



Using Sustainability as a Driver for Change in Denmark's Construction Industry

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Abstract

The main aim of this research is to compare two structural systems – PC (precast concrete) and CLT (cross laminated timber) with respect to commercial viability and environmental credibility. The findings from this work are then set against two environmental ambitions of Copenhagen that are intrinsically linked to the construction industry in Denmark.

1. To be the first city in the world to be carbon neutral by the year 2025.
2. To build 6.8 million sqm of new buildings by the year 2025.

The aim of this paper is to challenge the use of PC in the light of Copenhagen's environmental ambitions and of the availability of CLT. In this way, we hope to promote the role of engineers not just as technical problem solvers but as valuable contributors to contemporary social and political discourse.

Keywords: cross laminated timber, pre-cast concrete, residential buildings, sustainability.

1 Introduction

The Copenhagen Resource and Waste Management Plan 2018 states the following:

It is important to have focus on choice of materials and building methods in connection with new building or renovation in order to cause the least possible burden to the environment and minimize resource wastage when the buildings are to be demolished or renovated in the future. [1].

It is clearly a priority of the City of Copenhagen to ensure that the design of new buildings considers the environment, both in terms of their initial construction, as well as in terms of their life after their final demolition. But how well does the current Danish construction market support this ambition?

PC (precast concrete) construction consists of pre-fabricated reinforced concrete floor and wall elements which are connected together to form a stable structure. This construction system has a long history in Denmark and has developed in response to client and contractor demands for decreased risk, increased profits and cost certainty.

In the search for savings, organizations look to improve the cost efficiency of the way they work, often using familiar material and processes – so called incremental improvements [2]. Such path-dependent development of technologies can lead to the emergence of dominant technologies that have had the benefits of scale economies, learning & network effects and the adaption of actor expectations, each reducing cost or risk perceptions [3]. In the context of construction