

# CIVIL AND ENVIRONMENTAL ENGINEERING

## MUR DM 117/Masera - Bridge parametric design

<b>Funded By</b>	MINISTERO DELL'UNIVERSITA' E DELLA RICERCA [Piva/CF:97429780584] MASERA ENGINEERING GROUP S.R.L. [Piva/CF:10502970014] Politecnico di TORINO [Piva/CF:00518460019]
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<b>Context of the research activity</b>	<p>The research topic is focused on the development of "parametric design" applications in the design and structural adaptation/retrofitting of bridges and viaducts</p> <p>Progetto finanziato nell'ambito del PNRR - DM 117/2023 - CUP E14D23001990004</p>
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<b>Objectives</b>	<p>The main topic of the research is to evaluate the main advantages and practical applicability of Parametric modeling in bridge design, as it offers numerous advantages, potentially making it a more efficient and user-friendly approach compared to traditional methods. Here are the key points to be highlighted are:</p> <p><b>Efficient Design Process:</b> Parametric modeling, in combination with Building Information Modeling (BIM), allows engineers to create 3D bridge models and quickly analyze if they meet the project's requirements. Parameters are set by the engineer to develop a design that meets specific needs, streamlining the design process and reducing the time required for initial design creation.</p> <p><b>Dynamic Modifications:</b> One of the most significant advantages of parametric modeling is the ability to make changes to the design efficiently. Engineers can modify parameters, and the software will automatically recalculate the impact on the entire model. This real-time updating ensures that all design requirements and constraints are met, without reworking the entire model. This feature saves valuable time during the design iteration process.</p> <p><b>User-Friendly Interface:</b> Despite its technical-sounding name, parametric bridge design software, like Allplan Bridge, is designed to be user-friendly for engineers. The software uses 2D cross-sections and tables to create 3D parametric models, making it familiar for bridge engineers already</p>
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<b>Objectives</b>	<p>accustomed to traditional 2D sketches and spreadsheets.</p> <p><b>Multiple Design Concepts:</b> Parametric modeling allows engineers to create several detailed bridge concepts quickly. This capability enables exploring various design alternatives in a short period, facilitating the selection of the optimum solution for the project. The ability to visualize and assess different concepts enhances decision-making and design optimization.</p> <p><b>Complete End-to-End Solution:</b> Parametric modeling tools equipped with BIM functionality offer a complete workflow solution for bridge engineers. From the initial bidding phase to the final as-built construction and maintenance, the software aids in various aspects of the project, including accurate cost estimation, construction scheduling, and interdisciplinary coordination checks.</p> <p><b>Reduced Human Errors:</b> Automation in parametric modeling reduces the chances of human errors that could lead to costly miscalculations. By minimizing manual work, the software ensures greater accuracy in the design process, increasing the overall quality of the project.</p> <p><b>Easy Data Reuse:</b> Parametric modeling supports easy data reuse, reducing bridge design costs. Data generated during the design process can be utilized efficiently, avoiding redundant efforts and enhancing productivity.</p>
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<b>Skills and competencies for the development of the activity</b>	bridge engineering - programmazione
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