



Mahatma Gandhi Missions College  
of Engineering & Technology

# COMPARATIVE STUDY OF FSW AND TIG JOINTS OF AA 6082 ALUMINIUM ALLOY

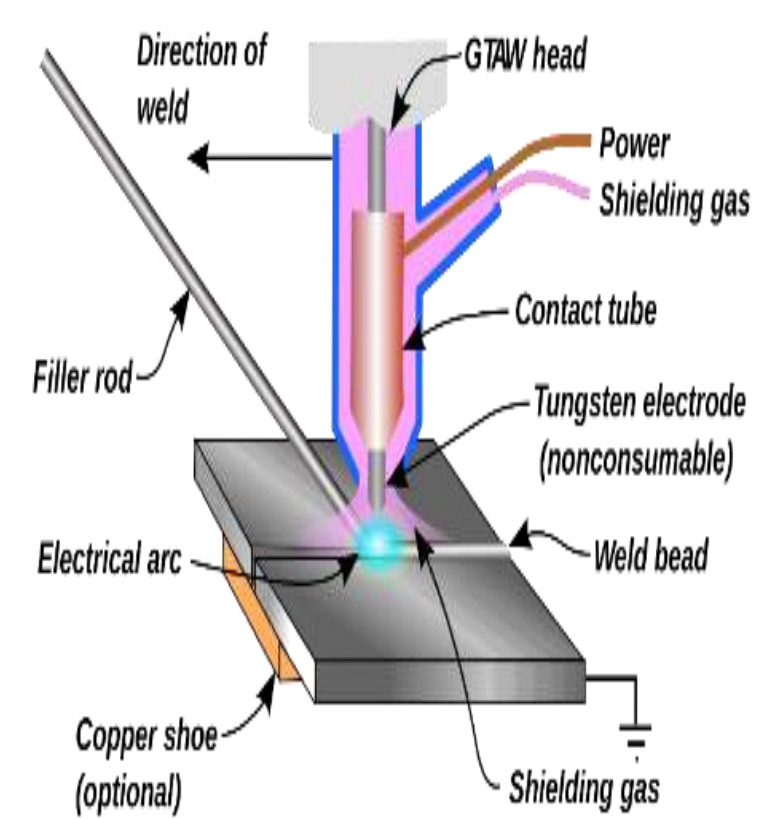
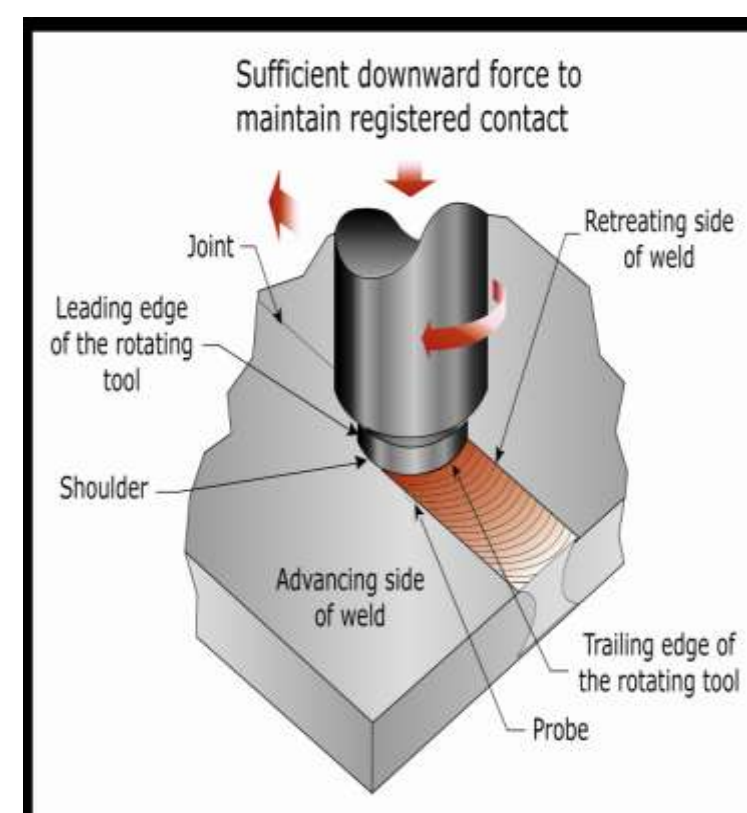
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## Introduction

Friction Stir Welding (FSW), a solid state joining process was developed and patented by the Welding Institute (TWI) in 1991. FSW is the potentially useful solid state welding technique in which welding is done below the melting point of the work piece material.

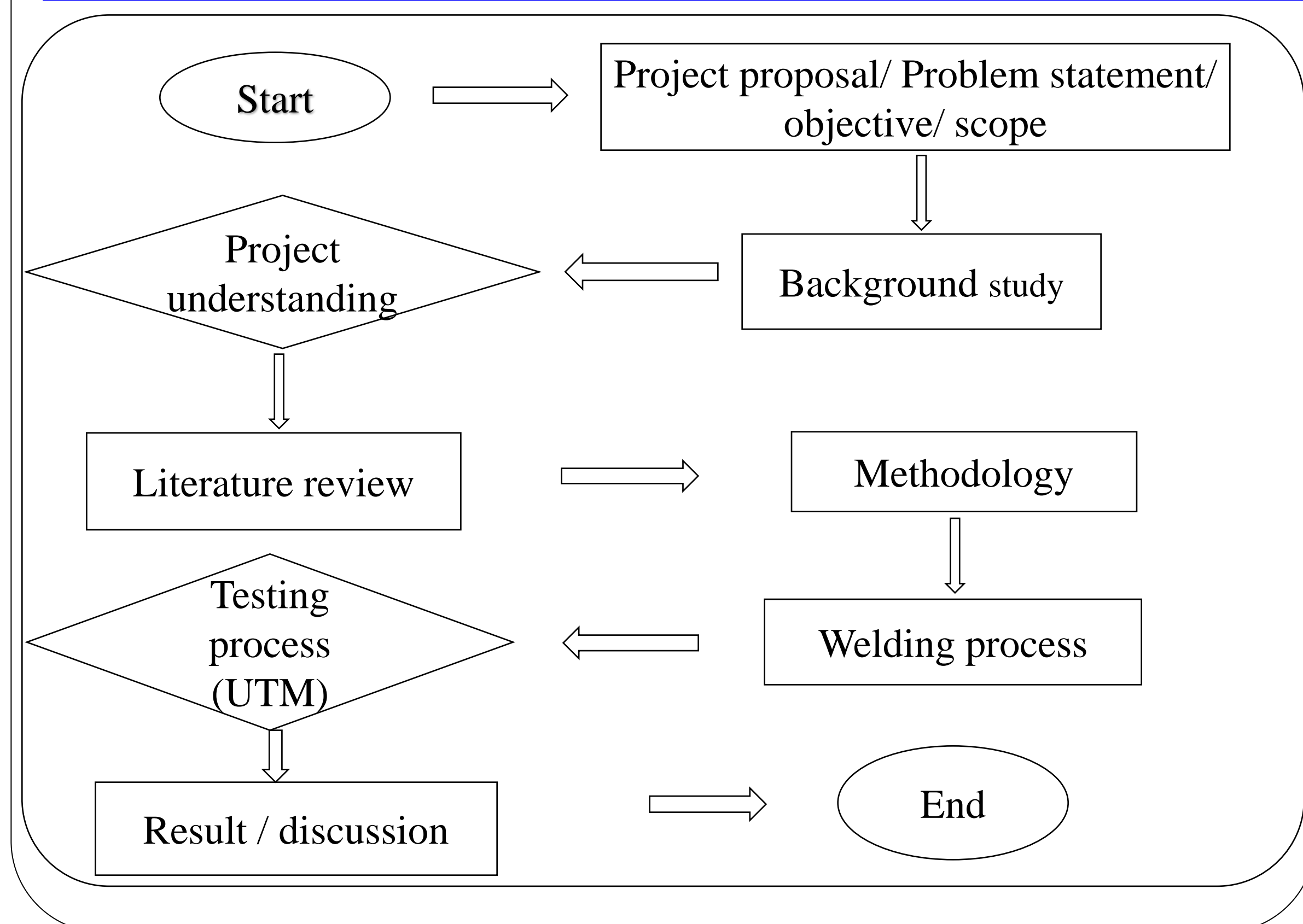
- TIG was originally developed for welding aluminum and other non-ferrous materials in the 1940s
- TIG is a gas welding process also known as Gas tungsten arc welding (GTAW)



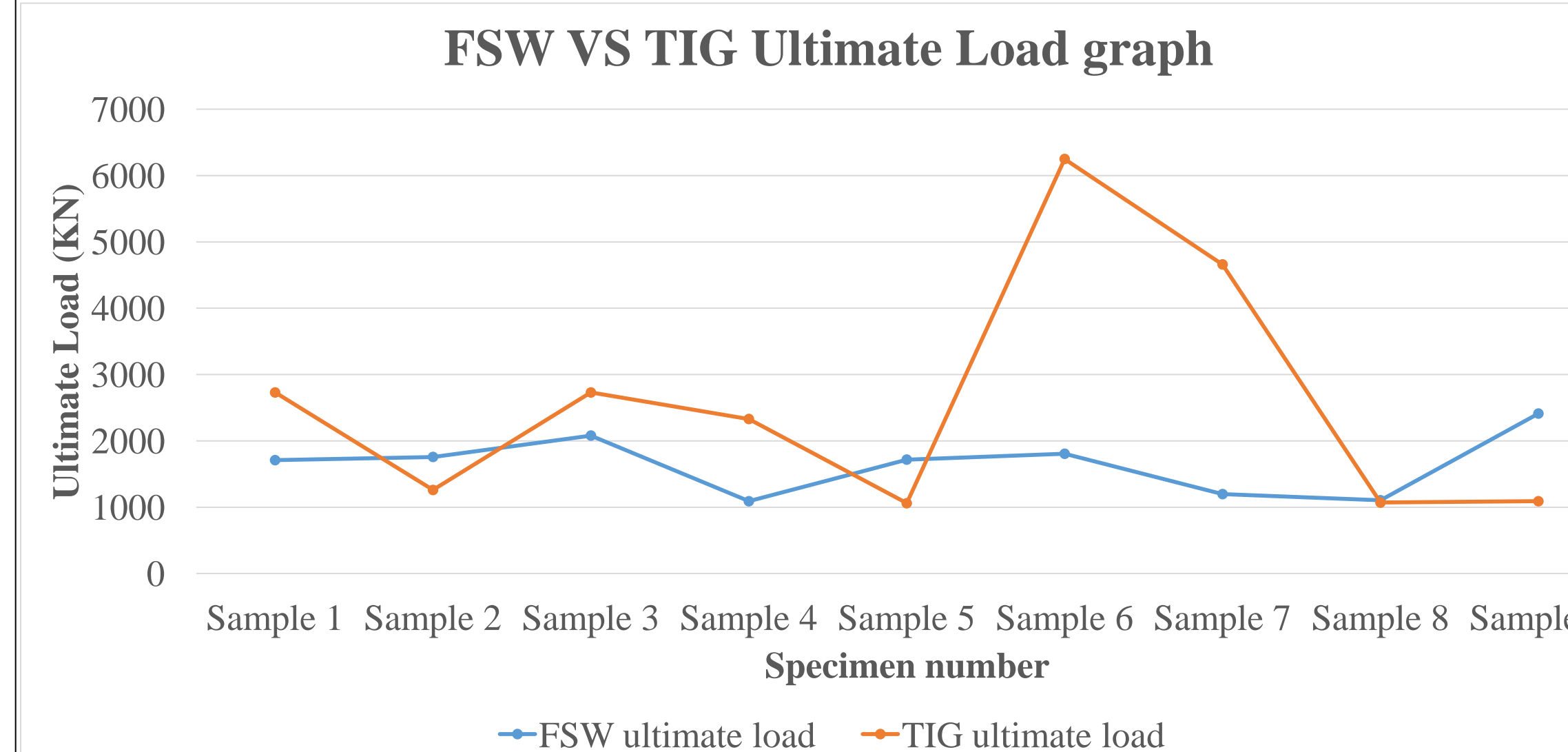
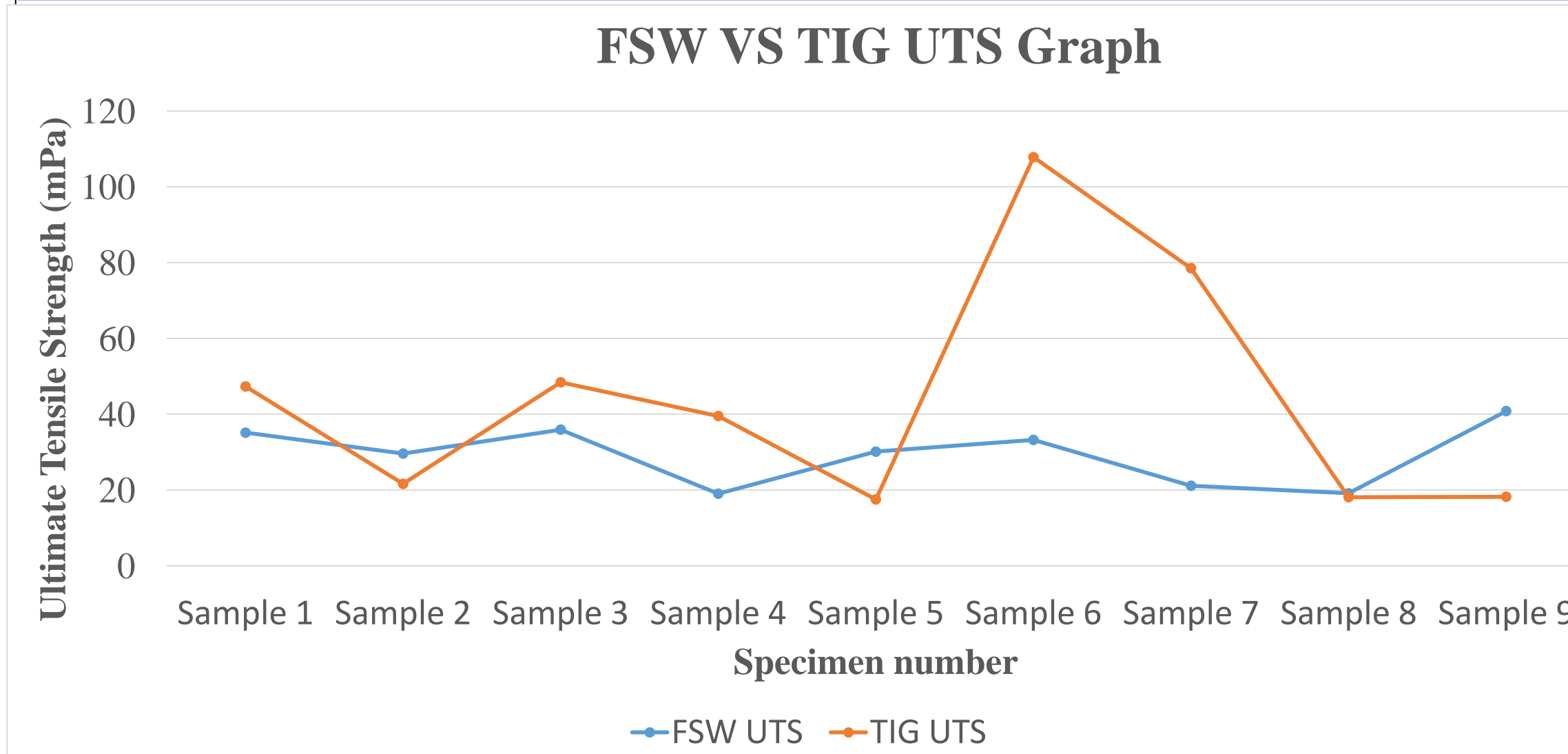
## Project Objectives

- To prepare the welding joints by TIG and FSW.
- To conduct visual inspection for TIG and FSW welded joints.
- To compare mechanical properties (Tensile strength) of welded joints.
- To prepare the graph based on results obtained.
- To use Taguchi method for optimization of Tensile strength with 3 parameters of TIG and 3 parameters of FSW.

## Methodology



## Results and Discussion



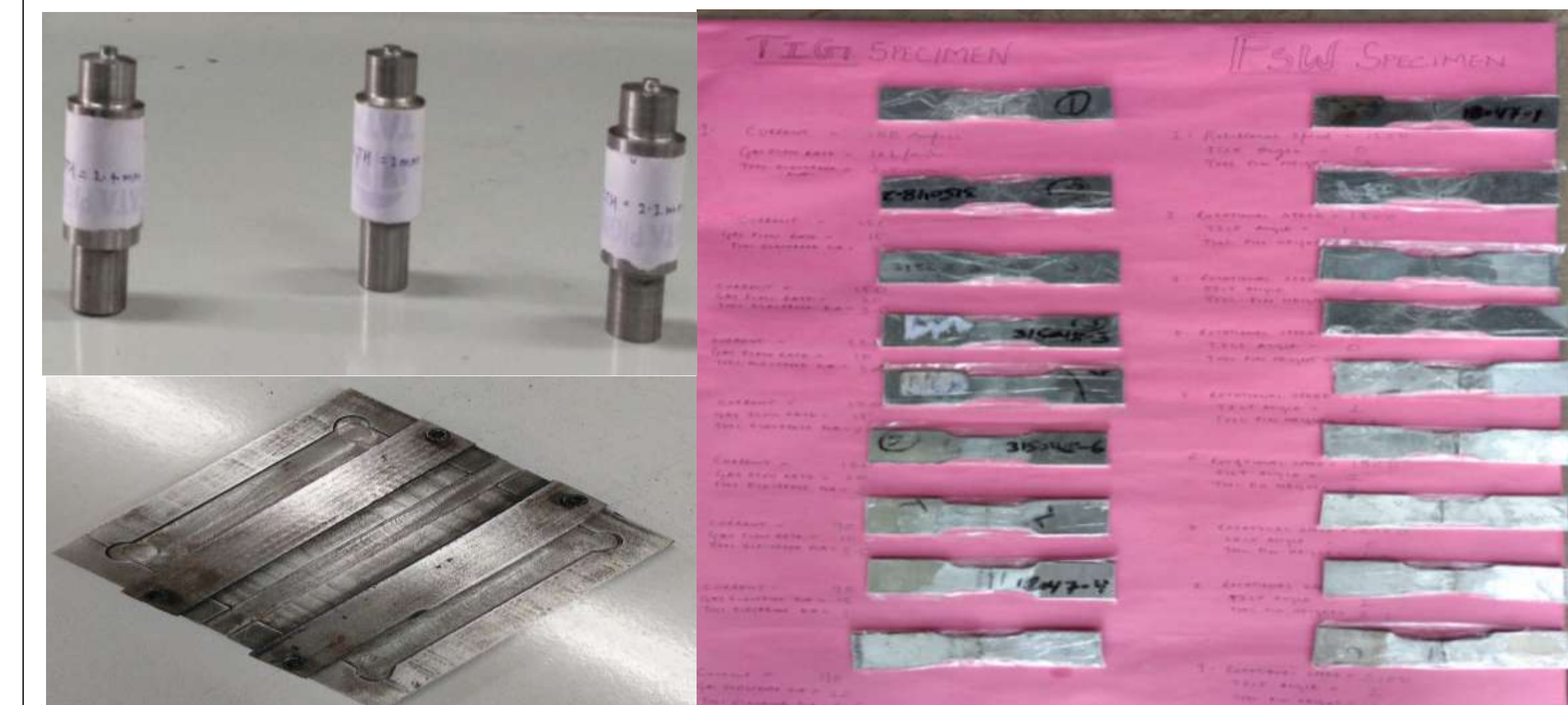
- The predicted value of tensile Strength on Minitab software Obtained by regression analysis is 17.928 and optimum parameters are Spindle speed is 1500 rpm, pin length 2.2mm Tilt angle 2 degree for FSW.

After performing final run at optimum parameters obtained from the lab reports the result came is 18.7 for FSW

- The predicted value of tensile Strength on Minitab software Obtained by regression analysis is 18.5 and optimum parameters are current is 120 Amp, Gas flow rate is 10L/min, Tool pin diameter is 2.5 for TIG.

After performing final run at optimum parameters obtained from the lab reports the result came is 19.1 for TIG.

## IMAGES



## Conclusions

- Tilt angle is the most dominant factor for tensile strength is spindle speed and pin length respectively for FSW.
- For the given set of parameter and optimum parameters are current is 120 Amp, Gas flow rate is 10L/min, Tool pin diameter is 2.5 for TIG.
- Gas flow rate is the most dominant factor for tensile strength is current and Tool pin diameter respectively for TIG.

## References

- [1] Bal Subramanian V., Ravisankar V. and Madhusudhan Reddy G., "Effect of pulsed current welding on mechanical properties of high strength aluminium alloy". International Journal of Advanced Manufacturing Technology, vol 36, pp. 254-262, 2008
- [2] Lakshminarayanan A.K. and Balasubramanian V., "Effect of welding processes on tensile properties of AA6061 Aluminium alloy joints". International Journal of Advanced Manufacturing Technology, vol 40, pp 286-296, 2009

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