

## PERFORMANCE STUDY OF RESISTANCE SPOT WELDING OF NUGGET SIZE OF UNLIKE METAL SHEETS

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### ABSTRACT

Resistance spot welding (RSW) is a system in which reaching metal surface focuses are joined through the warmth got from opposition toward electric flow. It is a division of electric resistance welding. Job piece are held collectively under pressure applied by electrodes. RSW is typically utilized in the car business for joining lean sheet metals. Inferable from contact opposition and joule warming; a liquid weld chunk is created in the work pieces. The work piece is joined as hardening of the weld pool happens. The procedure uses two shaped copper alloy electrodes to focus welding current into a tiny spot and to concurrently clamp the sheets collectively. Compelling an extraordinary current moving through the detect, the spot will dissolve the metal structure the weld. Hold time is that the scope of your time altered into the weld controller, generally among the completion of weld time and therefore the request to open the electrode. The genuine hold time is the amount of time for while the electrode power is tried resulting to current sever to stream. The four critical boundaries are the welding current, the wire electrode augmentation, welding voltage and the curve travel speed. These particulars will influence the weld properties to a colossal degree.

**Keywords:** RSW Machine, unlike Metal Sheets (Mild Steel & Stainless Steel), Weld Parameters etc.

### I. INTRODUCTION

RSW is accomplished when current is caused to flood over the electrode tips and the split bits of metal to be tied. The resistance of the local metal to electric flow course causes limited heating in the joint and the weld is made. RSW is an efficient joining measure broadly utilized for the creation of sheet metal gatherings. RSW has fantastic techno-monetary benefit, for example, little cost, rapid and suitability for computerization which settles on it a striking decision for auto-body congregations, truck lodges, railroads and home apparatuses

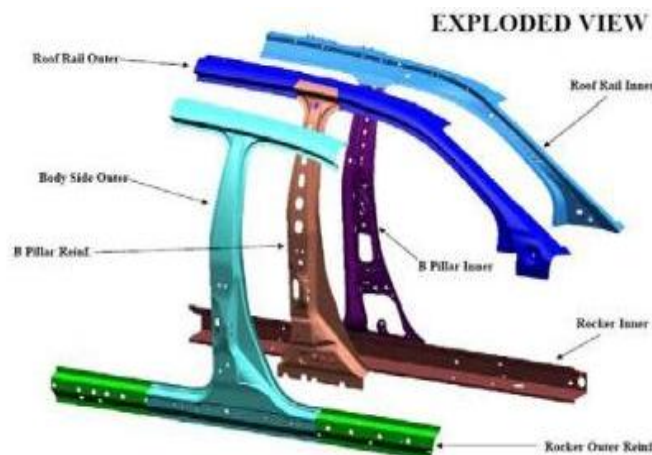
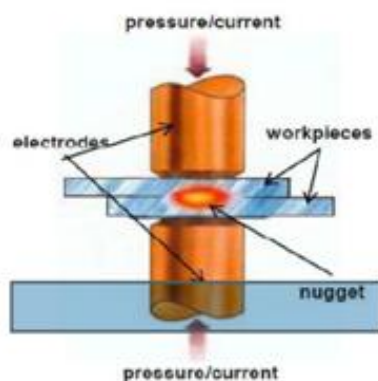


Fig.-1: Exploded view

Resistance welding is a fusion welding procedure in which coalescence of metals is formed at the faying surfaces by the heat developed at the joint through the resistance of the work to the surge of electricity.



**Fig.- 2:** Process of RSW

**Fig.-2:** By righteousness of joule heating and contact resistance, a liquid weld chunk is delivered in the occupation pieces. Work pieces are joined as cementing of weld pool happens. Shape of nugget, dimension of nugget, emergence of blowhole and expulsion.

## II. METHODOLOGY

Correspond to other welding procedure just as arc welding, RSW is rapid, easily automated and with no trouble maintained. It involves interface of electrical, mechanical, thermal and metallurgical experience. Weld quality strictly depends on factors like Tensile strength of joint, Shape of nugget, dimension of nugget, emergence of blowhole and expulsion. Heat developed in the welding zone rely upon the subsequent equation-

$$Q = I^2RT$$

Where

Q = heat developed 'Joule'

I = current 'Ampere'

R = work piece resistance 'Ohm'

T= time 'Sec'

From this equation we come to know that as heat changes with the square deviation in current. So current has most effect on the weld zone and weld uniqueness.



**Fig.-3:** RSW Machine

RSW Principle is incorporated in singular of opposition welding technique that heat is haggard in the joining the work portions of metal. The welding technique is applied in the area with the guide of electrical obstruction in RSW both the occupation some portion of metal which are intertwined together

by applying electric flow and weight inside the zone to be weld. It needn't bother with filler metal or motions for adding to the weld area for the period of welding methodology.

**About Sheets Metal**

Metal Sheets are two types in which one is mild steel and next is stainless steel. The dimensions of both sheets are the same (100 X 20 X 1.2) all dimensions are in mm.

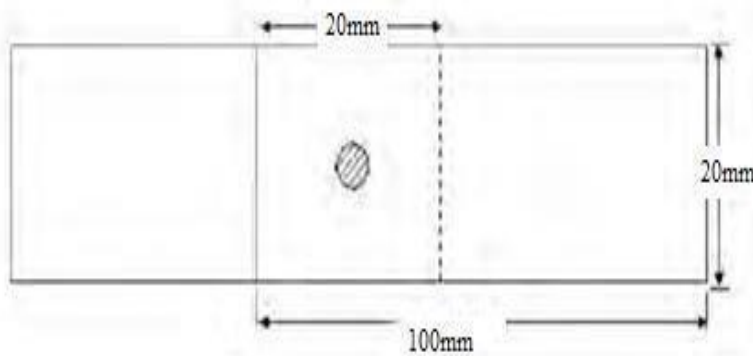


Fig.-4: Dimensional of Lap joint



Fig.-5: Samples Sheet Joint

Table: 1 Chemical Composition of selected sheet metals

	% C	% Mn	% Si	% P	% S	% Cu	% Cr	% Ni	% Mo
Sus-304	0.8	0.2	1	0.045	0.03	--	18-20	8-10.5	--
Mild Steel	0.16-0.18	0.7-0.9	0.4	0.04	--	--	--	--	--

**III. EXPERIMENTAL WORK**

In this segment we discuss what is outcome on nugget to alter the parameters in first experiment to constant the current.

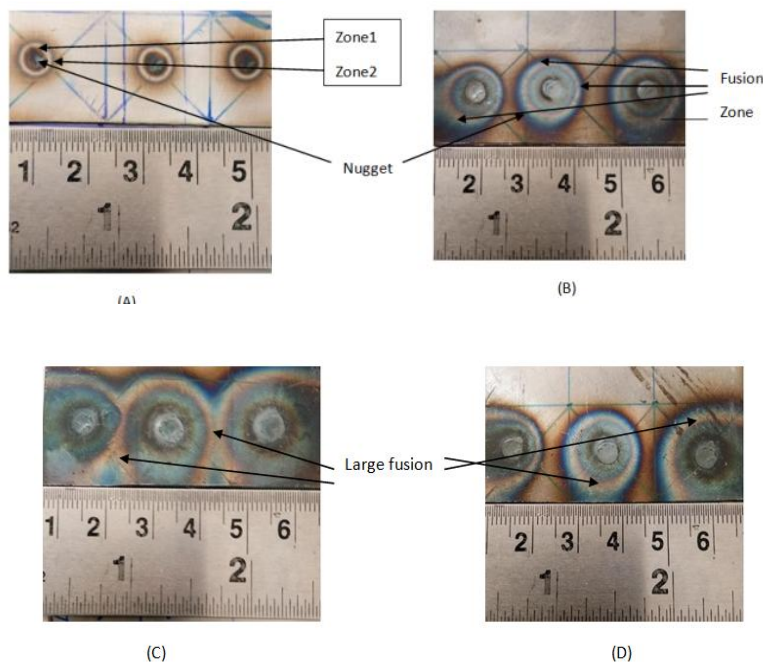


Fig.-6: Different types of Nugget size

#### IV. RESULTS AND DISCUSSION

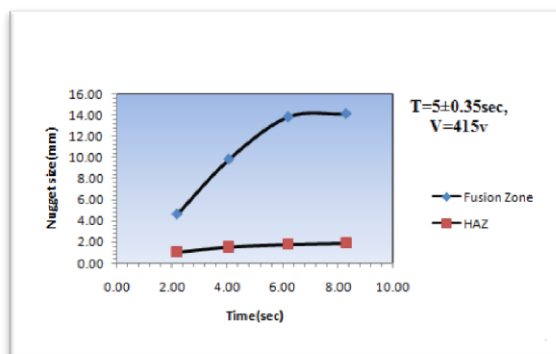


Fig.-7: Current constant

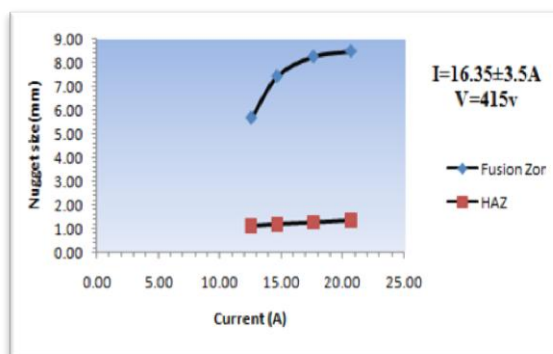


Fig.-8: Time constant

Fig.7 and Fig.8 shows spot size Fig.7 show the spot range when current is constant. Fig.8 show the spot range when time is constant. Increase the time then increase the spot size of nugget. Increase the current then also boost the spot size of nugget.

## V. CONCLUSIONS

Stainless steel is tough as a compare to mild steel. Dimension size of spot weld more increase when increase the time as a compare to increase the current. The hardness of stainless steel is more than as a compare to mild steel. So this type of joint is very powerful.

## VI. REFERENCES

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