Public summary

Kamphuis Konstruktie produces steelwork constructions for milking parlours. Currently, clients receive personalised models, which is a time-consuming task to model and produce. Moreover, the construction of a parlour is time-consuming, and it requires specialised personnel. Therefore, the goal was to design a milking parlour concept, which can be produced and assembled more cost and time efficient. Without sacrificing the feeling of personalisation, ergonomics and usage efficiency. The focus of the assignment was on the steelwork construction of a parlour while leaving space for other aspects in the design such as equipment, during the parlour design.

This assignment has been completed using a modular design approach. First, the functions were listed to obtain an overview of necessary modules based on function. Then design considerations have been researched through brainstorming, a questionnaire, literary research and empirical research, concerning milking parlours. Such as Kamphuis' values, a farmer's values, the space a cow needs and the functionality of a parlour. From this research, a requirements list and a design proposal could be created. Which formed the basis for evaluating existing models and new concepts.

New concepts were generated through morphological schemes resulting in ideation sketches, then through evaluation, concepts were adapted and improved. Finally, a concept was developed which seemed to satisfy the assignment.

This concept was then taken apart into the functional parts on which the design was built. Parts have been grouped into modules, and components have been redesigned to fit the modular approach, mostly through standardisation. The main construction of the solution is based on the existing construction of one of Kamphuis Konstruktie's parlours. However, the cubicle construction, in which the cow stands while being milked, has been completely redesigned. To improve ergonomics, while decreasing the amount of space and materials needed.

Through configuration possibilities, the client still has the possibility to personalise within boundaries defined by Kamphuis Konstruktie. This could decrease the price of the system, as Kamphuis can produce in stock and model more efficiently with a standardised parts library. It also enables Kamphuis to outsource the production of components, which is part of their future vision.

By using the design proposal and the design requirements, the concept has been evaluated and it is considered to satisfy the assignment; of developing an attractive and configurable parlour for the farmer which is more efficient in production, construction and distribution for Kamphuis Konstruktie. The result is a milking parlour design concept, which uses a new design for cow placement in the milking parlour. It uses less materials compared to other parlours offered by Kamphuis. Moreover, it gently pushes cows with their hind to the farmer, allowing the farmer to easily reach the udders for milking claw attachment. It is animal-friendly and ergonomically sound for the farmer.

In this thesis the research question ''How to develop a milking parlour concept which is attractive and configurable for the farmer and more efficient in production, construction and distribution for Kamphuis Konstruktie?'' has been answered through illustrating this design process as an example. This engineering approach 'learning by doing' has been chosen to ensure the result is a tangible and feasible result, which Kamphuis Konstruktie can elaborate upon. Avoiding the result of a purely theoretical instruction.

The final deliverables are; the parlour concept design idea itself, of which a module list has been composed, allowing Kamphuis Konstruktie to model the concept. Moreover, three walkthrough

models have been created, so illustrate the possibilities of a configurator and as clear visual support of the new concept. Lastly, details about realisation and further development of the concept have been discussed to provide guidance to Kamphuis Konstruktie if they decide to develop the model.