



# REPORT

FCLT PROJECT | CONCEPT OF THE CONSTRUCTION  
FACILITY AND QUALITY CONTROL

22.4.2017

## Concept of the construction facility

### General information

The construction facility takes the measurement of 23800 (length) x 8800 (width) mm. It contains three sawing machines. Two of them are provided for sawing wood and one is provided for sawing the wind proof sheet. Every sawing machine takes up 1x1 m. The wood sawing machines have a runout on each side of six meters, in contrast to the other sawing machine, which has a runout of only two meters per side. The big wood saws are located at the long sides of the construction facility opposite to each other. The smaller saw is placed on the short wall opposite to the entry / exit. The containers, in which the materials should be transported to the construction site, can be placed on each end of the runout of the particular saw. The exact position of them can be seen in the CAD-drawing. With the help of the crane the containers can be moved easily to the exit and be replaced by two new containers. The materials which are delivered mostly just-in-time can be seated at the beginning of the runout of the wood saws. To do not interfere the whole production process, because of several reasons (e.g. delay of delivery, delivery of wrong material, etc.) there is a rack-grid provided at the height of 3500 mm to store some safety stock.

### Benefits of the layout

The main advantage of the composition of the construction facility is the flexibility in combination with speed. First, the flexibility results from the placement of the saws and secondly from the possibility on the one hand, to store materials which are needed in a production step later and on the other hand, to use the materials which are already stored on the rack-grid. The composition of the three saws is responsible for the speed and the fact that three workers can operate simultaneously, increases this effect. This would not be possible if the production line is arranged in a circle. Furthermore, the workers are all working in one direction which is towards the containers. This reduces the waste of time which is also one of the main principles of Lean Production. Another aspect which leads to a higher speed is the available crane at the ceiling which can switch the containers very easily. Additionally, the incoming material can be placed exactly where it is needed and so the production time is reduced to a minimum.

## Layout of the containers

It is important that the materials in the containers are arranged in the right order. Only then the building process at the construction site can be done quickly and effectively. Furthermore, it saves time because each worker does not have to search for the needed parts. The most logical thing how to arrange the materials, is to put the parts you need at the end of the building process in at first. The consequence for the production process is that those parts, which are needed at the end of the building process on the construction site, should be produced first. In the special case of the CLT house and the company "Kokkoplan", following arrangement would be appropriate (order in which the parts should be put into the container):

1. Sheet boarding
2. Wood battens
3. Wind proof board
4. Insulation with framing wood

This also reflects the order in which the parts should be produced.

Thinking about the production process it is important to consider at which saw the different materials should be cut. The wind proof board has not been taken into consideration because there is an own saw provided. Due to this there are two different possibilities how to organize the sawing process:

1. Assuming the containers stay at their designated places during the whole production process, there is the possibility that one worker saws all the needed parts for one container at one saw and the other worker does the same for his container.
2. The workers and saws are specialized which means that e.g. the sheet boarding and the wood battens are only sawed at one saw and the framing wood from the insulation at the other one. This requires that the containers are moved during the production process and that the working steps at both saws take approximately the same time.

Which one of those suggestions will be used, depends on different criteria, e.g. the skills of the workers, the time needed to cut the specific material and the time needed to change the containers. If the workers are highly skilled, it will be recommended to use suggestion 1. If the time needed to change the containers is very short, it will be better to use option 2, because then the workers can focus on one material to cut which also saves time.

## Implementing quality control to the production process

Quality control is a very essential part of nearly every business. How important it is can be seen in the paper "Lean Production" which has already been handed out.

For the company "Kokkoplan" which is still at the beginning of the development process, we have created two possibilities how to implement quality control to the production process. For a company of that size using more advanced technologies like tablets and buying expensive quality software is not appropriate. It is also possible to implement quality control with simple methods like the following examples:

1: This sheet contains the elementary information regarding e.g. raw material and basic measurements and a picture of the product is visible. The chart is divided into five columns and starts with a running number. For those we have chosen numbers in steps of ten, because if there is the need to fit in another production step, it can be easily done with adding e.g. number 15. In the next column, the working process is described in a short way helping the worker to remember what needs to be done and additionally implementing a standardised way for every production process. The following column gives the worker a description where the working process should be done and which tooling equipment has to be used. In the fourth column, additional data or useful remarks can be left. In the last column, you can find a check-box which should be ticked-off after every production step is completed. This makes the worker aware of checking all the important data again and therefore mistakes can be avoided or easily be recognized. In the last column, there is also the possibility to implement a barcode and then use a barcode scanner. This method enables to receive an automatic message to your computer or smartphone and therefore knowing exactly which production process is already done.

2: This sheet holds also a description with the most important information regarding the product. The chart only contains the running number, the working process and the barcode. The columns have the same tasks as in the first example. The composition of this sheet is done in an easier way without containing such a detailed description and listing. However, it contains the most important elements that are responsible for a successful quality control system.