


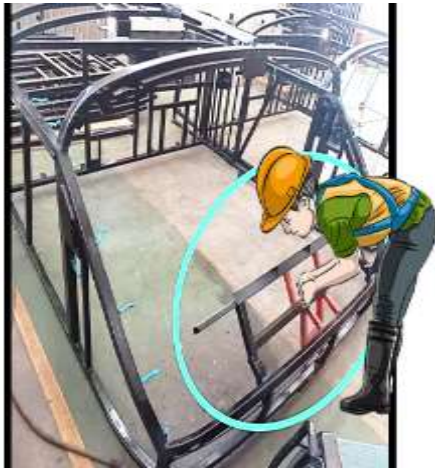


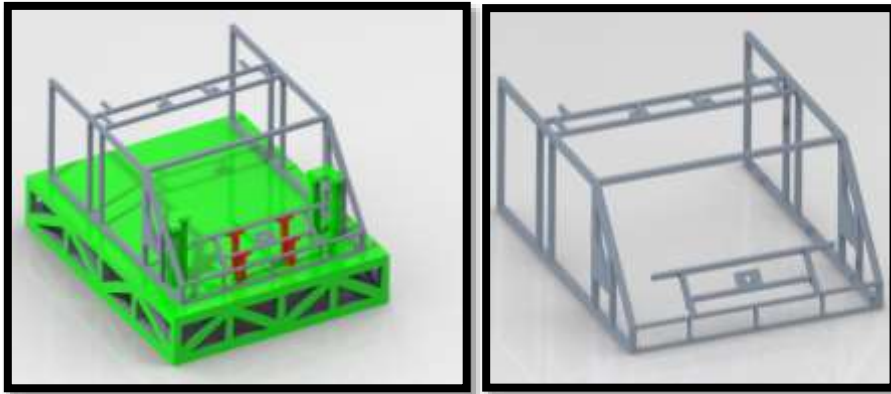
Final Year Project Showcase Batch-2019 Year 2023

Department: Automotive & Marine Engineering Programme: <u>Automotive & Marine Engineering</u>	
1	Project Idea <p>The purpose of this project is to design assembly jigs for the Bus plant of Master Motors Corporation pvt limited (MMCL's) which increases the ergonomics and productivity. Additionally, the project explores the efficiency of the jig's design using lean engineering tools to analyze its impact on operational efficiency.</p>
2	Process <p>The project initiates with a comprehensive analysis of the existing assembly processes, identifying ergonomic challenges and productivity bottlenecks. It involves studying the work environment, analyzing operator movements, and assessing potential risks and inefficiencies. These findings serve as the foundation for designing a specialized assembly jig that effectively addresses these issues.</p> <p>During the design process, various factors such as operator safety, ease of use, and adaptability to different assembly tasks are considered. Computer-aided design (CAD) and computer-aided engineering (CAE) software are employed to create a 3D model of the assembly jigs, allowing for virtual testing and optimization before fabrication.</p> <p>A series of experiments are conducted to evaluate the effectiveness of the assembly jig. Lean engineering tools, including time and motion studies, value stream mapping, and process mapping, are utilized to assess the influence on productivity, cycle time reduction, and overall process flow improvement.</p>
3	Outcome <p>The team proposed various ideas to improve ergonomics and productivity, such as modifying the front sub-assembly jig, installing a Gantry Crane in the Body weld sub-assembly line, implementing A-zone sheet's jig and emergency door hinge jig in the Body weld main assembly line, and suggesting the installation of a vacuum cleaner at the Trim line. Virtual prototype models were created using Creo Parametric 6.0 and analyzed using Ansys. The proposed solutions were presented to MMCL's senior management, who appreciated the ideas and instructed for feasibility analysis and fabrication.</p>
4	Evidence (Theoretical Basis) <p>The project is industrially collaborated with Master Motors Corporation pvt limited. The purpose of this project is to design assembly jigs for the Bus plant which increases the ergonomics and productivity. Jigs are crucial for accurate and efficient assembly, driving demand for quality and faster production, resulting in standardized procedures, improved product quality, increased output, and reduced lead time. To understand assemblies processes the lean engineering tool especially "Time and Motion study" used for the project which plays significant role to identify the motion of the operators and their relative time to complete the each assembly. It highlights the</p>

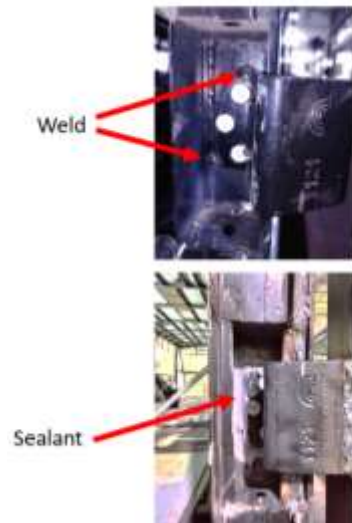


	<p>bottlenecks in the assembly processes which elaborate the non-standardization, non-value added and waste activity. It also provides the enhancement of value added activity as well.</p> <p>Based on these rooms for improvement the multiple ideas are proposed to the management of MMCL. The team proposed various ideas to improve ergonomics and productivity, such as modifying the front sub-assembly jig, installing a Gantry Crane in the Body weld sub-assembly line, implementing A-zone sheet's jig and emergency door hinge jig in the Body weld main assembly line, and suggesting the installation of a vacuum cleaner at the Trim line. Virtual prototype models were created using Creo Parametric 6.0 and analyzed using Ansys. The proposed solutions were presented to MMCL's senior management, who appreciated the ideas and instructed for feasibility analysis and fabrication.</p>
5	<p>Competitive Advantage or Unique Selling Proposition</p> <p>By improving assembly processes and operator well-being, the project contributes to enhanced productivity, evenness, and industrial success. Incorporating lean principles and ergonomics offers benefits such as cost reduction, increased productivity, waste elimination, improved work conditions, and employee engagement, which will lead to sustainable improvements in efficiency and profitability.</p>
a	<p>Attainment of any SDG (e.g. How it is achieved and why it is necessary for the region)</p> <p>SDG#09: Industry, Inovation and Infrastructure;</p> <p>The project contributes to the achievement of Sustainable Development Goal No. 9 by focusing on the development of an assembly jig which aims to improve both ergonomics and productivity. SDG goal 9 specifically emphasizes the importance of sustainable industrialization, innovation and infrastructure.</p>
b	<p>Any Environmental Aspect (e.g. carbon reduction, energy-efficient, etc.)</p> <p>None</p>
c	<p>Cost Reduction of Existing Product</p> <p>The proposed solutions suggested in this project aims to improve efficiency, standardization, ergonomics, and safety in the MMCL Bus Assembly Plant while reducing waste and costs. By implementing these recommendations, the assembly plant can work towards achieving operational excellences and cost efficiency.</p>
d	<p>Process Improvement which Leads to Superior Product or Cost Reduction, Efficiency Improvement of the Whole Process</p> <p>The implementation of the proposed recommendations including the fabrication of template jigs and modification of the existing assembly jig, as well as the installation of vacuum cleaners at the trim line, will result in significant benefits. These solutions will contribute to waste reduction, increased productivity, improved ergonomics, and enhanced worker satisfaction. By following the suggested implementation plan and closely monitoring the outcomes, the assembly plant can expect to achieve its goals of operational excellence and cost efficiency.</p>

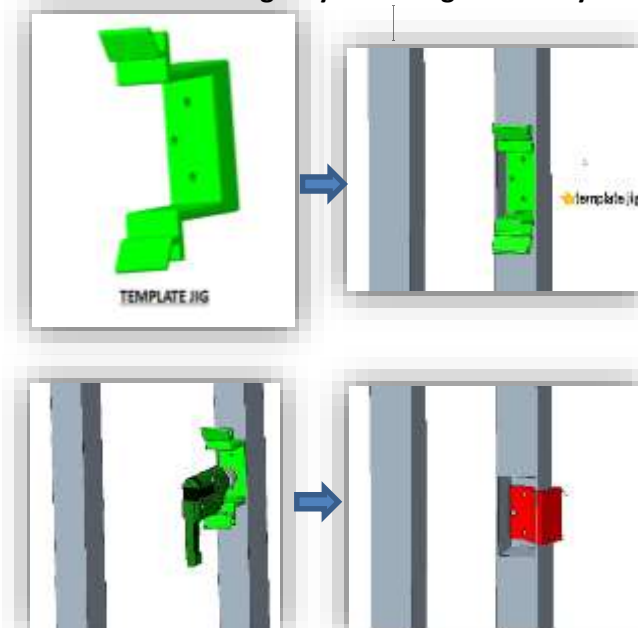
e	<p>Any Other Aspect The project highlights the bottlenecks in the assembly processes which elaborate the nonstandardization, non-value added and waste activity. It also provides the enhancement of value added activity as well.</p>	
6	<p>Target Market (Industries, Groups, Individuals, Families, Students, etc) Please provide some detail about the end-user of the product, process, or service</p> <p>The project is industrially collaborated with Master Motors Corporation pvt limited. The purpose of this project is to design assembly jigs for the Bus plant</p>	
7	<p>Team Members (Names along with email address)</p>	<p>Group Member Names:</p> <ol style="list-style-type: none"> 1) Muhammad Hassan (AU-19041) Email: Hassan4204449@cloud.neduet.edu.pk 2) Shaikh Muhammad Hamza Ahmed (AU-19035) Email: Ahmed4202097@cloud.neduet.edu.pk 3) Hamza Tanveer (AU-19036) Email: Tanveer4202361@cloud.neduet.edu.pk 4) Muhammad Asad (AU-19037) Email: Asad4208473@cloud.neduet.edu.pk
8	<p>Supervisor Name (along with email address)</p>	<p>Dr. Noman Uddin Yousuf Assistant Professor Dept. of Automotive & Marine Engg. Email: nyousuf@neduet.edu.pk</p>
10	<p>Pictures (If any)</p> <div style="display: flex; justify-content: space-around; align-items: center;">   </div> <p style="text-align: center;">Front sub-assembly jig and frame</p>	

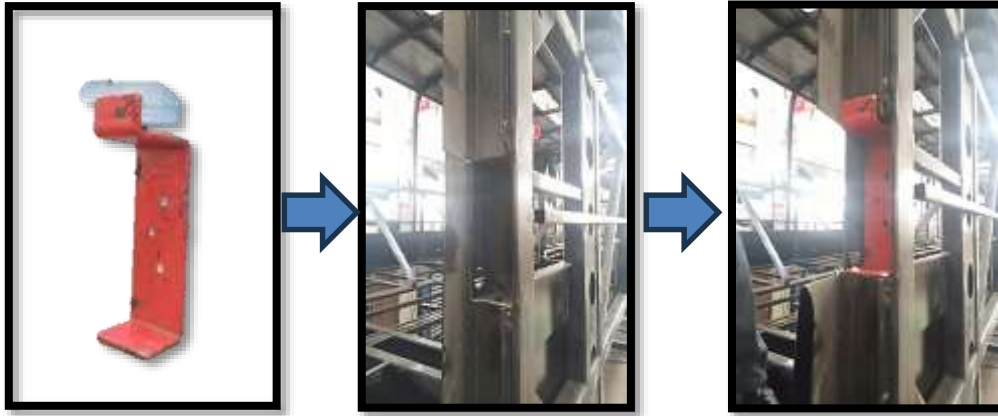


Proposed CAD models



Emergency door hinge assembly





Emergency door hinge assembly jig fabricated