ENSURING OPERATOR'S SAFETY DURING SPOTWELDING OF FRAME R 7160 THROUGH THE FABRICATION OF A WELDING JIG

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ABSTRACT

Spotwelding is a widely used resistance welding process in manufacturing industries for joining two or more metal sheets together at localized points. This process involves the application of heat and pressure to the metal surfaces, resulting in the formation of a weld nugget. The equipment use in spot welding typically includes a welding machine, electrodes and a power supply. Various factors, such as material type, thickness electrode geometry and welding parameters, influence the quality and strength of the weld. Spotwelding offers several advantages, including high speed, efficiency and reliability, making it suitable for mass production applications in automotive, aerospace, electronics and other industries. However, proper set-up, maintenance and adherence to safety protocols are essential to ensure optimal performance and operator safety during spotwelding operations. Ongoing research and advancements in spotwelding technology aim to further enhance process efficiency, weld quality and safety.

1. 0 INTRODUCTION

One division within P. IMES Corporation is the Metal Press Business Unit, which manufactures metal parts for various customers such as TRP, Glory, NHK, Artesyn and others. In addition to press machines, spotwelding machines are commonly used in their production processes. Safety of the operator performing the spotwelding process is a crucial consideration in their operations.

This report aims to identify safety hazards associated with spot welding the Frame R 7160 item. Through a comparison between the traditional method (utilizing pliers) and our improved approach (employing a welding jig) we will demonstrate the elimination of hazards when using the welding jig.

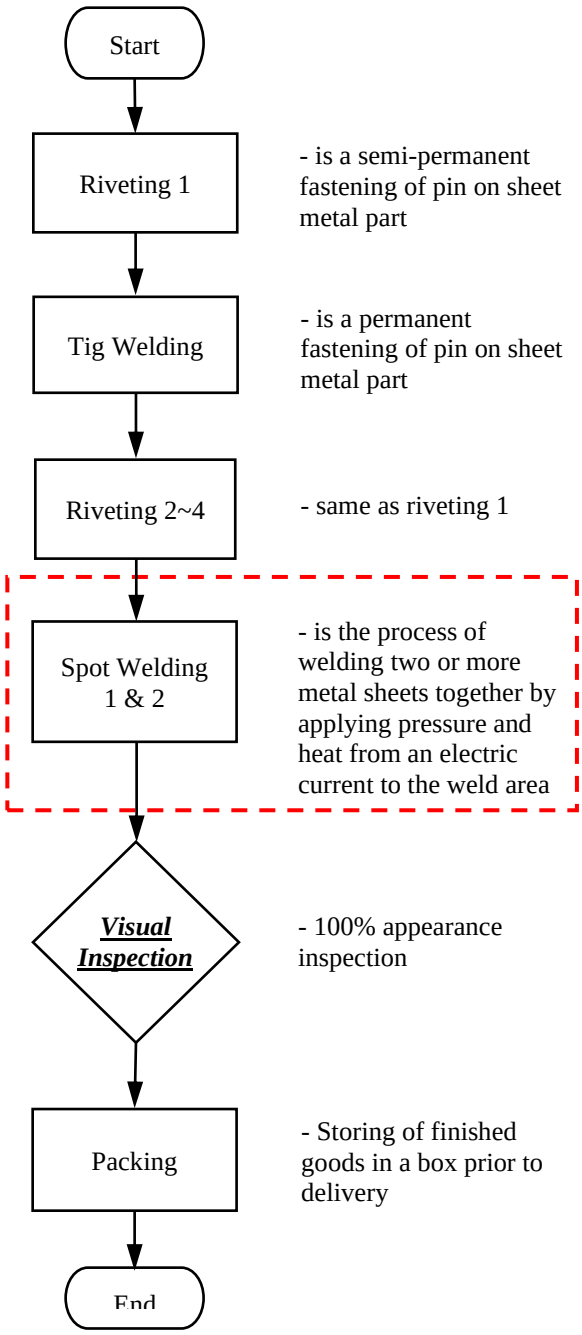

Figure 1: Process Flow of Frame R 7160

2. 0 REVIEW OF RELATED WORK

Operator employs pliers to secure the parts during the spotwelding process of the Frame R 7160 item.

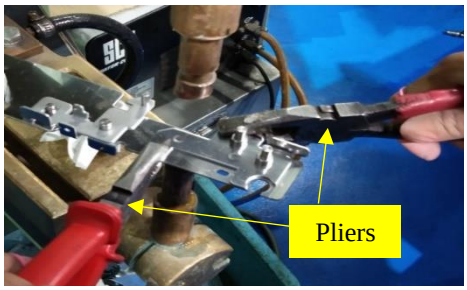

Figure 2: Current method on spotwelding process of Frame R 7160 using a pliers.

3.0 EXPERIMENTAL SECTION

3.1 Welding jig fabrication to improve the process

Under the supervision of Engineering, the operator carried out a trial simulation of the spotwelding process using a welding jig.

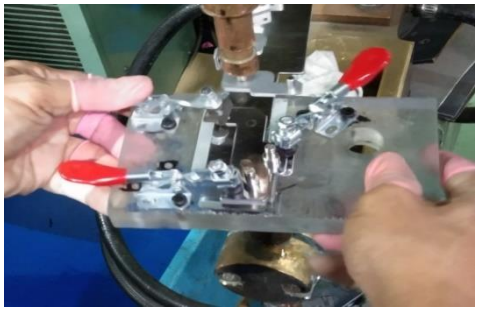

Figure 3: Welding jig trial simulation on spot welding using a welding jig.

4.0 RESULTS AND DISCUSSION

4.1 Use of Pliers versus welding jig comparison base on the result of simulation

Using pliers;

- The operator is required to apply force to securely hold the materials in place, leading to fatigue over time. This fatigue may result in inconsistent force application, potentially causing sparking during welding.
- The absence of a provided guide may lead to inconsistency in the welding process. Additionally, it poses a safety hazard when welding electrodes inadvertently hit undesignated areas due to the lack of guides.

Using welding jig;

- The operator does not need to exert force to securely hold the materials in place. Once the materials are set and clamped onto the welding jig, the operator can easily weld them.
- The welding jig includes a guide that prevents inconsistent positioning of parts on the welding machine, thereby reducing the risk of quality issues. This guide also minimizes safety hazards by ensuring consistent placement of parts.

5.0 CONCLUSION

I therefore conclude that there are numerous hazards associated with utilizing pliers in the spotwelding process. These include operator fatigue, sparking occurrences inconsistent positioning of parts and a heightened risk of quality issues during the process.

6.0 RECOMMENDATIONS

Engineering highly recommended the utilization of the welding jig over the pliers during spotwelding process of Frame R 7160 as a significant improvement to the process. The implementation of the welding jig has effectively eliminated several hazards commonly associated with the use of pliers. These hazards include operator fatigue, occurrences of sparking due to inconsistent positioning of parts and the heightened risk of quality issues. By adopting the welding jig, these hazards are mitigated, thereby promoting a safer and more efficient spotwelding operation for Frame R 7160.

7.0 ACKNOWLEDGMENT

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8.0 REFERENCES

1. Googles

9.0 ABOUT THE AUTHORS

Alcides S. Verdida has been in P. IMES Corporation since May 26, 2017. He is an Engineering Supervisor assigned on Metal Press BU or Business Unit. He gained his technical knowledge, skills and expertise through experience in different manufacturing firms and titles. He earned his degree in Bachelor of Science in Electrical Engineering in Adamson University, Manila