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Chassis Welding Line

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Abstract

In order to accelerate the rapid development of the automotive industry and increase competitiveness, a PLC-based car dashboard bracket welding control system is designed. The car dashboard bracket welding controller uses PLC as the control core to realize real-time control of welding fixtures, valves and other parts through the touch screen. The whole construction system realizes the welding inspection of the car dashboard holder, meets the requirements of the production process, effectively reduces costs and improves production efficiency.

The chassis is the main part of the vehicle system. It consists of an internal framework that supports a man-made object. It is the lower part of the vehicle which consists of frame and chassis such as engine, transmission system, suspension system etc. The chassis type used in the project is ladder chassis. Chassis modeling is done using advanced Unigraphics CAD software. This type of chassis is mostly used for heavy trucks. It provides good beam resistance with a continuous rail from front to back.

Keywords*: Programmable logic controller (PLC), Human machine interface (HMI), Valves, Cylinders and Push buttons.*

1. INTRODUCTION

Basically, welding is used to achieve a permanent connection between two metals through the localized application of an appropriate combination of temperature, pressure and metallurgical conditions. A wide variety of welding processes have been developed with different combinations of temperature and pressure. Welding is the main means of manufacturing and repairing metal products and is used in all industries. Among the main application areas, welding is widely used in the automotive industry. The most commonly used welding methods for automotive applications include resistance spot welding (RSW), resistance seam welding (RSEW), inert gas welding (MIG), tungsten inert gas welding (TIG), laser beam welding (LBW), friction welding (FW) and plasma arc welding (PAW). Advanced welding processes have been developed for automotive applications that allow for reduced vehicle weight and increased fuel efficiency. In conventional welding methods, additional material is always added to the weld joint, which flows into the joined materials and creates an extremely strong connection. The added metal in each weld adds weight to the vehicle, which in turn reduces fuel consumption The ladder frame chassis consists of two symmetrical rails and cross members that connect them to provide strength to the various components of the vehicle system. This type of chassis is mostly used for heavy trucks. It provides good beam resistance with a continuous rail from front to back. The reason for using this type of chassis is that it is easier to change the design without having to change the chassis, saving overall design time. The disadvantage of using this type of chassis is poor torsional stiffness, higher fuel consumption and also heavier than a unibody. As a result, the chassis has been designed to reduce vibration, increase strength and optimize chassis weight.

IEEE Paper "Design of Welding Fixtures and Positiners, Challenges and Open Research" The purpose of this study was to prepare an easy-to-understand guide for Hyria students. The instructions had to be simple and precise so that they could be learned quickly. Another goal of the work is to design a welding fixture with increased versatility. This will reduce production times compared to the existing design. In this thesis, the background, technology and applications of welding are first discussed. The second part deals with the analysis of problems, opportunities for improvement and limitations. After defining the problem, possible solutions were compared and in the final phase, the final idea was implemented. The chassis is the main part of the vehicle system. It consists of an internal framework that supports a man-made object. It is the lower part of the vehicle which consists of frame and chassis such as engine, transmission system, suspension system etc. The chassis type used in the project is ladder chassis. Chassis modeling is done using advanced CAD software graphics. Chassis design and analysis is done by identifying the location of high stress areas.

Automotive Applications of Welding Techniques – A Study" Welding is always used in the automotive industry to join various structural components and engine parts. The constant demand for new and improved materials for automotive applications requires the development of innovative joining techniques. This article discusses welding techniques commonly used in the automotive industry. Illustrative schematics and specific automotive applications are included in the post. A new technique for joining dissimilar metals, eg magnetic pulse welding, is also discussed. The latest update of the medium frequency welding method used by car manufacturers is also presented with its technical and operational advantages. A wide variety of car body parts are joined using welding techniques. The need to develop new welding techniques for automotive applications continues to grow to accommodate new material combinations for automotive body parts. The demand for innovative welding processes has been strongly felt in recent days as car manufacturers focus on lighter yet strong and fuel-efficient vehicles using lightweight alternative materials. The following sections explain the most commonly used welding techniques in automotive applications.

Overview of Robotic Welding of Automobile Chassis Assembly Feasibility Analysis" The constant and rapid development of technological processes has required the development of new technologies and equipment capable of meeting the increasingly complex requirements of the industrial environment. Welding processes are an important part of engineering, with the advantages of low cost, good connection performance, and easy operation, etc.

Fusion welding is a process used in the automotive industry. The increasing requirements for the quality of welds required the elimination of the human factor in welding processes as much as possible and the use of mechanized or robotic systems. The introduction of industrial robots eliminates the disadvantages of manual or semi-machine welding and meets new requirements for the quality and productivity of technological processes. Robot programming can be done online or offline and ensures repeatability of the process under specified initial conditions.

1.1 Motivation

A wide variety of car body parts are joined using welding techniques. The need to develop new welding techniques for automotive applications continues to grow to accommodate new material combinations for automotive body parts. The demand for innovative welding processes has been strongly felt in recent days as car manufacturers focus on lighter yet strong and fuel-efficient vehicles using lightweight alternative materials.

1.2 Problem Defination

A wide variety of car body parts are joined using welding techniques. The need to develop new welding techniques for automotive applications continues to grow to accommodate new material combinations for automotive body parts. The demand for innovative welding processes has been strongly felt in recent days as car manufacturers focus on lighter yet strong and fuel-efficient vehicles using lightweight alternative materials. The following sections explain the most commonly used welding techniques in automotive applications.

2. METHDOLOGY

2.1 Problem statements

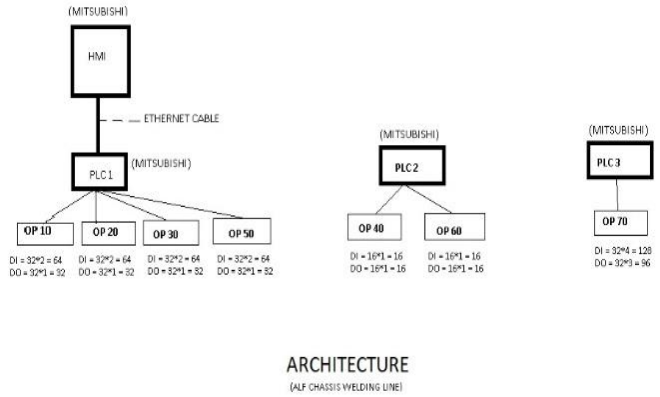
Welding is always used in the automotive industry to join various structural components and engine parts. The constant demand for new and improved materials for automotive applications requires the development of innovative joining techniques. That is why we have proposed this method in this article.

2.2 Model framework

The demand for lighter and fuel-efficient vehicles has increased in recent days. Car manufacturers are trying to produce lighter components. This contributes to the fact that existing cars are more economical and meet the requirements for alternative fuel vehicles, viz. fuel cell cars and hybrid gas/electric vehicles. The use of lighter materials such as aluminum and the development of new manufacturing processes that use less steel in welding can help to achieve the above goal. Additive material applied to the weld joint as in the conventional welding process increases the weight of the welded part.

3. FIGURES, BLOCK DIAGRAM

Figure shows architeure diagram of chassis welding line.



ARCHITECTURE
(ALF CHASSIS WELDING LINE)

Place figures and tables as close as possible to the text they refer to, and align them to the center. Tables and images should always be at the top or bottom. Text should be above or below tables and figures.

3.1 Result

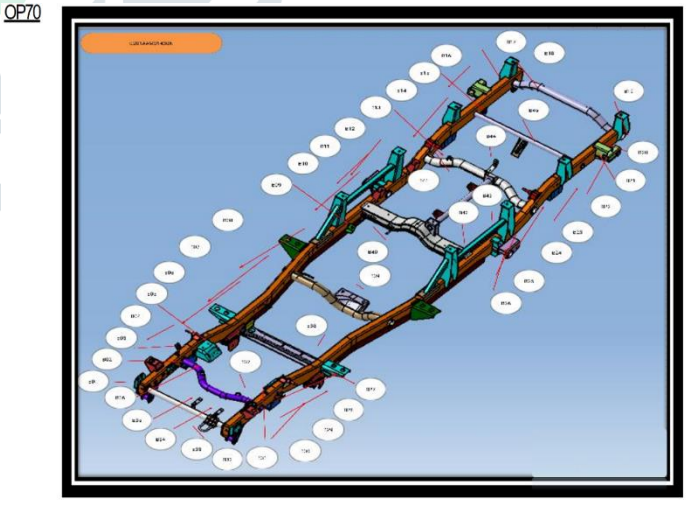


Fig 3.1: Structure of Chassis

The expected outcome of this project would be that our output chassis is well welded and tested using dummy sheets that contain various sensors for testing purposes.

Fig 3.2: Final Structure of Chassis Line

4. CONCLUSION

Automotive application of permanent joining methods is discussed with illustrative diagrams. Resistance welding techniques, namely spot and seam welding, are presented with specific applications. The solid phase welding method see friction welding is also discussed. The need for innovative and cost-effective welding methods to meet the growing demands for lighter and fuel-efficient vehicles is highlighted. Technological progress in metal joining in the context of the automotive industry is presented. The working aspect of medium frequency welding is briefly described with its distinct advantages. Magnetic pulse welding - a breakthrough in metal joining technology - is also explained. The following points emerged from the above study.

• Car manufacturers have focused on producing lighter but strong and fuel efficient vehicles using new improved alternative materials. This required the most efficient welding techniques that produce lighter welds without adding additional material.

• The commercial implementation of magnetic pulse welding may prove beneficial to the automotive industry in producing lighter and more fuel-efficient cars.

• Advances in laser beam and medium frequency welding allow new geometries to be developed for automotive transmissions and chassis systems using new combinations of materials, especially those produced by the powder metallurgy process**.**

5. REFERENCES

[1] H. Hayashi, Development of high-strength steel sheets and practical application to automobile body parts, Journal of Materials and Manufacturing, Society of Automotive Engineers, 104 (5), 1995, 560-569.

[2] B. Durand, Magnetic pulse welding process for reducing vehicle weight and increasing fuel efficiency, Research and Data for Status Report, 95-02-0055, 2001, 271-274.

[3] www.ewf.be/iab, accessed 3 May 13.

[4] www.boschrexroth.co.uk/automotive, accessed 3 May 13

[5] C.J. Dawes and W.M. Thomas, Friction Stir Process Welds Aluminum Alloys, Welding Journal, 75, 1996, 41-45.

[6] A.H. Jack, Jr. Frank, R. Manley, and D.E. Nelson, Fusion Welding P/M Components for Automotive Applications, Proc. UAE International Congress, Detroit, MI., March 1-5, 1993.

[7] A.H. Jack and W. Jeter. P/M laser welding for automotive applications, Proc. UAE International Congress and Exhibition, Detroit, Michigan, USA, 28 February - 3 March 1994.

[8] T. Holt, New applications in high power laser welding. Welding & Metal Fabrication, 63(6), 1995, 230–234.

[9] L. Quintino, P. Villica, P. Rodrigues and L. Bordalo, Laser welding for automotive hinges, Welding Research Supplement, 11(1), 2001, 261-267. [10] D. Havrilla and T. Weber, Laser welding takes the lead, Lasers & Optronics, 1(1), 1991, 30-35.