ETH zürich

Center for Sustainable Future Mobility (CSFM)

# Digitally supported intervention planning process

Hamed Mehranfar[1], Steven Chuo[1], Dr. Marcel Burkhalter[2], Dr. Saviz Moghtadernejad[3], Prof. Dr. Bryan T. Adey[1]
[1]IBI, ETH Zurich; [2]Angebotsplanung, BAV; [3]Construction Research Centre, NRC Canada

## 1 Introduction

The objective is to enhance the intervention planning process by considering train scheduling and enabling the optimal integration of digital tools. This will streamline the estimation of asset condition and grouping of future interventions, leading to improved efficiency and effectiveness in intervention planning.

## 2 Requirements

The planning of interventions involves many actors in different organizations, and the decisions made individually and collectively result in information and data that evolve over time.

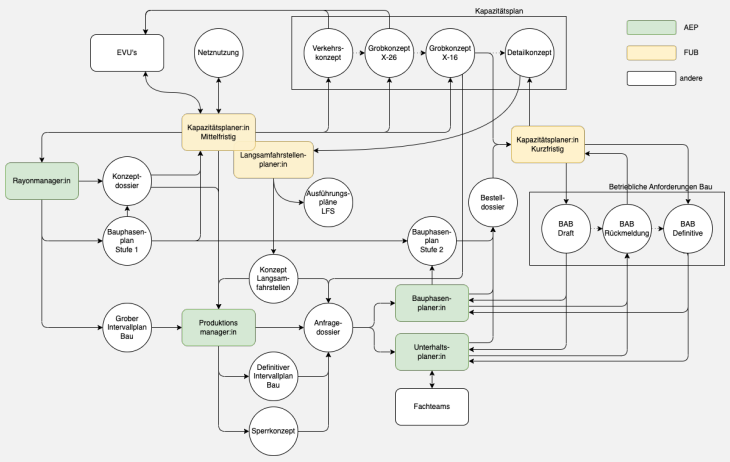


Figure 1. Current interaction between intervention planners and capacity planners

## 3 Proposal

The proposed methodology facilitates the communication between stakeholders by providing an overview of the optimal future intervention programs, associated possession windows, and expected costs.

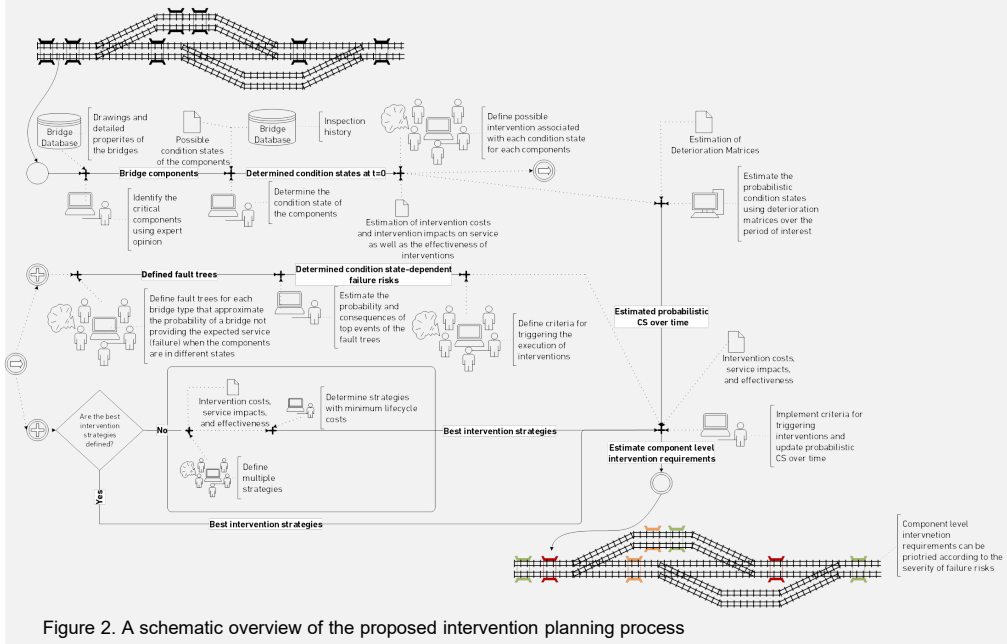


Figure 2. A schematic overview of the proposed intervention planning process

## 4 Results

The digital tools developed provide a summary of component-level interventions and the results are visualized on BIM using an automated workflow.

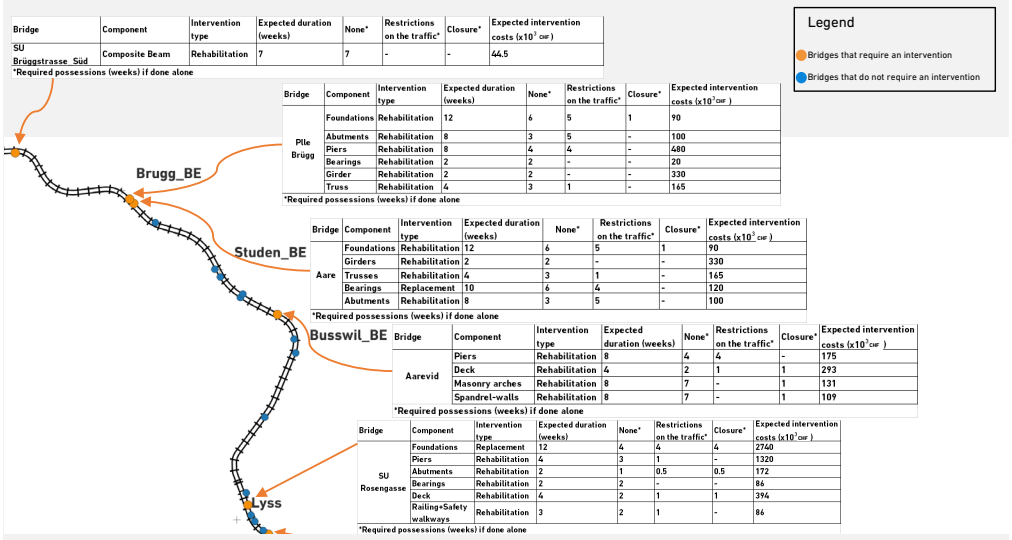


Figure 3. Overview of interventions required on a portfolio of bridges along the Brügg-Zollikofen corridor

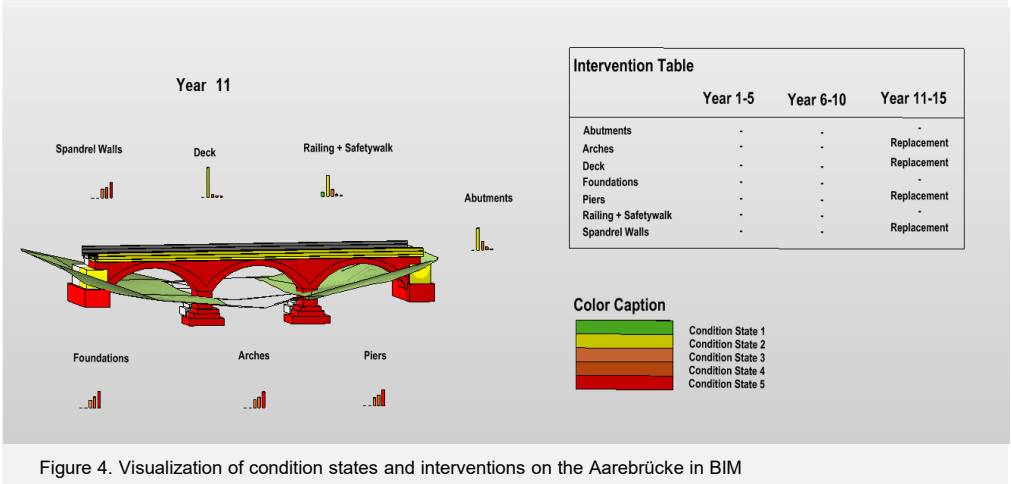


Figure 4. Visualization of condition states and interventions on the Aarebrücke in BIM

## 5 Conclusion and expected impact

- Gaining a thorough understanding of the existing intervention planning process is crucial in identifying areas that can benefit from digital tools and improvements.
- Infrastructure managers can improve their planning of future maintenance interventions by considering assets at the component level, with intelligent use of different levels of data.

## References

1. Chuo, S., Burkhalter, M, and Adey, B. T. “Current SBB intervention planning process in view of the STABILITY project”. Technical report.
2. Mehranfar, H., Adey, B. T., Moghtadernejad, S., and Chuo, S. “Using algorithms to provide bridge managers with consistent and complete early estimates of possible future maintenance interventions”. Technical Report.
3. Chuo, S, Moghtadernejad, S., Mehranfar, H., and Adey, B. T. (in press). “Estimation of bridge component condition states with varying data availability”. IALCCE 2023.
4. Mehranfar, H., Adey, B. T., Moghtadernejad, S., and Chuo, S. (in press). “Efficient early estimates of bridge interventions: costs, required possession times and associated failure risks”. IALCCE 2023.

Partner: amag SBB CFF FFS SIEMENS

CSFM