

INNOVATIVE TECHNOLOGIES FOR THE RECOVERY OF THE ARCHITECTURAL HERITAGE BY 3D PRINTING PROCESSES

Marta Calzolari¹, Sara Codarin², Pietromaria Davoli³

¹ University of Ferrara – Department of Architecture – Architettura>Energia Research Centre, via della Ghiara n.36 – Ferrara (IT), marta.calzolari@unife.it

² University of Ferrara – Department of Architecture – Architettura>Energia Research Centre, via della Ghiara n.36 – Ferrara (IT), sara.codarin@unife.it

³ University of Ferrara – Department of Architecture – Architettura>Energia Research Centre, via della Ghiara n.36 – Ferrara (IT), pietromaria.davoli@unife.it

ABSTRACT

A strong inertia for change distinguishes the construction industry. Its innovation features often result in technological transfers, hybridizations and contaminations from other sectors. New materials, technologies and processes belonging to industrial production may open innovative scenarios for the recovery and regeneration of the existing building heritage, especially in situations of emergencies due to natural disasters, social disorder and conflicting events.

The reproduction of individual components or entire building portions is now facilitated by the coordinated use of 3D digital survey tools with modelling software and 3D printing machines. The latter technology has recently been applied also on the architectural scale, with the aim of defining new design and constructive scenarios.

In the field of the recovery of existing buildings, research must focus in particular on the identification of reversible matrices (new punctual or spread insertions) for the elimination of *gaps*. They can be filled with solutions in analogy with the historical building or with an independent language, by using suitable materials, which do not alter the historical value of the building.

The improvement of these technologies can provide a useful contribution to the management of the construction site safety, the speed of reconstruction and the innovative design, thanks to the integration of survey systems, simulation and IT management processes, and production machines.

Keywords: Cultural Heritage, Restoration, Construction technologies, 3D printing