



## Open data transfer for bridge information modeling

**Antti KARJALAINEN**

WSP Bridges  
Oulu, FINLAND

*Antti.Karjalainen@WSPgroup.fi*



Antti Karjalainen, born 1967, received his civil engineering degree from the Oulu University of Applied Sciences, Finland. He has been working for WSP, Oulu, Finland, since 1994. Karjalainen has been participating in several bridge information modeling R&D projects and has done Master's Thesis in University of Oulu, Finland for development of open data transfer for bridge information modeling.

### Summary

The target set to the research was to develop open data transfer for bridge information modeling. Open data transfer was studied and tested to find software-independent solution to produce contents of bridge design data from initial data to engineering design.

As a result of the research it was found that information of the technical bridge structures and other infrastructure refer to the bridge is able to produce using open data formats, which are IFC and Inframodel. In information modeling based design the model includes almost all of the information set in requirements by bridge design manuals and guidelines. However for software used in bridge and infra engineering design there are still limited possibilities to execute data transfer using open data formats between different technical design areas.

**Keywords:** bridge, building information modeling, BIM, data exchange, IFC, Inframodel, open standard

### 1. Background

Information modeling in bridge engineering has become more common in recent years. Modeling has been used mostly in detailed design stage using modeling applications to produce detailed model of the structure with all members and connections. The models have been used to produce workshop and other drawings to service construction work, as well as to take quantity takeoff.

However, the key idea for modeling is to model information and share and transfer that information between project participants. For buildings usage of open data transfer between architectural and engineering design and construction have increased a lot recently. The reason for that is that project participants have started to use more and more modeling but also that in many countries public organizations have created guidelines for modeling and open standard based data transfer and so also started to require modeling in project process.

For bridges same kind of modeling applications than buildings have been used but there are not common detailed guidelines how modeling should be used. Finland is one country where manual for bridge information modeling, "Siltojen tietomalliohje" (a.k.a. guidelines for bridge information modeling) have been published by the Finnish transport Agency but these guidelines does not solve question of open standard based data transfer in detailed level.

### 2. Development of open data transfer for bridge information modeling

Needs for contents of initial data, data transfer from civil structure design to bridge design and requirements of information to be included into design documents are already well known and documented and information modeling doesn't change the information flow process itself. The key idea of the information modeling is to transfer that information directly in electric and open standard format using software independent way from one application to another.