

Layer by Layer

Exploring Opportunities for Large-Scale Additive Manufacturing in Heritage Preservation

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The present work is the result of a five-month graduation project on the topic of Large-Scale Additive Manufacturing and its potential for added value creation in the preservation of architectural heritage.

The project is made up of two distinct sections prefaced by a short introduction that contextualizes Large-Scale AM within heritage preservation. The first section dives into the theoretical principles behind each discipline, setting the groundwork for a later, more in-depth analysis of their needs and opportunities. This is done through a series of case studies on first, Adaptive Reuse projects (Adaptive Reuse being a sub-discipline of preservation), and second, Large-Scale AM projects. The AR case studies help to understand other designers and architects' approaches to Adaptive Reuse, while the LSAM case studies are used to extract a series of features unique to Large-Scale Additive Manufacturing that present potential for added value creation in a preservation project. This section concludes with the mapping of these features to the 3D printing principles that enable them, as well as a series of factors that affect the potential success of Adaptive Reuse projects.

The second section aims to apply this theoretical framework to a real-world case. In it, a site is chosen based on a series of suggestions resulting from the earlier part of the research. The site is then visited and analyzed in an effort to understand its cultural, historical, and architectural significance. The results of this analysis are condensed into a series of design inputs that inform the design of an intervention which proposes the revamping of the site. Finally, the intervention is designed and broken down into its core principles, concluding with a reflection on the potential of Large-Scale AM in the preservation field.

