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Various approaches to Eliminate MIG Welding and Defects occurring in DT cap Fitting in a Three Wheeler Shock Absorber

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Abstract - In the world of competitiveness the all of us wanted the solution of the problem, which is cost effective and more convinced to the company for more profitable outcomes. The processes in the company would be through examined by the people to improve the process this has to be done in the various ways like to watch the process and its constraints and do the actions according to it .There are various way to reduce cost like product design for practical factor of safety, product must be manufactured in minimum time with optimized material. Cost reduction is necessary but it doesn't compromises the safety as required. The process improvisation leads to more profitability with existing resources.

The MIG Welding is the process in which consumable wire electrode is fed into an arc and weld pool at a steady but adjustable rate while a continuous envelop of inert gas flows out around the wire and shields the weld from contamination by atmosphere This process provide the less fumes then other same category of welds with reduced spatters and clean weld.

Resistance Seem welding is none other than spot welding, but when the spot welds are made in an overlapping array they do results in continuous weld which is leak proof .In this welding the electrodes are used in the form of wheels or rollers for stich of seem. It requires high current then the spot welding.

***Key Words*: MIG Welding, DT Cap , Shock Absorber.**

1.INTRODUCTION

In the process of manufacturing of suspension for 3wheeler the welding done on the DT cap doesn't give the desired strength to it, which leads to the failure of the product and have its various consequences on the product.

Due to the improper DT cap weld the further locking seem welding is also not done perfectly because the eccentrically done weld doesn't adheres at the time of weld .
2. Due to improper welding the DP cap is not sustaining for that pressure at the time of testing of assembly.
3. The welding is causing welding spatters on the neck which leads to tearing of the oil seal and contamination of the oil. Because of this the customer complains of oil leaks and more rejections are often detected.
1. The motive of this work is to give a required optimized strength to the DT cap assembly. The DT cap assembly is having the strength for sustaining the load and the next seem weld strength also depends upon this assembly strength and concentrically.
2. To improvise the strength of the product either by providing the supplementary object to increase the strength.

3. The strength improved of the product will reduce the rejection of the product from the buyer of the product.

4. The process furthermost to the DT cap welding is seem welding which need the adhered DT cap and also neat and clear eccentricity of the DT cap which has to be achieved to reduce the rework .

1.1 Objective

A] From the Survey, we found that the area of interest for improvement is to reduce rejection of products.

B] We found one cause of rejection is the improper welding lead to the failure.

C] The economic value of welding in MIG welding is lead to higher product cost with insufficient strength.

D] For these reasons this problem being the hurdle for customer satisfaction and company benefits.

Parameter	Specification
Arc voltage	18-19 V
Current	100-13 amp
Gas flow	0.014-0.016 m^3-min
Gas pressure	2.46-2.9 bar
Weld wire consumption rate	0.035-0.040 m
Pull strength	980.66 N-min
Push strength	980.66 N-min
Impact strength	No welding crack

Table 1 : Welding Parameters

2. Experimentation

A)The solution required is to add the strength in the existing DT cap joint this can be done with the help of supplement provided in the form of washer.

B) The prior solution for the problem is to add the washer of appropriate diameter proceeding to the DT cap.

C) This washer gives the additional thickness to the cap beheading it which will absorb the retained shock.

D) The washer makes it straight at the time of MIG welding which will reduce the misalignment of the cap.

E) This washer will reduce the rejection which is caused.

The whole assembly of 3 wheeler shock is done in the 3 steps of making the part and integrate the assembly of the 3 parts, they are as follows:-

1. Outer tube

2. Piston rod

3. Inner tube

1. Outer tube: - The processes done in the assembly of the outer tube are as follows,

A) Rolling: - The outer tube ordered from the vendor is not perfectly circular cylinder but it should be circular for the further processes on it therefore the outer tube is rolled.

B) Marking and spring seat pressing: - The parts are marked in the company for recognition of parts for maintaining records of parts produced per machine and parts product cycle. At this stage one more important step of spring seat pressing is done with the help of pneumatic press fitting machine.

C) Spring seat welding:-In this process the pneumatically actuated press fit the spring seat and weld it with sties on the neck for further process.

D) Cap fitted in tube: - The end cap is now fitted on one end of the tube.

E) Vertical seem welding: - The vertically seem weld ensure the fitting of the end cap which is important process.

F) Projection welding: - The eye bolt mounted on the end cap is welded with the assembly with the help of projection welding in which the eye bolt is fixed in the fixture above the end cap then the spot projected seem weld is done on it.

G) Overall welding leakage testing: - The testing is important for the quality assurance of the product. This is done with the help of bubble test for overall detection of leakage in the welding process .This is done by passing the high pressure air in the outer tube and inserting tube in water bath for bubble detection. Here bubble indicate the leakage in the test.

H) MIG welding: - The MIG welding done here is with the twin spindles for the rapid processing this is done above the atmospheric pressure for reduction of contamination.

I) Cleaning and drying :- Cleaning and drying are the processes which are done in the steam tank jacket in which the component are clean with the wet steam and they are heated to dry to insure the complete dry component for the prevention of the corrosion taking place in the further life of the component.

2. Piston rod – The processes done in the assembly of the piston rod are as follows,

A) DT cap press fitting and welding: - This process is the main area of concern in which the process accuracy is important. DT cap is press fitted on the tapering end of the piston rod. This tapper ensures the adhesion of DT cap and piston rod but the press fit is not giving the desired strength to the cap. Therefore the DT cap is welded on the piston rod with the help of MIG welding process, but in this process the migweld done on the DT cap is perfect and here comes the problem in picture. The DT cap welded is having non-aligned and eccentric weld because of the following reasons,

7 The fixture holding the piston rod is not aligned to the base fixture with which the MIG weld gun is designed.
8 The thickness of the DT cap is not sufficient for the fine weld with existing machinery.

b) Assembly mounted on piston rod –The following are the assemblies mounted on the piston rod

c) Assembly sequence –

1. Piston rod
2. Bump stop
3. Case cap
4. Mud wiper seal
5. Oil seal
6. Rod guide
7. Recoil spring
8. Retainer valve
9. Leaf spring
10. Plate valve 1
11. Plate valve 2

12. Piston double groove

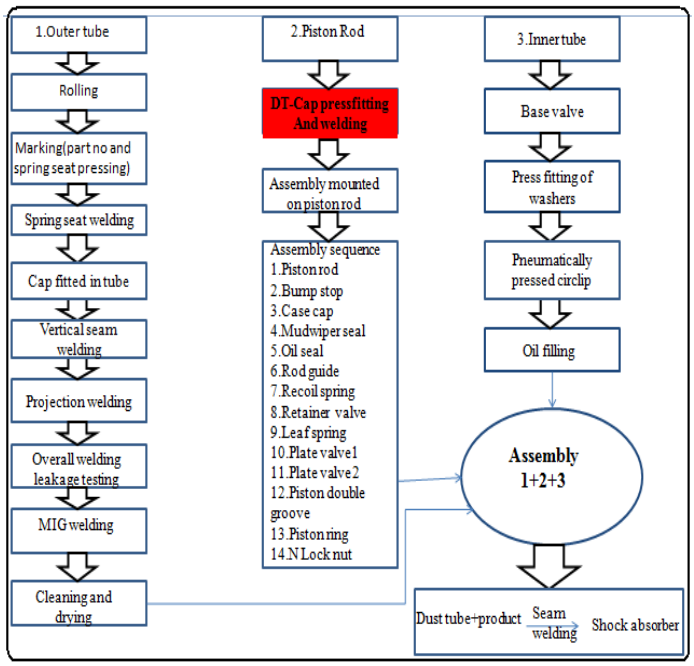

Fig 1 : Process Flow Chart

3. Inner tube: - The processes done in the assembly of the inner tube are as follows,

A) Base valve: - The one end of inner tube is sealed with non-return valve providing the base for the further assembly of the inner tube and use it as an oil reserve.

B) Press fitting of washers: - The washers provided here are for giving the strength and providing base for movement of spring shocks.

C) Pneumatically pressed circlip: - The washers added are sealed with a circlip enclosed pneumatically fitted on the washers.

D) Oil filling: - The measured quantity of oil is filled in the inner tube here depending upon the application.

OVERALL ASSEMBLY OF SHOCK:-

The shocks manufactured with these three parts assembly

2 The inner tube is inserted in the outer tube the piston rod is inserted in inner tube.
3 The outer tube is curled for the sealing of shock.
4 To ensure the contamination the shock is provided with the dust tube with seem welded at the end.
With this process the complete shock assembly is done

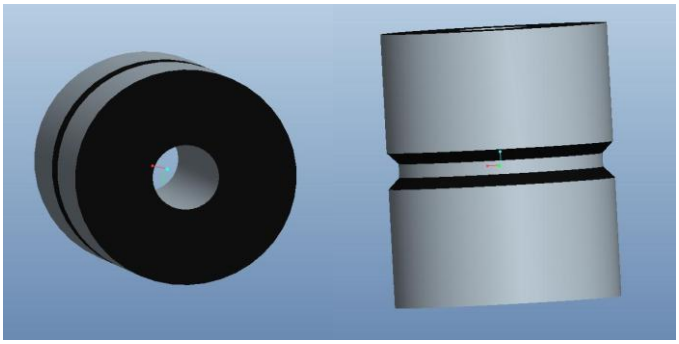

Fig 2: Arrangement of DT Cap

4 Design of DT Cap

Pro/ENGINEER is a feature based, parametric solid modelling program. As such, it's use is significantly different from conventional drafting programs. In conventional drafting (either manual or computer assisted), various views of a part are created in an attempt to describe the geometry. Each view incorporates aspects of various features (surfaces, cuts, radii, holes, protrusions) but the features are not individually defined. In feature based modelling, each feature is individually described then integrated into the part. The other significant aspect of conventional drafting is that the part geometry is defined by the drawing. If it is desired to change the size, shape, or location of a feature, the physical lines on the drawing must be changed (in each affected view) then associated dimensions are updated. When using parametric modelling, the features are driven by the dimensions (parameters). To modify the diameter of a hole, the hole diameter parameter value is changed. This automatically modifies the feature wherever it occurs – drawing views, assemblies, etc. Another unique attribute of Pro/ENGINEER is that it is a solid modelling program. The design procedure is to create a model, view it, assemble parts as required, then generate any drawings which are required. It should be noted that for many uses of Pro/E, complete drawings are never created. A typical design cycle for a moulded plastic part might consist of the creation of a solid model, export of an SLA file to a rapid prototyping system (stereo lithography, etc.), use of the SLA part in hands-on verification of fit, form, and function, and then export of an IGES file to the moulder or toolmaker. A toolmaker will then use the IGES file to program the NC machines which will directly create the mould for the parts. In many such design cycles, the only print created will be an inspection drawing with critical and envelope dimensions shown.

The experiments we perform to simulate the results of parts drawing and the DT cap assembly with the help of PRO-E cad

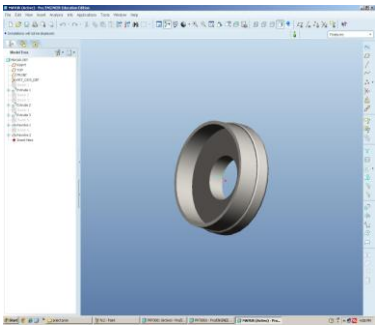

Fig 3: DT Cap Part 1

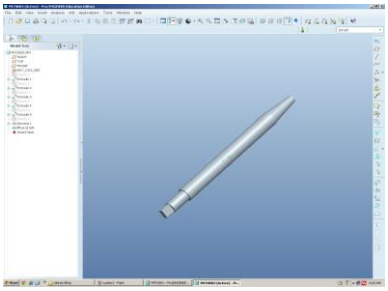

Fig 4: DT Cap Part 2

Fig 4: DT Cap Assembly

5. Conclusion

1. The company always needs the cost effective and improved quality products for the successful and secured future of the company which make him a land mark .The improved strength and the reduced rejections which is achieved by this project also drives the company for the secured and bright future with customer satisfaction.

2. The proper seem weld due to correct alignment of DT cap leads to reduced rejection at the time of welding.

3. The cost saving is done in terms of following possibilities -

a) Rework – "It is generally done on the rejected products for rework on them and give them fit for the use. " In this process the operators work efforts and time consumed which again leads with the cost.

4. The new tensile testing equipment's for the product are not installed yet they will be installed and the testing of the product would be easier afterword.

5. We will try to eliminate the MIG welding and replacing it with some alternative method of adjoins to provide the same strength.

ACKNOWLEDGEMENT

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