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# Prospective study on the integration of additive manufacturing to building industry- Case of a French construction company.

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## Highlights:

- Additive manufacturing allows design freedom and reduces the cost to manufacture a complex form.
- The comparison between traditional process and additive manufacturing for construction shows that prefabrication can be more time-efficient.
- Schedule shortening is not the main advantage of Additive manufacturing in construction.
- A breakeven point should be determined to choose the manufacturing method that suits best the need

## Abstract:

The objective of this paper is to present a reflection on the use of Additive manufacturing in construction. In this research examples from manufacturing industries are presented. Some Advantages of additive manufacturing in industry were identified. Relevant cases used to promote AM for construction are: building rate improvement and schedules shortening. This study investigated these advantages in three parts. Firstly, a comparison between construction and manufacturing industry was presented. Secondly, Design and Building rate for construction were studied using data from a French construction company. Finally a comparison was made between conventional processes and Additive manufacturing. Conventional processes included prefabrication and casting on site. Results showed that pre-casting may be faster than AM in some cases. Time saving is not necessary the best advantage from applying additive manufacturing to construction.

**Key Words:** *Design-Building rate-Prefabrication-Casting on site-Complexity-Cost.*

## 1. Introduction

Additive Manufacturing (AM) consists in building an object layer by layer using a 3D CAD model, an appropriate material and a special machine [1]. Various technologies are associated with AM, going from paste extrusion to the deposition of a binder on a powder layer.

Different Additive manufacturing technologies are used in the manufacturing industry. These technologies differ depending on the raw material used, and on the agglomeration process (*laser, light or liquid*). Three main technologies classes have been proposed [2]: Liquid based process, powder based process and solid based process. The first process uses a raw material

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