



IMPROVING SHEET METAL PROCESSES USING LEAN MANUFACTURING.

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ABSTRACT

- Lean manufacturing is a branch of manufacturing, that finds out the optimized route for a process to be completed. It isn't just about using tools or changing a few steps in our manufacturing processes. It changes the whole view of the business and its progress. Right from supply chain to the manager's role, is taken into consideration in this process.
- Lean is also known as a cost cutting mechanism. It helps companies strive for increased efficiency, decreasing the losses.
- Mapping and analysis (statistical) are the main approaches to lean. Lean focuses on step by step analysis of waste reduction, keeping the process clean and optimized.
- This poster will give an insight about Kaizen or Continuous Improvement, which helped improving the production, and simultaneously increased efficiency.
- Key tools and techniques used in lean systems are :-



Problem Statement:- The problem was to optimise the process of cutting a Mild Steel sheet of dimensions 6000mm*1200mm to 1000mm*100mm plates, using a laser cutting machine. Thickness of the sheet varies from 5mm to 8mm. To optimise the process will be the main focus in this problem. After going through all the parameters, it was decided to optimise the process timings.

Process 1:- (Initial Process)

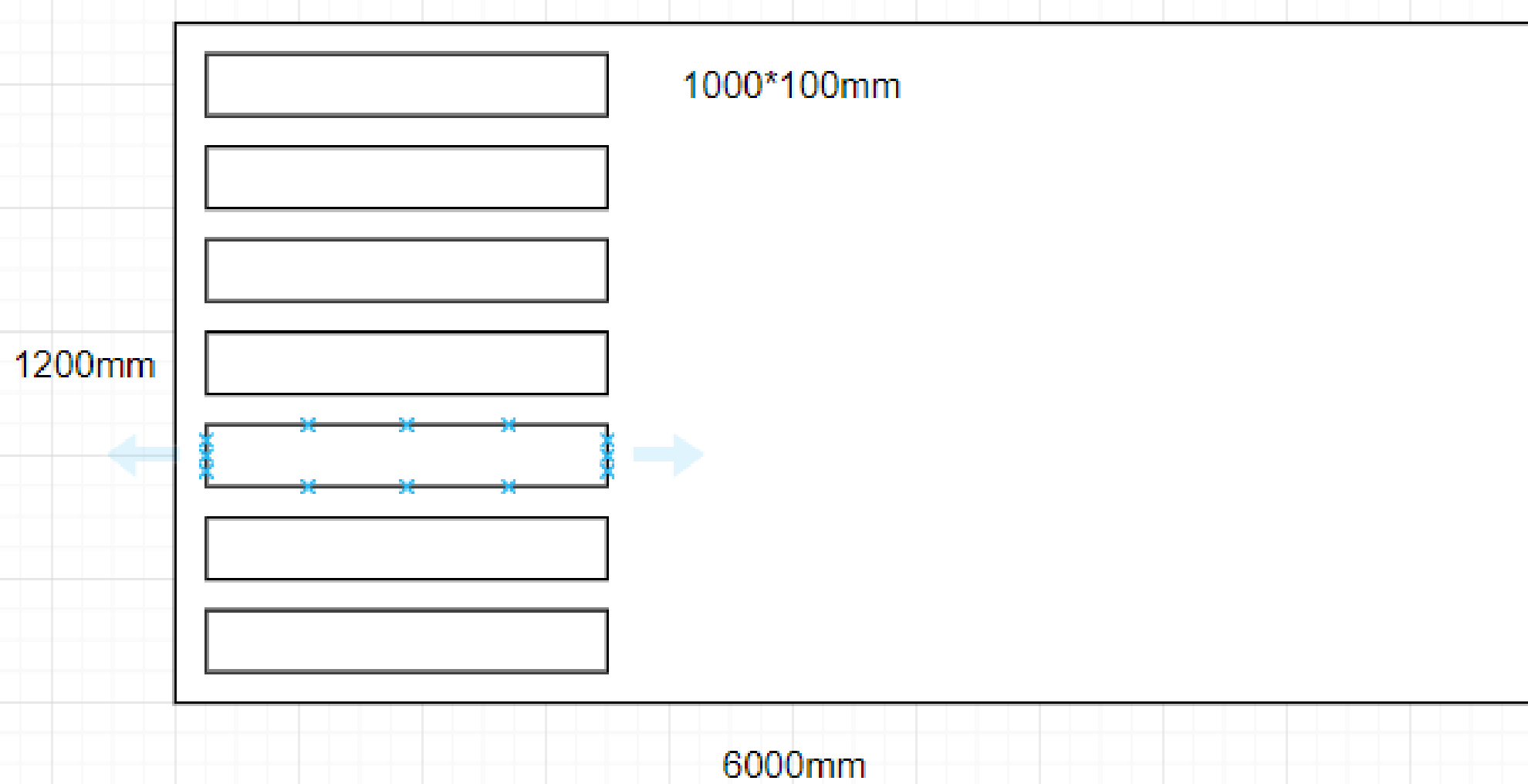


FIGURE 2.

- On calculating the maximum number of plates that can be cut from a 6000mm*1200mm sheet, it came out to be 50 plates, including all the tolerance.
- It was observed that it took 30mins for the whole task of cutting 50 sheets to complete.

- On monitoring the wastes and other elements it was observed time has to be optimized to increase the process efficiency.
- Hence a new process was developed.

Process 2:- (Modified Process)

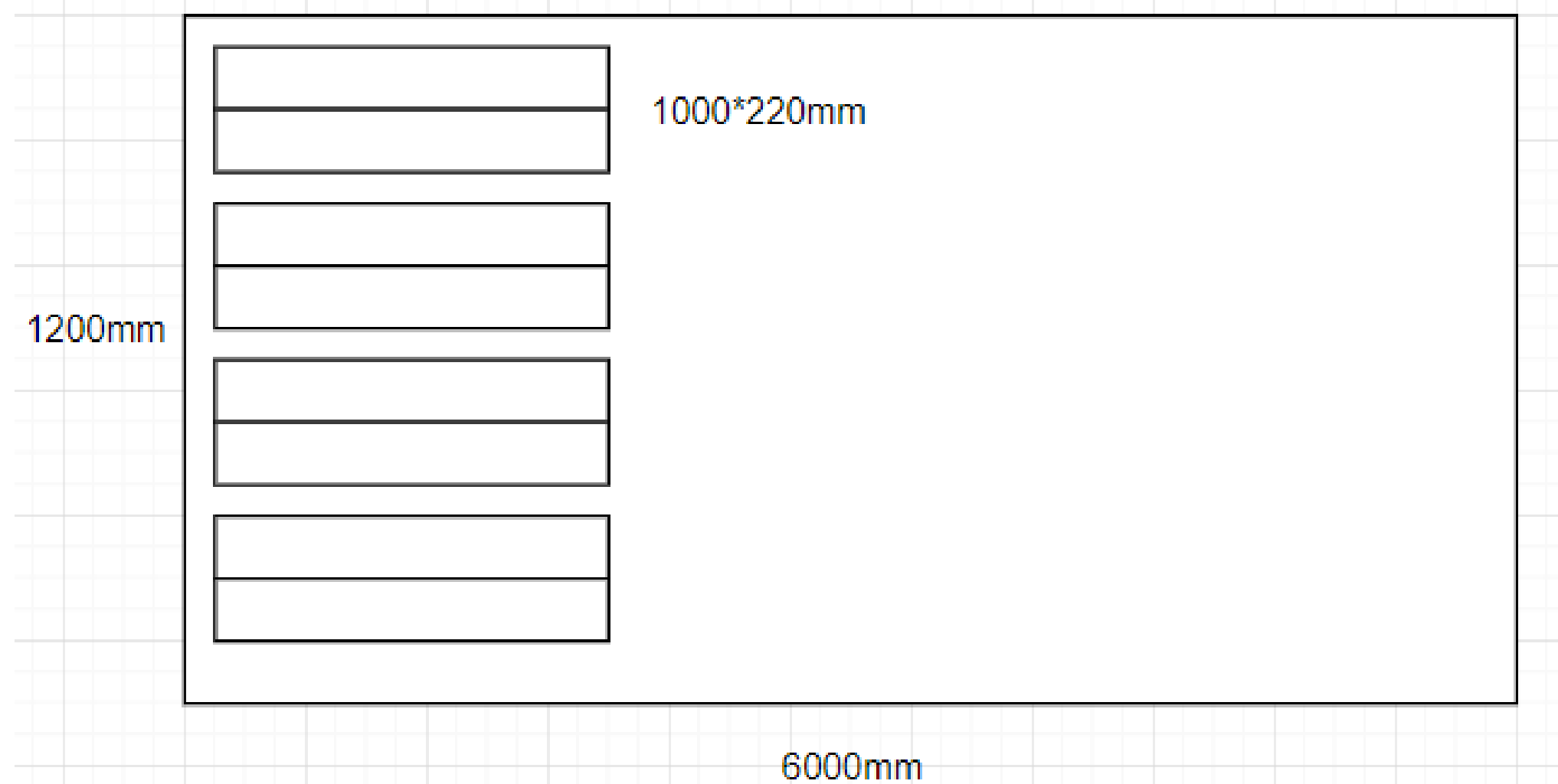


FIGURE 3

- It was observed that to cut one plate at a time was time consuming and a repetitive process.
- The solution that was put up was named as Common Cutting.
- The design which was the input to the laser cutting machine was modified without disturbing the required output.
- The modified design measurements can be seen in Fig.3 including the cutting tolerance which were required.
- To make cutting more precise, Microjoints were used to keep the plate stable, and not move while cutting the common side.

CONCLUSION

- The initial process took 30 minutes to complete the cutting of sheets into plates.
- The modified process reduced the time by 9 minutes i.e. 21 minutes.
- Hence, the process is improved by
- $x = \frac{\text{old time} - \text{new time}}{\text{old time}} * 100$
- $x = \frac{30 - 21}{30} * 100 = 30\%$.
- The new process reduced the time of cutting by 9 minutes and optimized the process by 30%.

FUTURE RESEARCH

- The world is now using laser cutting machines to get their sheet metal cutting job done.
- Tailoring industries who focus on mass production using laser precision cutting can use this technique in a modified manner.
- It will help them reduce the wastage of the fine cloth.
- Car manufacturers usually use leather for their interiors, they can apply this technique to ensure 100% use of their leather, reducing the wastage.

