

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

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### ABSTRACT

*Resistance spot welding(RSW) is procedure in which contacting metal surface points are joined through the heat received from resistance toward electric current. It is a division of electric resistance welding. Job piece are held collectively under pressure applied by electrodes. RSW is normally used in the automobile industry for joining lean sheet metals. Owing to contact resistance and joule heating; a molten weld nugget is produced in the work pieces. The work piece is joined as solidification of the weld pool occurs. The procedure uses two shaped copper alloy electrodes to focus welding current into a tiny spot and to concurrently clamp the sheets collectively. Forcing a great current flowing through the spot, the spot will melt the metal form the weld.*

*Hold time is the span of time programmed into the weld controller, typically among the end of weld time and the command to unlock the electrode. The actual hold time is the quantity of time for while the electrode force is tested subsequent to current break off to flow. The four significant parameters are the welding current, the wire electrode extension, welding voltage and the arc travel speed. These specifications will affect the weld properties to an enormous extent.*

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

### Introduction

RSW is achieved when current is caused to surge over the electrode tips and the split pieces of metal to be tied. The resistance of the native metal to electric current course causes localized heating in the joint and the weld is made.

RSW is a well-organized joining process extensively used for the production of sheet metal assemblies. RSW has excellent techno-economic profit such as little cost, high speed and appropriateness for automation which makes it an striking choice for auto-body assemblies, truck cabins, railways and home appliances. 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). By virtue of joule heating and contact resistance, a molten weld nugget is produced in the job pieces. Work pieces are joined as solidification of weld pool occurs.

### Litrature review

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.

RSW Principle is integrated in solitary of resistance welding procedure that heat is dilapidated in the joining the work parts of metal. The welding procedure is applied in the region with the aid of electrical resistance in RSW both the job part of metal which are fused jointly by applying electric current and pressure within the zone to be weld. It doesn't need filler metal or fluxes for adding to the weld region for the phase of welding procedure.

#### **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.

#### **Experimental Work**

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

#### **Results**

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 (1) constant. Increase the time then increase the spot size of nugget. Increase the current then also boost the spot size of nugget.

#### **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.

#### **References**

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Spot Weld Growth on Dissimilar Joints with

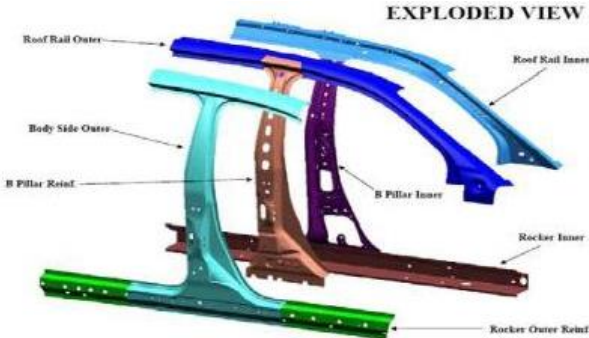


Fig.1 Exploded view

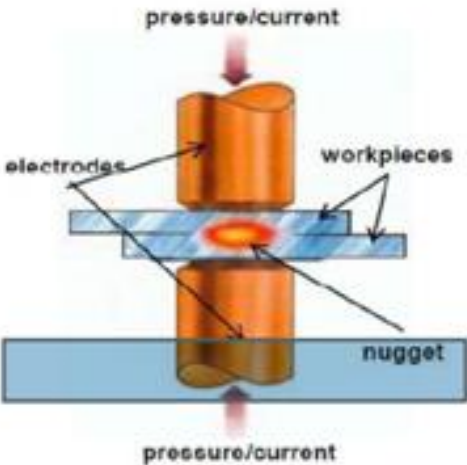
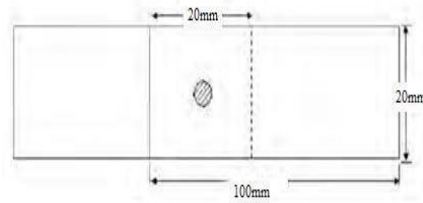


Fig.2 Process of RSW



**Fig.3 RSW Machine**



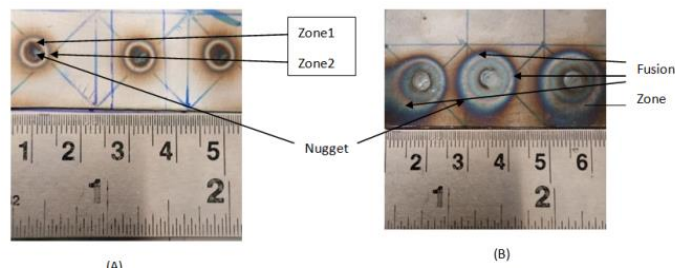
**Fig.4 Dimensional of Lap joint**

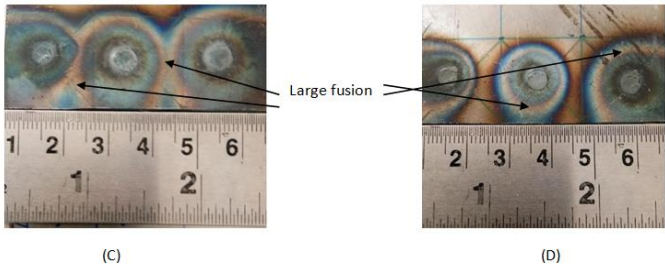


**Fig.5 Samples**

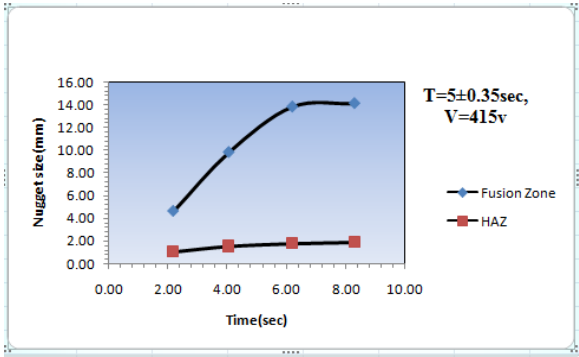
	% C	% Mn	% Si	% P	% S	% Cu	% Cr	% Ni	% Mo
Sus-304	0.8	0.2	1	0.045	0.03	--	18 - 20	8-10.5	--
Mild Steel	0.16 - 0.18	0.7-0.9	0.4	0.04	--	--	--	--	--

**Table:-1 Chemical Composition of selected sheet metals**

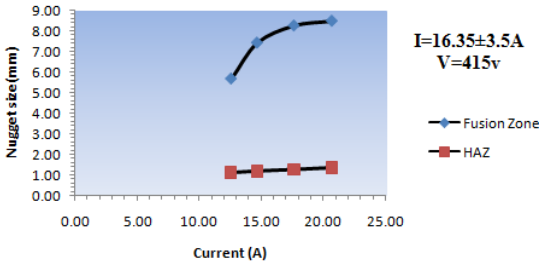




**Fig.6 Different types of Nugget size**



**Fig.7 Current Constant**



**Fig.8 Time Constant**