International Journal of Advance Research in Science and Engineering
Vol. No.5, Special Issue No. (02), March 2016
www.ijarse.com
IJARSE
ISSN 2319 - 8354

NEW PROCESS DEVELOPMENT FOR END CAP TO BRACKET WELDING

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ABSTRACT

This paper provides in-detail description of the Comfort and safety is the basic importance of the vehicle, we generally at luxury level choose more comfort. This brings to main frame about shock absorber. Our project concentrates on the same zone. Shock absorber is a device which absorbs the shocks occurred due to rough surface or roads while traveling of vehicle from place to place.

End cap is display for a product placed at the end of an axle. The display of product on the end cap is sometime also called as fixture. Resistance spot welding is commonly used in the automotive industry. because it has the advantage which is high speed, high-production assembly lines and suitability for automation. The objective of this paper is to find out the influence of the various process parameters on the tensile shear strength of the resistance spot welded joints for low carbon steel. The problems associated with RSW are tendency of alloying with the electrode resulting in increased tool wear, and subsequent deterioration of weld quality. More current and time lead to expulsion and overheating of the electrode, affecting the weld quality and less value result in insufficient weld strength. The complicated behavior of this process must be analyzed to set the optimum parameters to get good quality weld.

Keywords: Automotive Industry ,End Cap, Fixture, Resistance Welding ,Tool Wear

I. INTRODUCTION

Comfort and safety is the basic importance of the vehicle, we generally at luxury level choose more comfort. This brings to main frame about shock absorber. Our project concentrates on the same zone. Shock absorber is a device which absorbs the shocks occurred due to rough surface or roads while traveling of vehicle from place to place. The project is about design the Mandrel in the press machine, to increase the productivity up to a required limit and balance the welding line. A brief introduction to all the processes carried out is given below.

As we observed their the complex manufacturing process in end cap press machine , for completion of one job it was taking around 14 second which was too much consuming time so less productivity came from the welding line. Due to that welding line was unbalanced that is out of the four machine of welding line there was extra load coming on to End cap press machine and Leak test machine.

II. SHOCK ABSORBER

A shock absorber is a mechanical device designed to smooth out or damp shock impulse, and dissipate kinetic energy. Shock absorbers are an important part of automobile and motorcycle suspensions, aircraft landing gear, and the supports for many industrial machines. Large shock absorbers have also been used in structural engineering to produce the susceptibility of structures to earthquake damage and resonance.

A transverse mounted shock absorbers, called a yaw damper, helps keep railcars from swaying excessively from side to side and are important in passenger rail road, commuter rail and rapid transit because they prevent railcars from damaging station platforms. The success of passive damping technologies in suppressing vibration amplitudes could be ascertained with the fact that it has a market size of around $ 4.5 billion.

Key Features of Industrial Shock Absorbers over other Vibration Reducer

1. Hydraulic Dashpot (High stopping force at start of the stroke)

With only one metering orifice the moving load is abruptly slowed down at the start of the stroke. The braking force rises to a very high peak at the start of the stroke (giving high shock loads) and then falls away rapidly.

2. Springs and Rubber Buffers (High stopping forces at end of stroke)

At full compression also they store energy rather than dissipating it, causing the load to rebound back again.

3. Air Buffers, Pneumatic Cylinder Cushions (High stopping force at end of stroke) Due to the compressibility of air these have a sharply rising force characteristic towards the end of the stroke. The majority of the energy is absorbed near the end of the stroke.

4. Industrial Shock Absorbers (Uniform stopping force through the entire stroke). The moving load is smoothly and gently brought to rest by a constant resisting force throughout the entire shock absorber stroke. The load is decelerated with the lowest possible force in the shortest possible time eliminating damaging force peaks and shock damage to machines and equipment. This is a linear deceleration force stroke curve and is the curve provided by industrial shock absorbers. In addition they considerably reduce noise pollution.

2.1 Components:

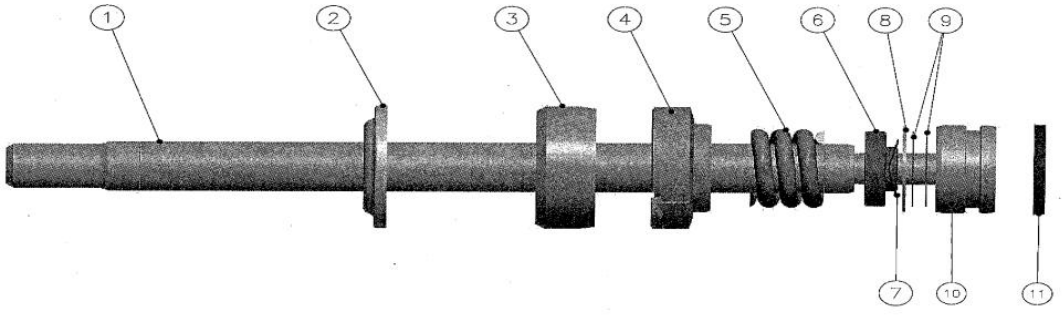

Fig.Piston rod assly

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IJARSE
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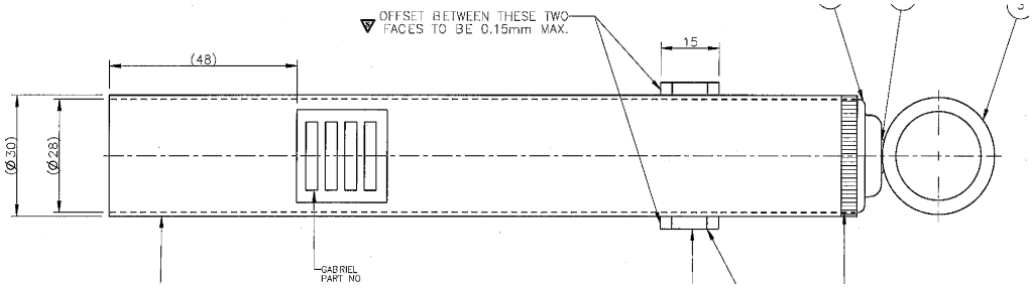


Fig. Outer tube assly

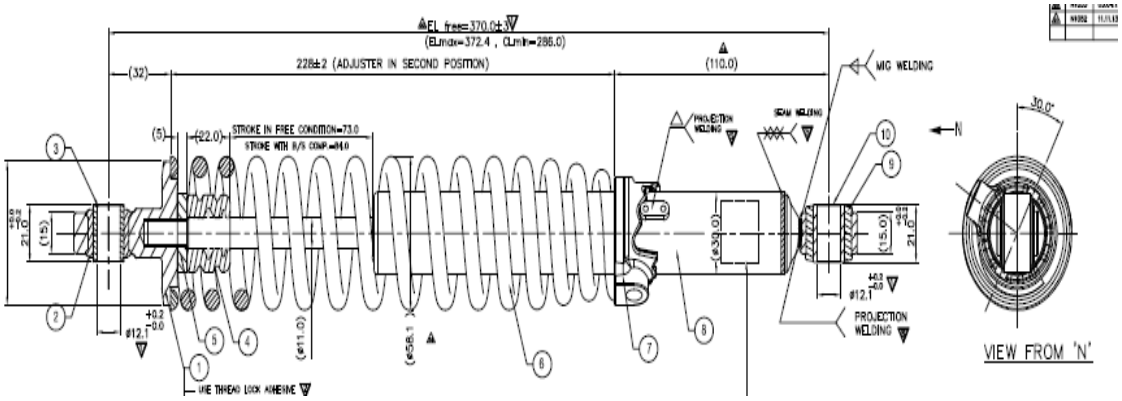


Fig. Peripheral Assly

2.3 Types of shock absorbers:

There are several commonly used approaches to shock absorption. Dry friction as used in wheel brakes, by using discs (classically made of leather) at the pivot of the leaver, with friction forced by springs. Used in early automobile such as the ford model T, up through some British cars of the 1940s.although now consider obsolete, An advantage of this system is its mechanical simplicity, the degree of damping can be easily adjusted by tightening or loosening the screw clamping the discs, and it can be easily rebuilt with simple hand tools. A disadvantage is that the damping force tends not to increase with the speed of the vertical motion.

2.4 Various shock absorbers :

Shock Absorber		
		
Yamaha	**Bajaj**	**Auto Kinetic Motor**

Gladiator-Rear Shocker	Platina SNS - Rear Shox	Spice – Rear Shox
		
Global Xenetic – Rear	**Auto Yamaha** OE-36	**Bajaj** OE-36
		
PVPL Front	**Bajaj-Antidive** 3 WH	**Kinetic Nova-FR** 135CC

Fluid friction, for Example the flow of fluid through a narrow orifice (hydraulics), constitutes the vast majority of automotive shock absorbers. An advantage of these type is that using special internal valving the absorber may be made relatively soft to compression (allowing a soft response to a bump) and relatively stiff to extension, controlling "jounce", which is the vehicle response to energy stored in the springs similarly, a series of valves controlled by springs can change the degree of stiffness according to the velocity of impact or rebound.

Compression of gas, for example, Pneumatic shock absorbers, which can act like springs as the air pressure is building to resist the force on it. Once the air pressure reaches the necessary maximum, air dashpots will act like hydraulic dashpots. In aircraft landing gear air dashpots may be combined with hydraulic damping to reduce bounce. Such struts are called oleo struts (combining oil and air). Magnetic effects, Eddy current dampers are dashpots that are constructed out of a large magnet inside of a non-magnetic, electrically conductive tube.

Pneumatic and hydraulic shock absorbers commonly take the form of a cylinder with a sliding piston inside. The cylinder is filled with a fluid (such as hydraulic fluid) or air. This fluid-filled piston/cylinder combination is a dashpot. The shock absorbers duty is to absorb or dissipate energy. One design consideration, when designing or choosing a shock absorber, is where that energy will go. In most dashpots, energy is converted to heat inside the viscous fluid. In hydraulic cylinders, the hydraulic fluid will heat up, while in air cylinders the hot air is usually

exhausted to the atmosphere. in other types of dashpots, such as electromagnetic types, the dissipated energy can be stored and used later. In general terms, shock absorbers help cushion vehicles on uneven roads.

III. RESISTANCE WELDING IN SHOCK-ABSORBER

Resistance welding is the most commonly used method for joining steel sheets. No filler metal is needed and the heat required for the weld pool is created by means of resistance when a high welding current is directed through the welded workpieces. An electro-conductive contact surface is created between the workpieces by pressing them together. Contact is made using the shape of either the welded surfaces of the workpieces or the shape of the electrodes.

Water-cooled electrodes made of alloyed copper are used in resistance welding. Electrodes convey a pressing force to the joint and direct the welding current to the joint in the appropriate manner. After welding, the electrodes rapidly cool down the welded joint.

Work stages in resistance welding are very fast. The surfaces to be welded do not usually need to be cleaned before welding, in addition to which the weld does not usually require grinding or postheating. The resistance welding process can be easily automated.

3.1. Lug Welding

Lug welding takes place between outer tube & spring seat or lug. As shown in fig. Outer tube is clamped between two steel electrode. Steel lug is press along outer tube & then welded.

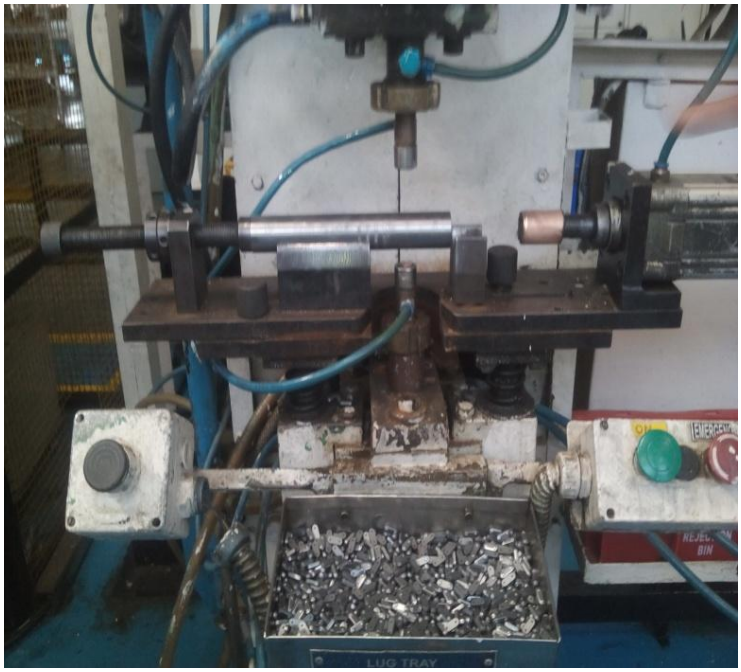


Fig.3.1:Lug Welding machine

3.2 End Cap Press Machine

End cap press machine is first machine in welding line. Machine is to press end cap on the outer tube which place on mandrel. The piston rod move in downward direction which press the end cap on the outertube.

Fig 3.2.End Cap Pressing Machine

3.3 Seam Welding Machine:

It is the Machine on which seam welding takes place between Outer tube and spring seat. It has two copper discs in between the welding takes place. External cooling is provided to reduce temperature at weld position. Fixture is provided to hold the job. It has One degree of freedom.

Fig.3.3.Seam Welding Machine

3.4 Projection Welding:

Main function of projection welding machine is to weld Circular ring on End cap. The main components of Projection Welding Machine are clamp, two selected rods and protective shield.

Fig.3.4.Projection Welding Machine

3.5 Leak Test Machine:

Leak test machine is to check leakage in welding. The main components are mandrel, top adapter a pneumatic cylinder.

Fig 3.5.Leak Testing Machine

IV.PROBLEM DISCRIPTION

Stage	Impact of Welding Failures
End User (Bike rider)	• Leads to accidents due to welding failures • Decrease the morality of user
Honda	• Complaint from Field
Company	• Complaint from Honda • Increase in Internal Scrap cost • Increase the customer returns • Fear of Brand

Table :Impact of welding Failure

4.1 The 5 M's (used in manufacturing industry) To Analyze the Problem:

1. Machine :technology
2. Method :process
3. Material :Includes Raw Material, Consumables and Information
4. Man Power :physical work/Mind Power ,brain work, Suggestions
5. Measurement :Inspection

From above 5-M tool , We cannot change existing machines , i.e.seam welding m/c , projection welding m/c etc. same as machines we cannot change the man power, material from supplier and measurement .We change only one tool i.e. METHOD.

4.2 Change in Process

BEFORE:

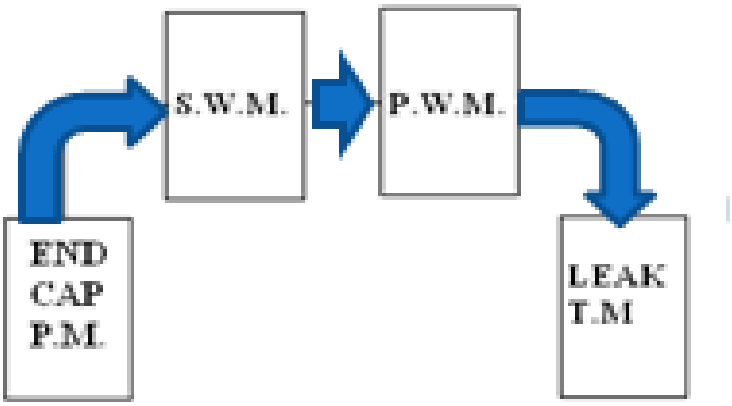


Fig: 4.5 welding line

AFTER:

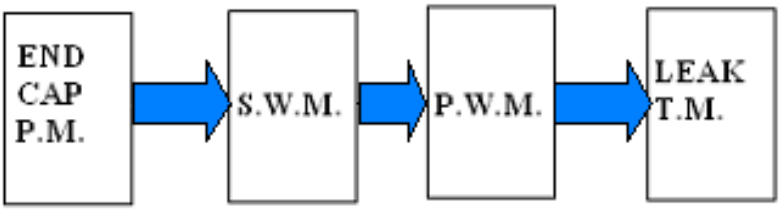
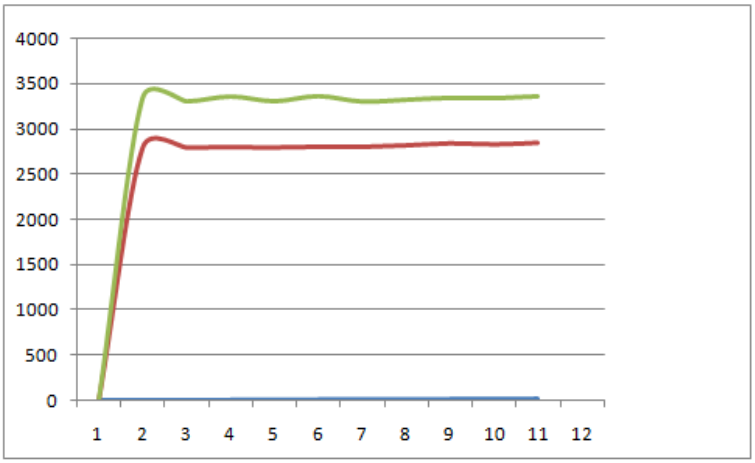


Fig:4.6 welding line

V. RESULT

The Result of ten shock absorber under destructive testing are given below , the before welding line are result in tensile strength is average 2825kgf.And implemented new welding line has results average 3345 kgf . this results are taken from ten sample on universal testing machine(UTM).



Graph:Result

VI. CONCLUSION

The project started with basic operations carried out which leads to unbalanced welding line and less productivity.

After studying different operations like projection welding, lug welding, end cap pressing , end cap welding and leak test we conclude that projection welding require more time for there operation.

Implementing new process welding line we minimize the welding time , current loss during welding and increse the strength of weld joint.

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