



POLITECNICO  
DI TORINO

# Honors thesis

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COURSE OF ARCHITECTURE CONSTRUCTION CITY

*Abstract*

**BIM and interoperability for infrastructure between  
architecture and systems: the Serra Rotonda Tunnel case  
study**

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BIM adoption and implementation in infrastructure design has appeared at least two years later than in building construction. Especially in Italy, infrastructure projects are still developed using CAD based technologies.

The goal of this thesis is therefore to investigate about the applicability of using BIM technologies for infrastructure design processes.

Thanks to the information and documents supplied by ANAS - the Italian company for road and highway maintenance service - a real project has been identified as a case study for BIM application: the “Serra Rotonda” tunnel.

After a detailed research about BIM potentialities and opportunities, this study provides an understanding of how much the BIM technologies are involved in the worldwide infrastructure projects. The first phase of the study has dealt with examining the technical reports and papers produced and supplied by ANAS in .dwg and .pdf file format.

As result of this analysis, it has been possible to identify every single detail of the tunnel. Such key details enabled to correctly set up the BIM process.

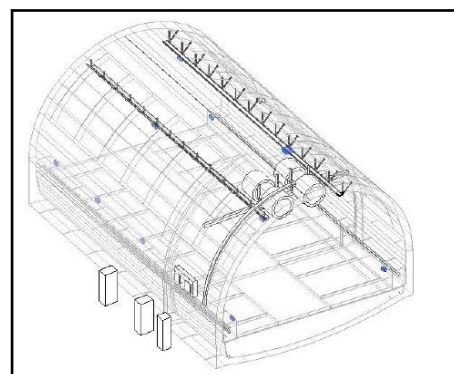
After an accurate documentation analysis and an investigation about the most suitable BIM software tools available, the study went on to the following step: applying the parametric methodology to the design process.

The most important topics in this thesis are mainly three: the first – detailed in the fourth chapter – concerns the methodology, i.e. how to carry out a tunnel design by using a parametric software; the second – detailed in the fifth chapter – relates to the parametric management and maintenance of the tunnel subsystems; last but not least, the sixth chapter points out the interoperability: among different software packages, as well as the various stages of the design process (e.g. building and management).

Finally, it is worth highlighting that since the Serra Longa tunnel is an actually existing infrastructure, the project feasibility considerations are not part of the chapter titled “BIM methodology applied to the case study”. These are briefly reviewed into the chapter titled “Interoperability”.



*Fig. 1: Software used: Infracore 360, AutoCAD Civil3D, Revit, QGIS and Subassembly Composer.*



*Fig. 2: Example of system management*