

PROJECT OVERVIEW

Objectives

The aim of the project wiSIB is to develop a novel system identification procedure for engineering systems with application to bridge monitoring that are difficult to identify. The system will work in near real time and is suitable for both temporary and continuous use. The method is designed to identify local damage and detect it at an early stage. Comparable systems do not exist, because these are global processes based on resonance frequency changes and are geared to the overall system. The focus of the research is on the inclusion of knowledge about damage through knowledge-based approaches in order to obtain good start models and additionally reduce the generated simulation models.

The use of the identification system can lead to the following benefits:

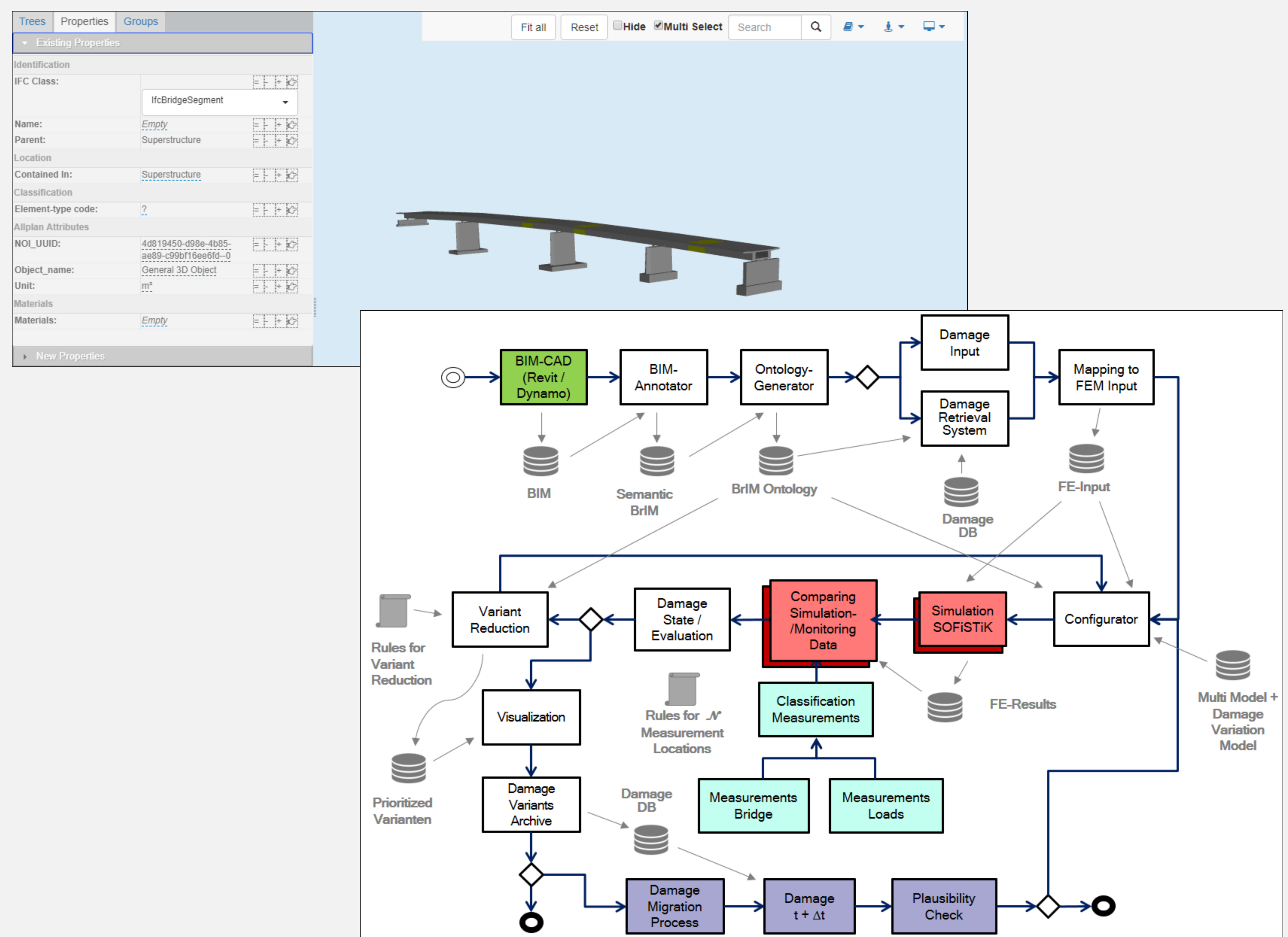
- More accurate assessment of the safety risk for damaged bridges
- More accurate prediction of the remaining lifetime of bridges based on the exact condition of the bridge and the continuous improvement of the prediction through permanent monitoring and system identification
- Assessment of the influence of increased traffic loads on bridge safety and lifetime.
- Optimization of the multi-phase refurbishment of process
- Evaluation of the influence of traffic load reducing actions by limiting vehicle load and –speed through traffic lights or lane reductions.
- Early detection of new damage and defects.

Approach

The key technological innovations of wiSIB are:

1. Method for creating bridge model variants, including the utilization of sensitivity rules
2. Mapping API for the interaction between the numerical system analysis tool and sensitivity analysis
3. Management system for mass analyses in the grid/cloud
4. Identification of damage and defects, i.e. identification of model changes and system migration by using a knowledge-based approach.

For the implementation of the simulation-based identification system, the BIM-based virtual laboratory approach will be used, which has been developed by TUD. This approach focuses on a semantic information management system that ensures both sufficient interoperability and information logistics. The information management system is to be implemented on the basis of a multimodel and used as the leading data structure IFC (ISO 16739). Based on this approach, a very flexible and dynamic linking of the different models possible. The 4 most important models are the building model, the damage model, the traffic load model and the sensor model.



Partner



FIDES DV-PARTNER

Associated Partner:



<http://www.wisib.de/>