

Analysis of the modal shift from road freight transportation to alternative transportation modes between Germany and the UK to improve the environmental balance

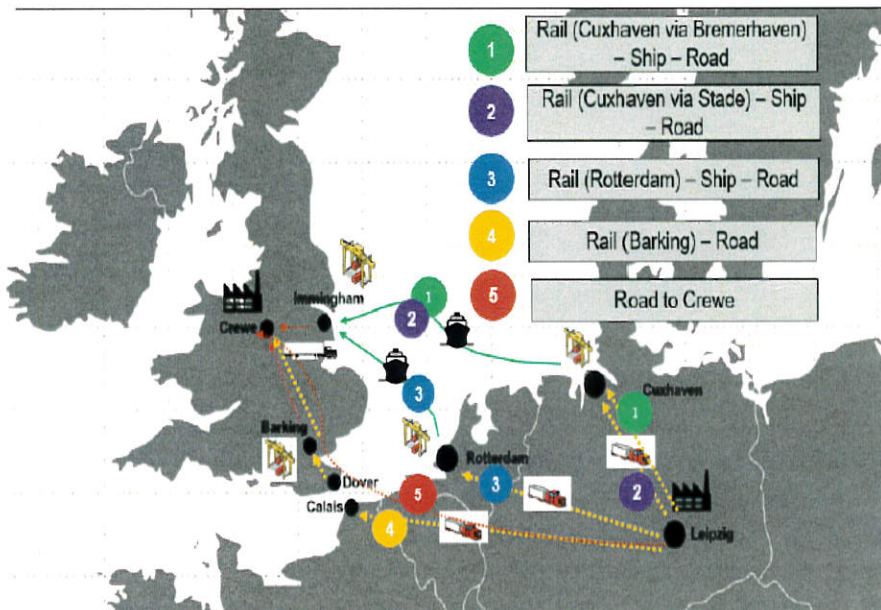
MASTER'S THESIS of Shaker Alalem

Supervision:

Dipl.-Verk.wirtsch. Judith Geßenhardt (TUM)
B.Sc. Aine Milling (Railistics GmbH)

Mentoring:

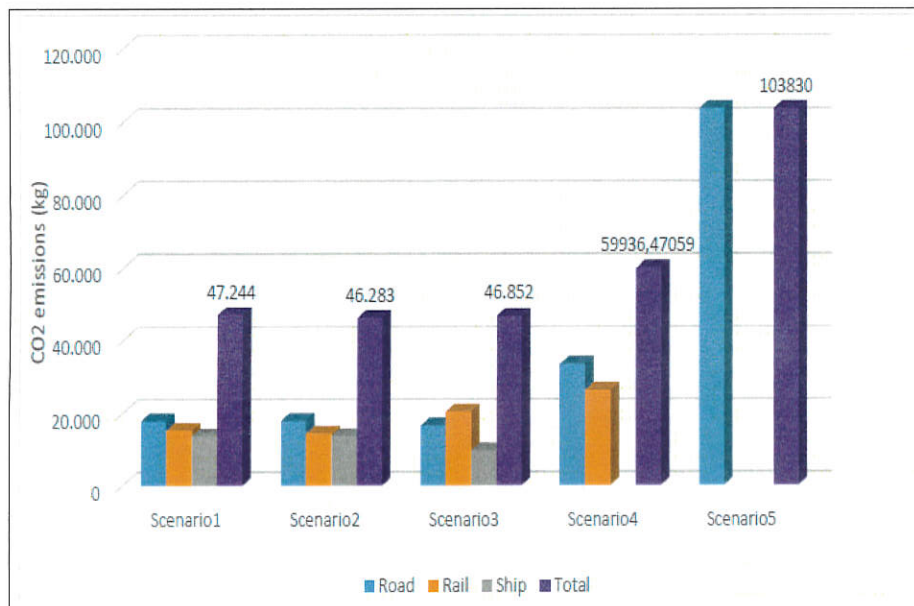
Dr.-Ing. Karl Dumler (TUM)



This research is conducted as a case study of a German OEM, that expressed the need to develop new economically feasible rail transportation concepts between Leipzig (Germany) and Crewe (The UK). The thesis introduces new transportation scenarios to replace the traditional road transport.

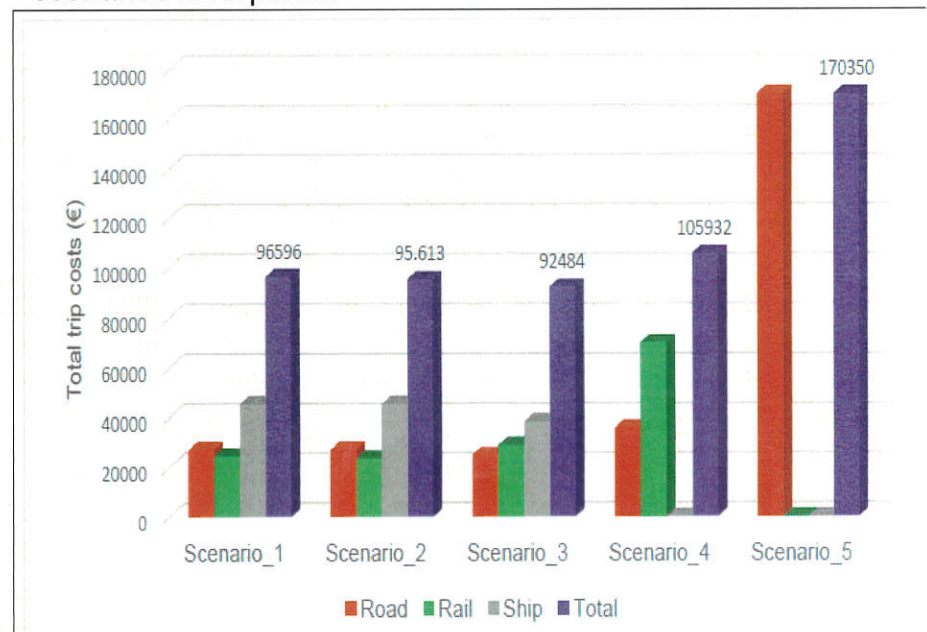
After identifying the new transport scenarios, the existing infrastructure was analyzed to explore the possibility of using these scenarios to move the freight volumes to the end destination. The scenarios were analyzed by developing a freight cost calculation tool and CO2 emission calculations.

The preliminary results of the research show that, shifting the freight volumes between Germany and the UK to rail is not practically possible. The only possibility is to shift these freight volumes from road to intermodal transport.



Choosing the right mode of freight transport has the potential to reduce CO2 emissions, cost, and fuel consumption required for the transportation process. The freight transportation costs and CO2 emissions can be significantly different depending on the supply-chain and the used modes of transport. In consequence, it is necessary to go through a decision-making process to determine the mode of transport which is better for the environment and meets the needs for the shippers.

The aim of this study is to analyze the possibilities and requirements for shifting the existing freight volumes between Germany and the UK from road to rail or other alternatives, and to quantify the effect of this modal shift on the transport costs and CO2 emissions. To achieve this goal a comprehensive analysis of the infrastructure, the cost of transport and CO2 emissions from different transportation scenarios is required.



The conclusion can be drawn that the intermodal freight transport between Germany and the UK is economically feasible and would replace road freight transport.

Furthermore, increasing the modal share of rail freight transport in the intermodal transport chain from Germany to the UK will save about 37% of transport costs and eliminate about 42% of the total CO2 emissions per round trip.

Moreover, other slower freight transportation options are practically possible and can reduce about (43 to 46%) of the transport costs and 55% of the total CO2 emissions per round trip.