

Graduation Plan

Master of Science Architecture, Urbanism & Building Sciences



Graduation Plan: All tracks

Submit your Graduation Plan to the Board of Examiners (Examencommissie-BK@tudelft.nl), Mentors and Delegate of the Board of Examiners one week before P2 at the latest.

The graduation plan consists of at least the following data/segments:

Personal information	
Name	Jelmar Broekman
Student number	4647973

Studio		
Name / Theme	MSc Graduation Laboratory Management in the Built Environment Theme 5:	
Main mentor	Ruben Vrijhoef	Design & Construction Management (MBE)
Second mentor	Stijn Brancart	Structural Design (AE&T)
Argumentation of choice of the studio	Sustainability transitions and the transformation of (port) cities	

Graduation project	
Title of the graduation project	A supply-chain blueprint for emission-free construction
Goal	
Location:	The Netherlands
The posed problem,	To make the transition from traditional to emission-free construction, all stakeholders in the construction supply chain need to collaborate and be aware of their role and impact on the transition process. A systems approach to the implementation of emission free practices in the Dutch construction supply chain is missing, but would be valuable to speed up the transition.
research questions and	<p><i>Main question: How could a supply chain for low-emission high-rise construction in Dutch cities be organized?</i></p> <ol style="list-style-type: none"> 1. What are the most impactful steps in the construction supply-chain to influence implementation of low-emission methods for high-rise construction in Dutch cities?

	<ol style="list-style-type: none"> 2. What values and actors within the supply-chain influence the implementation of low-emission methods for high-rise construction in Dutch cities? 3. What values and actors external to the supply-chain influence the implementation of low-emission methods for high-rise construction in Dutch cities? 4. What methods and practices are currently being used in the construction supply chain to benefit the implementation of low-emission methods for high-rise construction in Dutch cities? 5. What methods and practices beneficial to the implementation of low emission methods for high-rise construction in Dutch cities are not present in the current supply chain? 6. How could changing the supply chain organization benefit the implementation of low-emission methods for high-rise construction in Dutch cities?
design assignment in which these result.	A blueprint for Emission-free construction
<p>Quite some academic papers have written about the greening the constructing supply chain or Green Supply Chain Management (GSCM). The unique characteristics of the construction supply chain makes it difficult to implement new methods and technologies in the supply chain. For this reason it is important to take these characteristics into account when the goals is set for a transition towards emission free construction in Dutch cities within 10-20 years.</p> <p>By using green construction supply chain management principles in combination with the available information on emission-free construction methods, a blueprint will be created in which each actor is assigned specific tasks to benefit the transition. Because the blueprint will be created in collaboration with these actors and the entire supply-chain is considered, the result will be practice based and hopefully the integrability will be feasible.</p>	
Process	
Method description	
<p>Using literature a conceptual blueprint will be created to answer subquestion 1. In this blueprint several activities to reach emission-free construction will be formulated based on theory and in relation to the supply-chain actors in a construction project.</p> <p>Afterwards the empirical research will further shape this blueprint. Sub questions 2 and 3 will either confirm the theoretical research and/or provide new important activities and</p>	

stakeholders to consider. Information for answering these sub questions will be collected through semi-structured interviews with construction sector supply chain actors in different real life cases.

In sub question 4 current practices that already benefit emission free construction will be determined through interviews and in sub question 5 possible blind spots in the construction supply chain will be defined, also by semi-structured interviews.

The information from the theoretical research together with the findings from empirical research will provide input into the creation of a new blueprint. These findings will be tested in expert sessions to validate the conclusions.

Literature and general practical preference

For this research literature in the field of Supply Chain Management, **Green Supply Chain Management** and **Construction Supply Chain Management** will be consulted. **Green practices** linked to GSCM will be compared and combined with literature on **emission-free construction methods** and -sites to create an Emission Free Construction Supply Chain Blueprint.

In this process theory on organizational decision-making and values like **Porters five forces model and - value chain** will be useful to understand drivers and barriers of each actor.

Practical knowledge will be provided by my graduation company, **Synchroon projectontwikkeling**, and their supply chain partners across several case studies.

Reflection

1. Relation to theme and master track.

My topic is based around the idea that the construction sector should move towards a more sustainable future by changing its processes. This relates very well to the topic for theme 5, Sustainability transitions and the transformation of (port) cities. The transition from traditional to emission-free construction is one that will make building development more sustainable and Dutch cities healthier.

Since my topic is focussed on the management of stakeholders in the construction supply chain, which is core to design & construction management, this topic relates very well to the master track Management in the Built Environment.

2. Societal and Scientific relevance

The societal relevance of my graduation work is related to global warming and emission reduction of other harmful substances than greenhouse gasses in our environment. Especially in the Netherlands these are very urgent themes. My research will provide actors in this field with practical guidelines.

Scientifically this research relates green supply chain management in construction to the implementation of emission free construction practices in the Dutch context. Closing the gaps in scientific research on green supply chain management by considering the full supply

chain and the relationships between actors. On top of that, since the configuration of the construction sector and the related regulations vary between regions and countries, a focus on the Dutch Inner-city context, will possibly offer new context specific insights on emission-free construction of green supply chain management.