

Combined LOD-Definition for Bridge Maintenance and 3D City Maps



BUILDING AND DESIGN

Authors: Omar El-Mahrouk, Sebastian Baumgartner, Marc-Patrick Pflieger, Markus Vill
Faculty: University of Applied Sciences FH Campus Wien, Austria
Contact: omar.el-mahrouk@fh-campuswien.ac.at

The objective of the paper is to define a combined Level of Detail (LOD) for bridge remodeling for Bridge inspections and application in 3D City Maps.

LOD Definition for Bridge Inspection

LOD	LOG & LOI	Description
LOD 100	LOG 100	A Box model without any specific geometric data is required
	LOI 100	Basic semantic information are included, such as object name, object number, annotation, street, administration institution, static system, bridge class, length, width, area, year of construction, general annotation.
LOD 200	LOG 200	The model elements are represented as solids with approximate quantity, dimensions, shape, position and orientation. They only serve as placeholders.
	LOI 200	Semantic information according to BIM application cases can be included, such as material or component classification.
LOD 300	LOG 300	The model elements are displayed with the exact quantity, dimensions, shape, position and orientation that can be determined directly from the model.
	LOI 300	Further semantic information according to BIM application cases is added, such as exposure class, surface protection system, corrosion protection.
LOD 400	LOG 400	The model elements are displayed with the exact quantity, dimensions, shape, position and orientation that can be determined directly from the model. Interfaces to neighboring components are mapped, for example by surface fastening objects.
	LOI 400	Further semantic information according to BIM application cases is added, such as specific information on the fastening objects.
LOD 500	LOG 500	The model elements are updated with specific photographic data and special annotations
	LOI 500	Further semantic information according to BIM application cases is added, such as information on special annotations

Table 1. Level of Detail concept based on the Level of Development Definition of Franziska Mini

LOD Definition for 3D City Maps

LOD	LOG & LOI	Description
LOD 1	LOG 1	Included are: Volume parts of the bridge shell; surface parts of the bridge shell; terrain intersection curve; bridge parts; bridge construction elements
	LOI 1	Not Defined yet
LOD 2	LOG 2	In addition to LOG1: curve parts of the bridge shell; boundary surfaces; other bridge installations
	LOI 2	Not Defined yet
LOD 3	LOG 3	In addition to LOG2: openings
	LOI 3	Not Defined yet
LOD 4	LOG 4	In addition to LOG3: Bridge rooms; Interior bridge installations
	LOI 4	Not Defined yet

Table 2. Level of Detail Definition of the Citygml 2.0 standard

LOD 300 & LOD 2 needed for both application separately

Combination of Applications!

LOD 300 & LOD 3 needed for combination!

Result: The municipal Department 41 of the City of Vienna has to increase the needed LOD from LOD 2 to LOD 3 in order to enable a combined Application

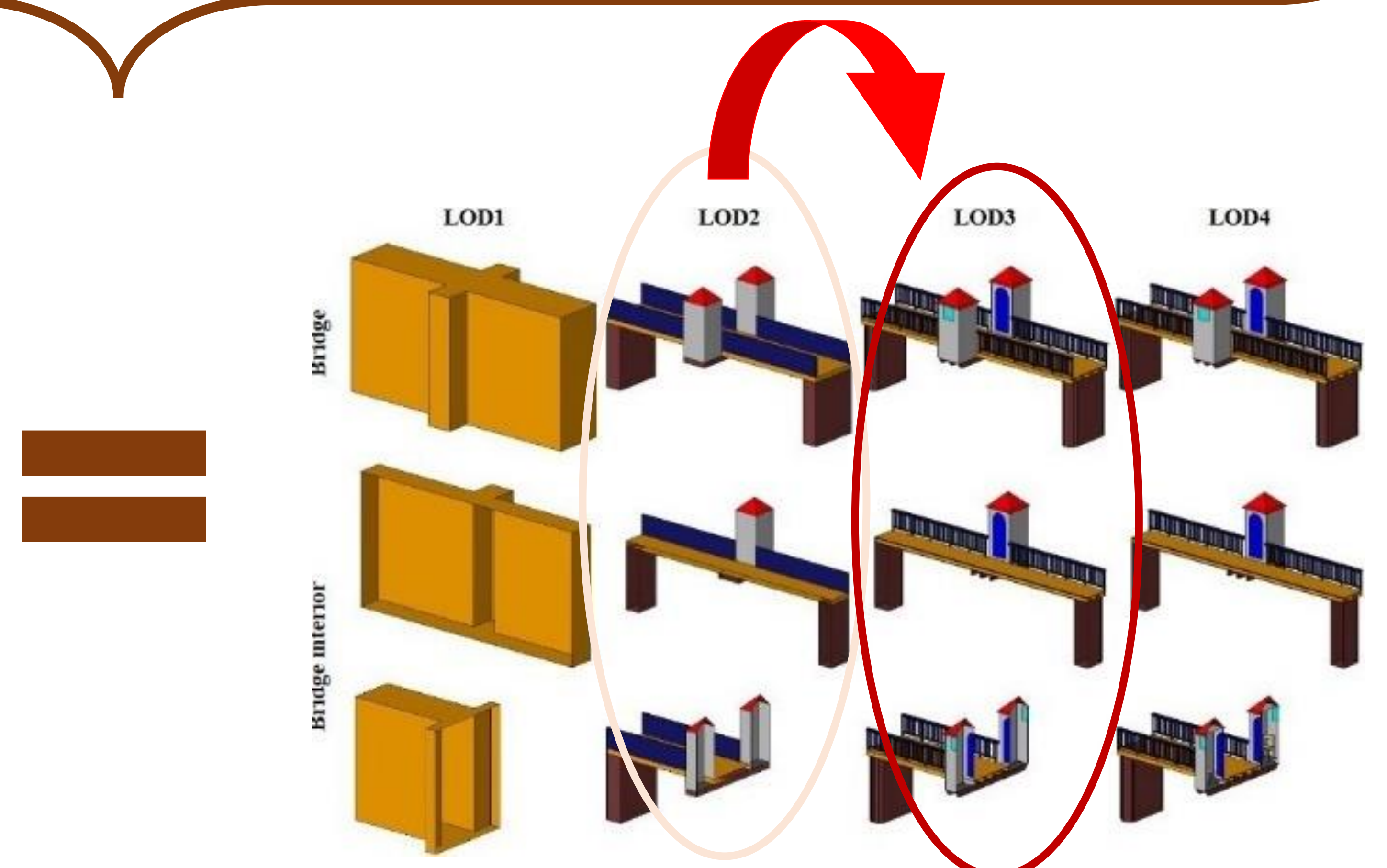


Figure 1. LOD Levels for bridges according to Citygml 2.0 standard