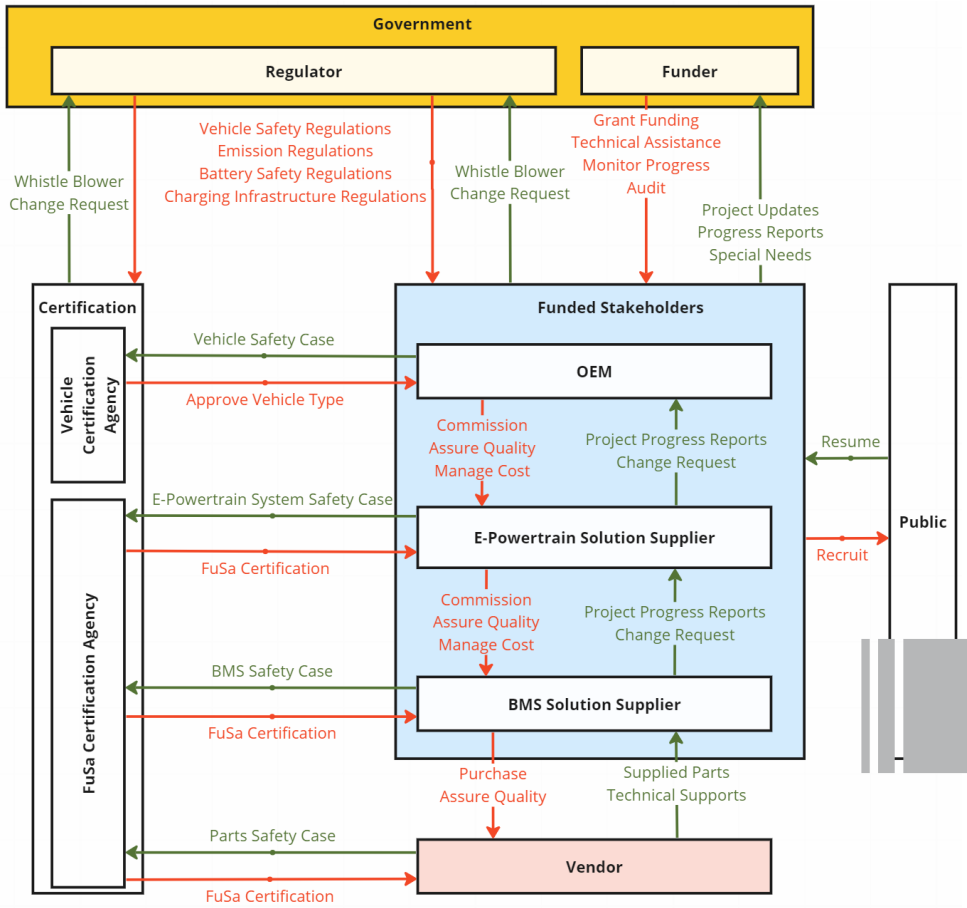
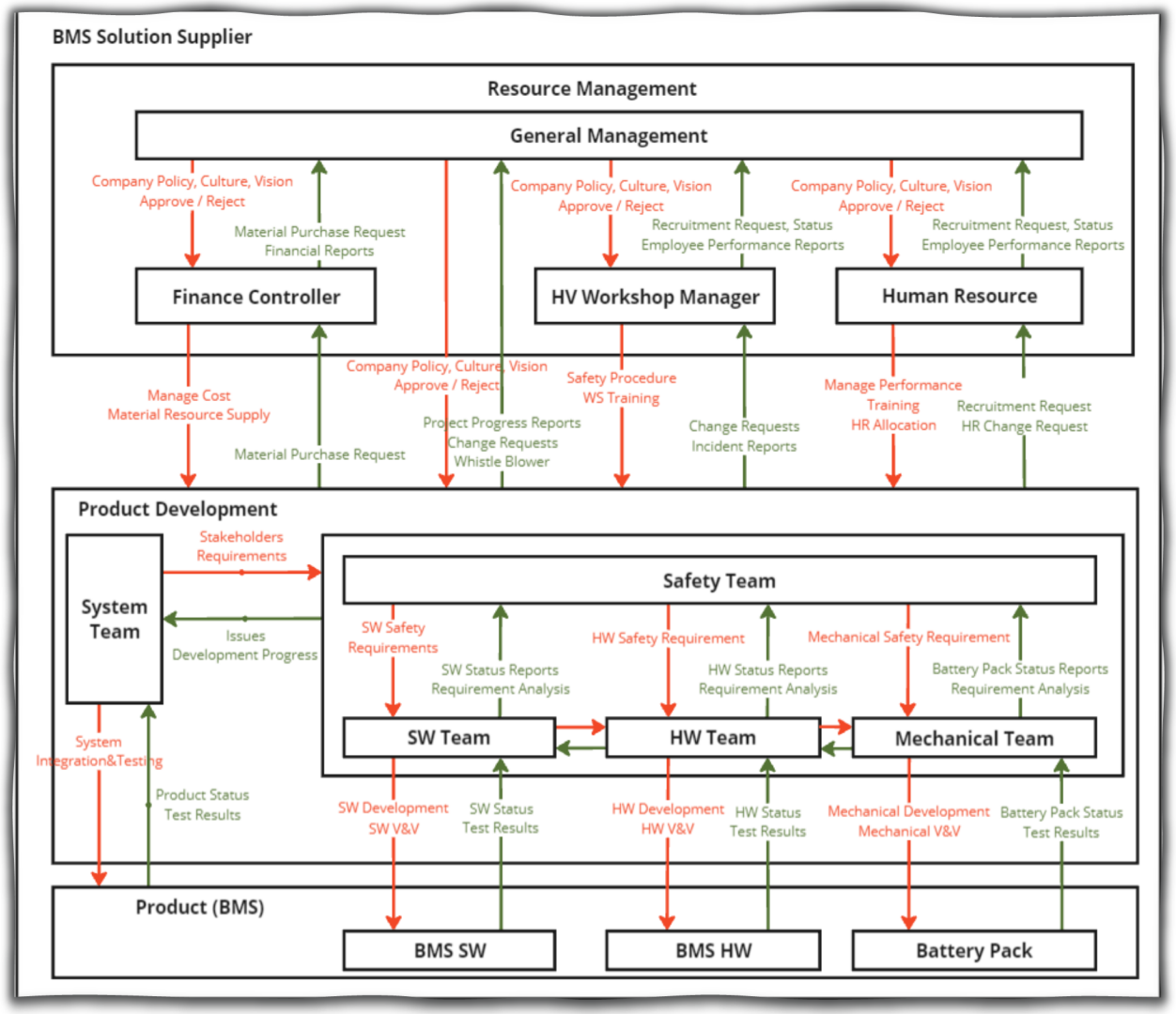
# Control Structures (Level 3)





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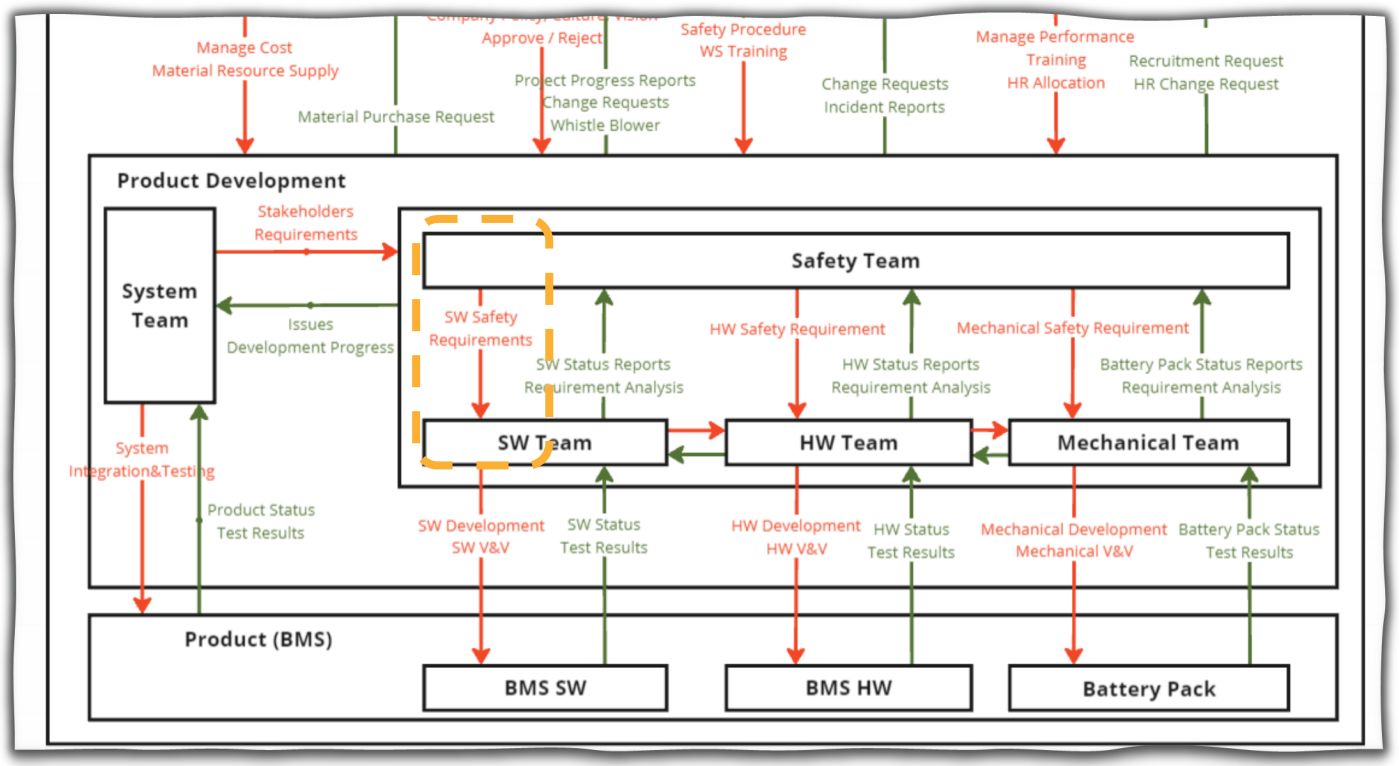
# Some ‘Impressive’ UCAs




**UCA1:**

Safe Team issues outdated **SW Safety Requirements** to the SW Team when the SW team is in a critical phase of releasing the next version of the software.

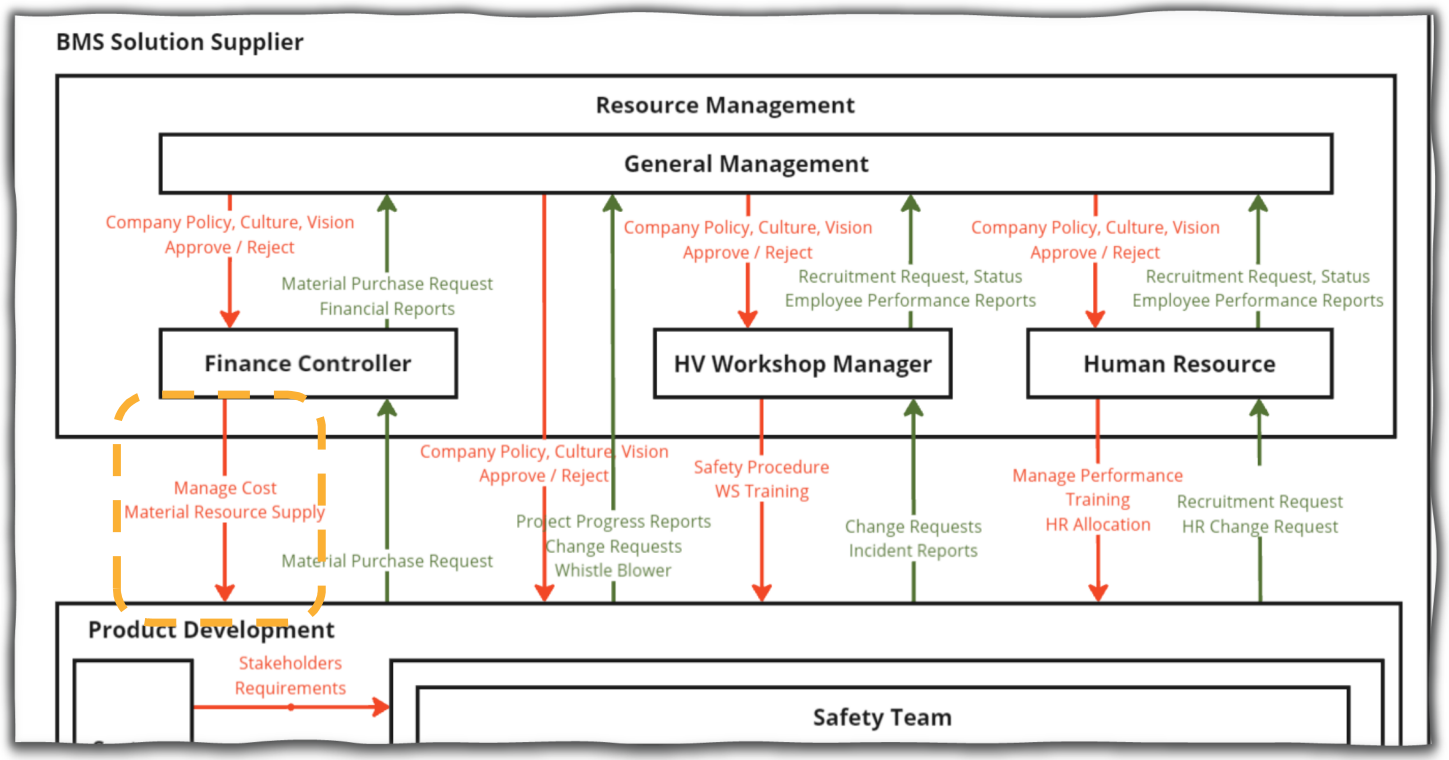
**Leading to:**

**H2:** Project stakeholders lose trackers.

**H3:** Project operation does not meet H&S regulations.

**H4:** Project budgets are overspent.

# Some ‘Impressive’ UCAs



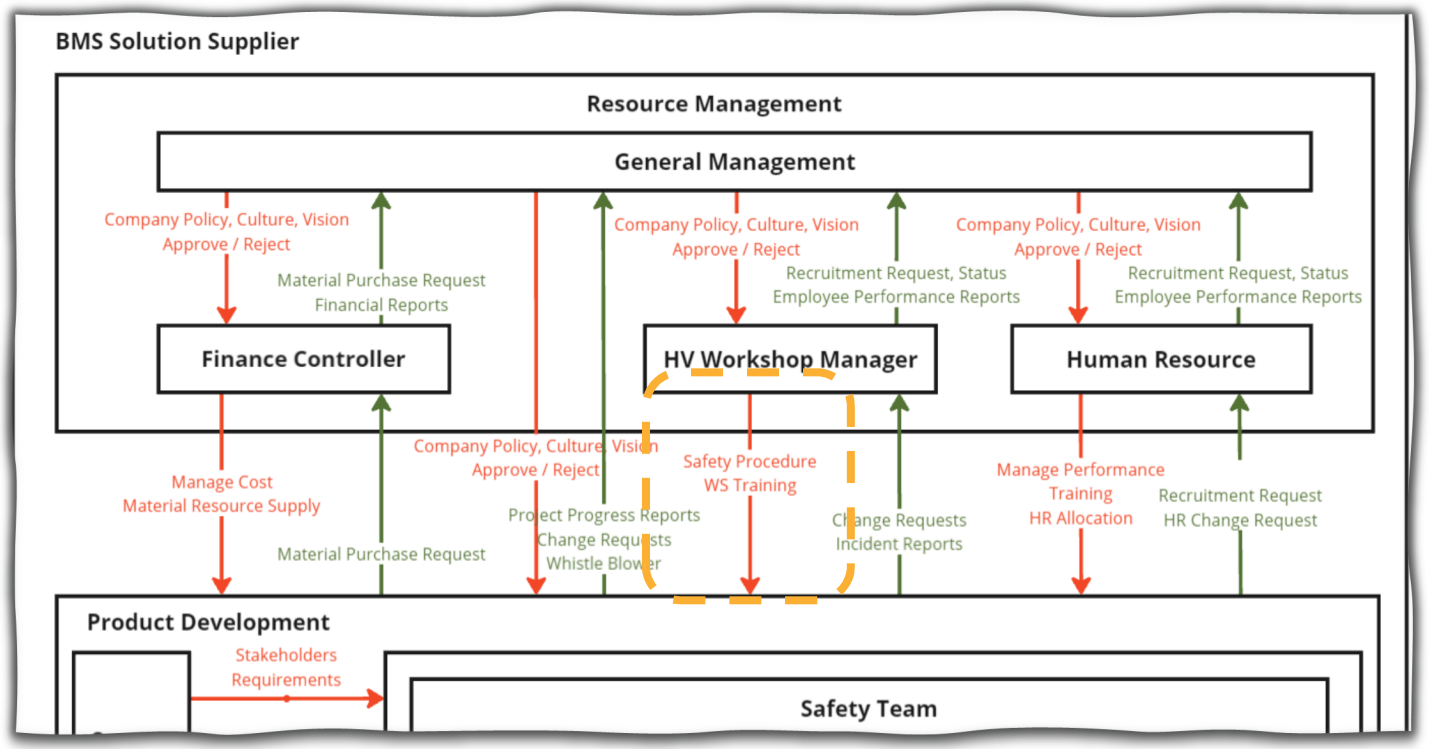

**UCA2:**

Finance Controller stops **managing cost** too soon when the project is still running and there are still purchase orders going on.

**Leading to:**

**H4:** Project budgets are overspent.

# Some ‘Impressive’ UCAs



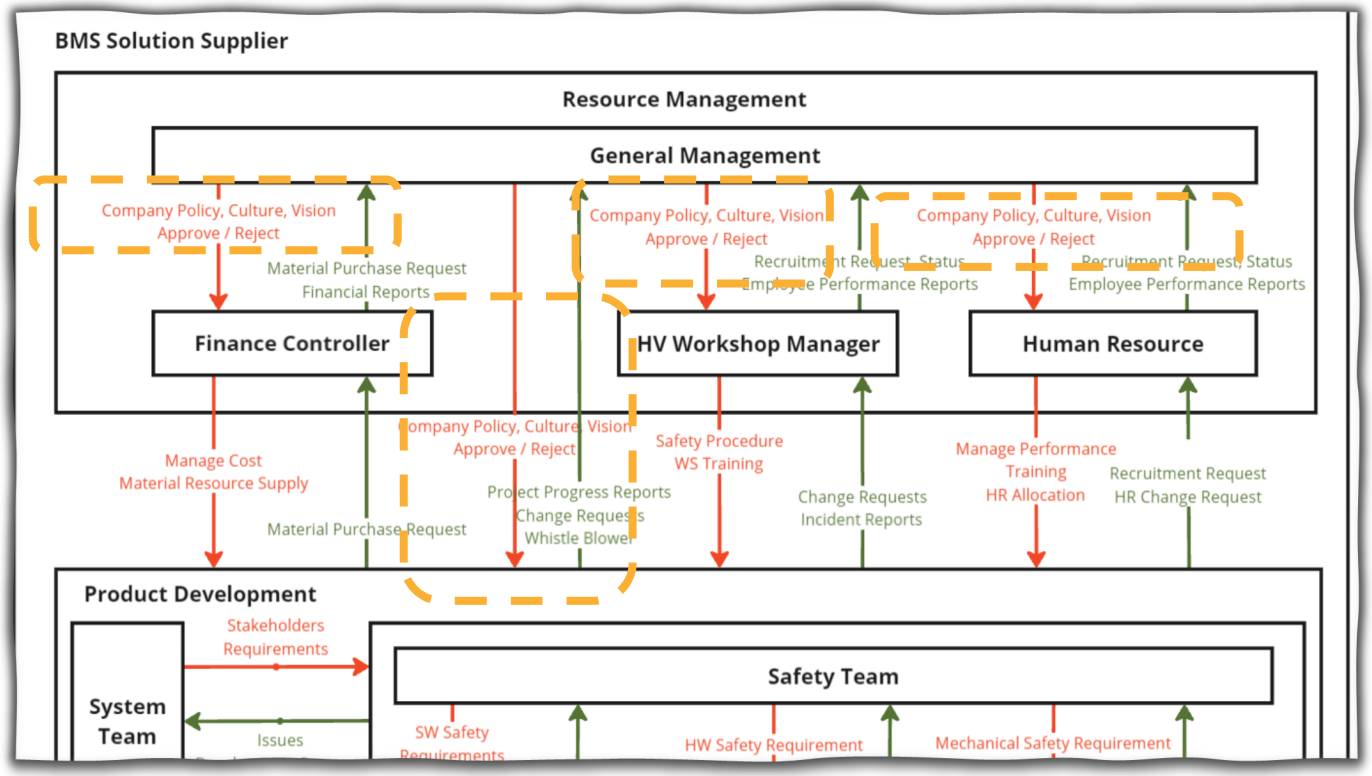

**UCA3:**

**HV Workshop Manager** provides WS Training too late when new team member has joined and started working in the workshop.

**Leading to:**

**H3:** Project operation does not meet H&S regulations.

# Some ‘Impressive’ UCAs




**UCA4:**

General Management provides company visions too late (>6months) since new people joined.

**Leading to:**

**H1:** Project stakeholder(s) resign(s).

**H2:** Project stakeholder(s) lose trackers.

# Some ‘Impressive’ Loss Scenarios

**UCA1:**

Safety Team issues outdated **SW Safety Requirements** to the SW Team when the SW team is in a critical phase of releasing the next version of the software.

**What happened?**

- Safety Team was believing that the latest requirements were uploaded (but **actually NOT**!).
- There was an error message, but it was **unintentionally ignored** as Safety Team was **overloaded** with other work.

# Should the Safety Team be BLAMED???

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# If we replaced the Safety Engineer with another people, would the UCA be prevented?

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# Some improvement learned from STPA

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**For General Management**

- To emphasize the importance of **safety culture**.

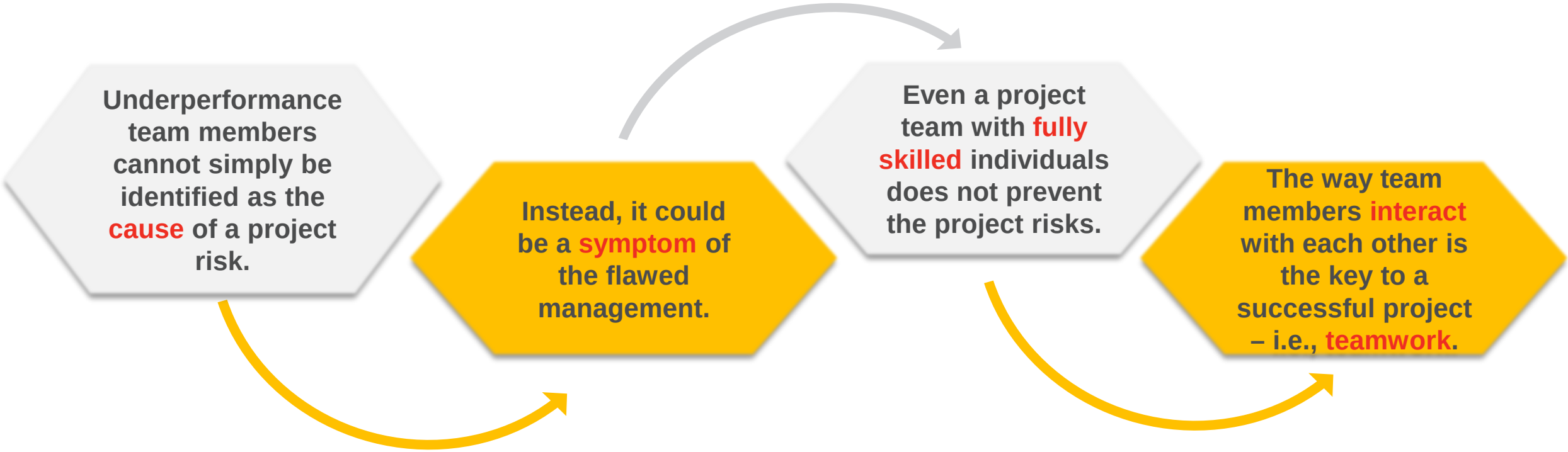
**For Safety Team Leader:**

- To further elaborate and **prioritize** tasks.

**For both HR and Safety Team Leader:**

- To recruit **dedicated** requirement manager(s).

# What have we learned?



# What has STPA benefited the team?

1

**Improved project efficiency and collaborations:**

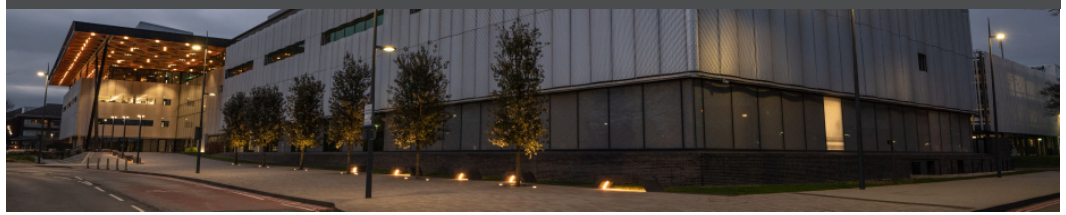
- Graphical nature of STPA.
- System-thinking process.
- Change management.



2

**Improved working & safety culture:**

- Blame-free.
- STPA complements with project tasks.
- Pro-active identification of risks and communications.

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# Thank you.

Shufeng Chen
Shufeng.Chen.1@warwick.ac.uk

**WMG**
University of Warwick
Coventry
CV4 7AL
United Kingdom

warwick.ac.uk/wmg

wmgmarketing@warwick.ac.uk

@wmgwarwick

wmgwarwick

wmg-university-of-warwick

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# Q&A



Shufeng Chen

Shufeng.Chen.1@warwick.ac.uk

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