

This thesis was written on the basis of an Estonian metal working company named Temeko Metall OÜ, which is planning to start a new product line besides its current of producing different metal constructions. As a new line they are starting to produce different car trailers. The new product line will start to compete with brands like Tiki-Treiler, Respo, Brentex and Farmipro.

Temeko, who starts to produce and sell trailers carrying trademark Arcas Trailer has taken the direction to produce trailers as unified and simple as possible. Three main types of trailers to be sold are similar from the width but different from the length and carrying capacity. This type of solution will help to reduce number of different sub products and number of sub-assemblies in stock. Also as first in Estonia they are planning to start to produce trailer on line method, doing so without turning the product from top to bottom in the assembly process. All this will give a competitive advantage thanks to low production and side costs.

To start the planning of the production firstly the current capabilities were studied. Also it was founded how much could be produced if the methods of production stayed the same. Since it was only 6% of maximum capability and starting from the second year the planned volume could not be achieved, then it was clear that investments and new production processes were needed.

For selecting the new assembly layout different aspects like speciality of the production processes, maximum measures of the trailers and limitations set by the measures of the building had to be considered. Speciality of the processes is, that from the main principle all the three trailers are assembled in similar way. First the profile materials of mainframe and sub constructions are prepared, after that welded and hot-dipped galvanized. Concurrently the sheet metal parts are produced. After that different sub-assemblies are put together and finally the trailer is assembled. At the final stage that this thesis is concentrated on the operations done are also similar for three trailer types. Firstly axles and lower constructions are placed onto the frame and in the next stages upper parts are mounted.

As on all the cases the production processes are similar, then the product based layout was selected. This enables more smooth production processes and product movement through the stations. As a design for the layout series type was selected. For this the main criteria was the limitation coming from the measurements of the building. The corridor is 27 meter long and with a width of 5.7 meters. Maximum length of the trailer needed to produce is 8 meters. So according to this total number of three trailers could be assembled at the same time. Parallel production would not be possible and also work in three stations where each of them produces

the trailer from start to finish, because the limitations of moving the end product. So it was selected, that production will be done in line method in three main workstations with the possibility to add two stations in the end other end of the corridor.

To speed up the assembly process the production in a jig was selected. This will help to rule out the option of turning the trailer while assembling. This method is used by the Estonian competitors, where firstly the trailer is assembled upside down, placing axles and brake system after which the trailer is turned and the top construction is made. This way of production has several inefficient operations and time consuming limitations, which Temeko wishes to avoid. Instead of that first the axles and attached brake systems are mounted to jig, after which the trailers frame is added. Next the assembly continues with building the top constructions and in the final station the trailer is lifted from the jig.

Thesis also handled the design of the production jigs. For the solution main assembly frame was selected, into which firstly the axles and then the frame could be added. Then onto the frame the parts needed. To fix the frame in a jig different toggle clamps were used. For moving the jig from one assembly station to another four wheels were added to the jig, with possibility to lock two of them. Also different jigs were design for the more complicated sub-assemblies.

To apply the selected production method it was found that slight adjustments to the building were needed to be done for the production building. As for the assembly line has only one wider entrance provided at from the last end of the line, then one more hole into the wall between the sheet metal production hall is needed for the transportation of the bigger frames to the beginning of the line. Also it is useful to use the cold storage besides the assembly line. Best way to do that is to make door holes between each station and storage. On the winter period it is wise to use PVC curtains in front of tore to avoid the heat loss.

Next the tools were selected that are needed to conduct the assembly processes. Due to ease of use the pneumatic hand tools were selected, which are easy and efficient to use. Different pneumatic tools are used in all eight workstations.

In the fourth chapter the overview after the production times after the investments were overviewed. As the investments have not been done yet and assembly line not developed the assembly was simulated to get the objective timetable of the operations. This was done for the trailer and its sub-assemblies as closely to the solution given in the thesis as possible. Time measurements were done systematically by each trailer.

Next chapter described the overall assembly unit and detailed overview of the production building with different movements was given also the 3D overview from CAD model was added.

Sixth chapter concluded the work done in previous chapters and new productivity was found. It turned out that before the investments and adjustments done it was possible to fulfil 6% the final productivity. The main bottle neck was the lack of workstations and human resources. After the investments and corrections time it is possible to fill the production plan at the 118% capacity.

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