International Journal of Innovative Research in Science and Engineering
Vol. No.3, Issue 02, February 2017
www.ijirse.com
ISSN (O) 2454-9665
ISSN (P) 2454-0663

IMPROVEMENT IN WELDING FIXTURE FOR RISER FRAME OF SEATING ARRANGEMENT IN AUTOMOBILE VEHICLE

Tushar Arote[1], Vilas Bhorkade[2], Ganesh Burkul[3], Pallavi Sangle[4], Prof. Kunal S. Marathe[5]

[1,2,3,4,5] *Mechanical Department, LoGMIEER (INDIA)*

ABSTRACT

Seat is an important element in automotive vehicle which provides safety and comfort to the driver While assembly of seat child parts such as back frame, cushion frame, recliner etc. are assembled, some processes such as welding, bending, cutting, punching etc. are used. Proper assembly of all these parts gives satisfactory performance. So the aim of this project is to find out root causes behind variation occurred during assembly in order to save time & to reduce operator fatigue. We study some processes and devices Such as welding fixture, sequence of welding, sequence of tightening of nuts, method of loading and unloading of component, etc. Therefore we try to find causes of variations and prime aim is to reduce it.

Keywords-: Automobile, Assembly, Riser, Save Time, Welding Fixture.

I.INTRODUCTION

Riser is backbone of automotive seat that support the entire seat system. Riser frame consist of various child parts such as Front Bracket, Rear Bracket, Riser front Pipe, Riser rear pipe, Bush. Riser is the element which provides required height to mount cushion frame. Riser consists of two specially designed metal Brackets made by punching having varying diameter holes for mounting of sub-parts. Brackets are joined together by welding Pipes to it. Pipes having welded Clamps which helps to mount frame on riser. In order to manufacture Riser all parts mentioned above are load on welding fixture and hold in position by clamps and locators. MIG welding is used with copper coated mild steel electrode. After unloading, gauging is done. Final assembly is check for CD variation and twist. While gauging the Riser CD does not match with the Gauge CD. Hence it requires hammering and bending of riser to correct a dimension so that gauging is ok. This process of extra hammering may develops excessive stresses in weld zone and sometime may damages. Also this action takes more time hence contributes to additional cost. Aim of this project is to develop the new fixture that will overcome such problem and also minimize time of clamping and unclamping.

II.HEADINGS

ISSN (O) 2454-9665
ISSN (P) 2454-0663

1. Existing Fixture
2. Working of new Improved Fixture
   2.1 An air compressor
   2.2 Filter
   2.3 Regulator and Lubricator

III. INDENTATIONS AND EQUATIONS

3.1 Existing Fixture

Existing fixture is operated manually for clamping and unclamping. Fixture having locators, pins, clamps, support plates, etc. are operated manually and having no control over forces exerted. This may cause deformation of parts results in variation in frame. Clamping devices includes C clamps,locating pin, quick clamping, toggle clamp, elbow clamp. While welding all parts of riser are mounted in fixture then fix in position by manually operated clamps and locators after that welding is carried out. After complete welding all clamps are unclamped manually and riser is taken out. Same procedure is repeated.

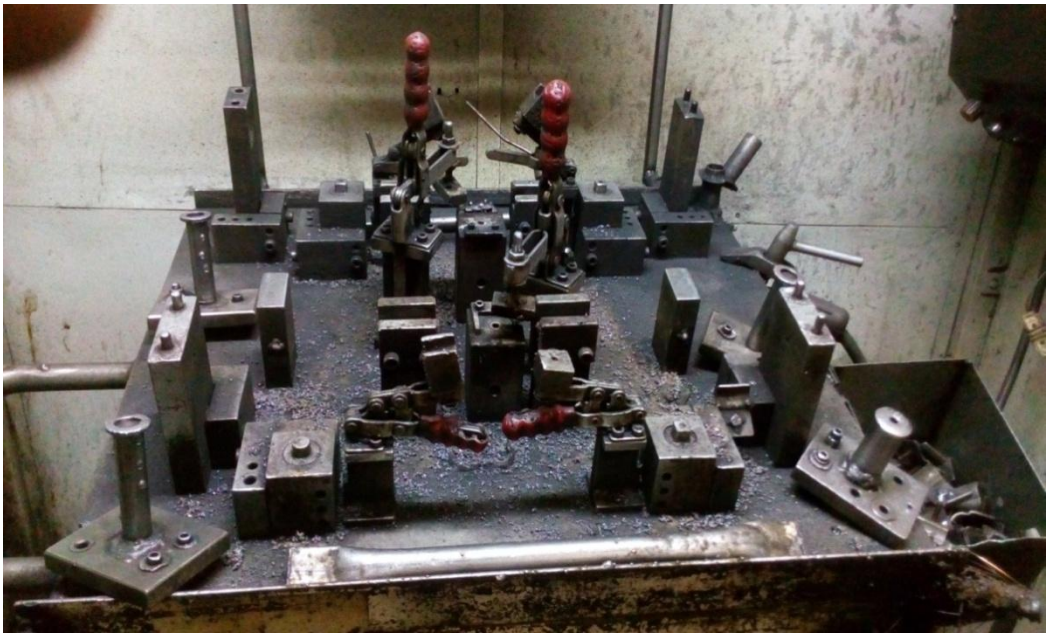

Fig.1 Existing Fixture

During clamping uneven pressure is created on parts that will cause deformation of weak zone of part and dimensions are fires out. Some clamps gets loose after continues use.

3.2 Working of new Improved Fixture

This fixture is Design in such way that both driver and co-driver risers can be produced. Pneumatic actuation clamping compressed air is used to actuate the Double acting cylinder. In this fixture manually operated clamping devices are replaced by pneumatically operated clamps. As load resistance increases speed of

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pneumatic devices drops and vice versa. Moisture in air causes rusting of pneumatic cylinders and valves which can be minimized by using lubricator. Pressure regulator can be used to vary system pressure. Air assisted hydraulic work holding, it is divided into three groups of components. First group of component is, the shop air system (6-12bar) provides power in the form of pneumatic pressure. Shop air(pressurized air) system consists of air inlet, filter/regulator/lubricator device, and the safety valve /release valve. The second group of component is hydraulic booster consists of booster, check valve, and manifold.

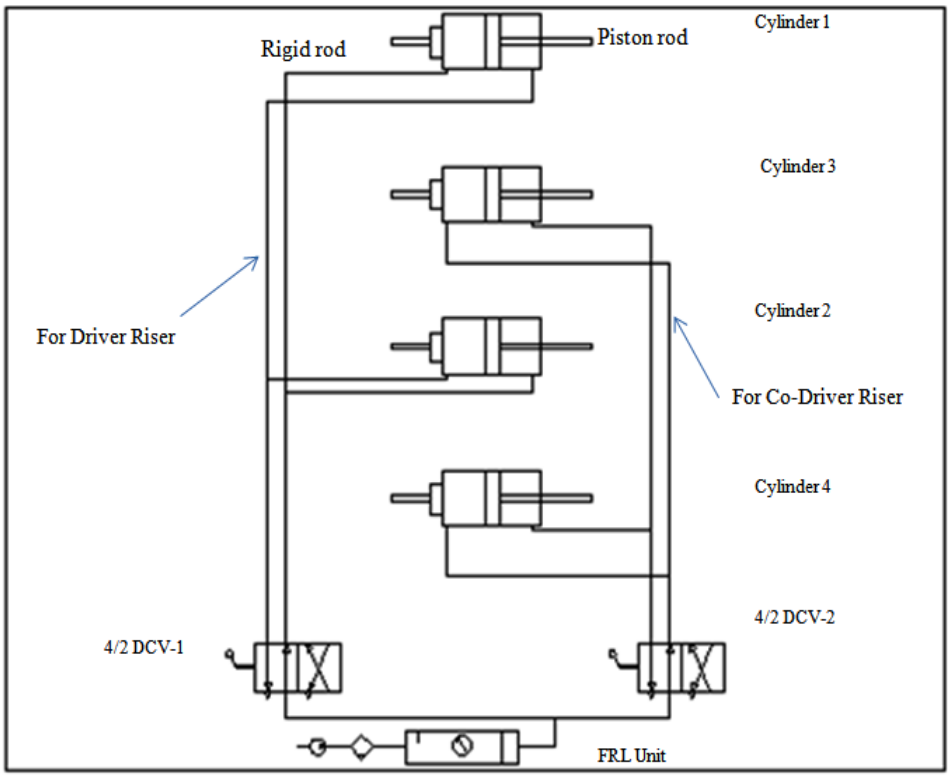

Fig. 2 New Improved Fixture circuit Diagram

The function of clamping system is to hold, position, and support the work piece. Atmospheric air is just used for boosting an actuator. Actuators are Double acting cylinders actuated by lever operated 4/2 direction control valve. Cylinder is mounted such that it having free motion along with axis during operation. At the end of piston rod clamp is connected and hinged at center so that it will act as a lever. Another end of clamp is used to clam the riser. On opposite side of piston rod rigid rod is attached to cylinder and same arrangement of clamping is made.

Position1

Air from DCV1 enter in inlet port of cylinder 1 and cylinder 2 simultaneously with same pressure. when Piston moves outwards Riser gets unclamped as ends of piston rod and rigid rod are attached to end of clamps.

Position 2

ISSN (O) 2454-9665
ISSN (P) 2454-0663

In second position air enter in outlet ports of cylinder 1 and cylinder 2 simultaneously with same pressure. In this case Piston moves Inward Riser gets clamped as ends of piston rod and rigid rod are attached to end of clamps.

3.2.1 An air compressor

It is a device that converts power into potential energy stored in pressurized air.Low-pressure air compressors, having discharge pressure of 150 psi or less is used.

3.2.2 Filter

Air leaving a compressor is hot, dirty, and wet which is harmful to compressor. Before air will be used it needs to be filter, regulate and lubricate. An airline filter cleans compressed air. It also traps solid particles such as dust, dirt. Separates liquids (water, oil) entrained in the compressed air. Filters is installed in the air line upstream of regulators, lubricators, directional control valves, and air driven devices such as cylinders and air motors. Selection of proper size of filter for any application should be done by determining the maximum allowable pressure drop, which can be caused by the filter.

3.2.3 Regulator and Lubricator

Air regulator regulates pressure of air. Lubricator is used to add lubricants in air so that no external lubrication is needed.

IV.FIGURES AND TABLES

International Journal of Innovative Research in Science and Engineering
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ISSN (O) 2454-9665
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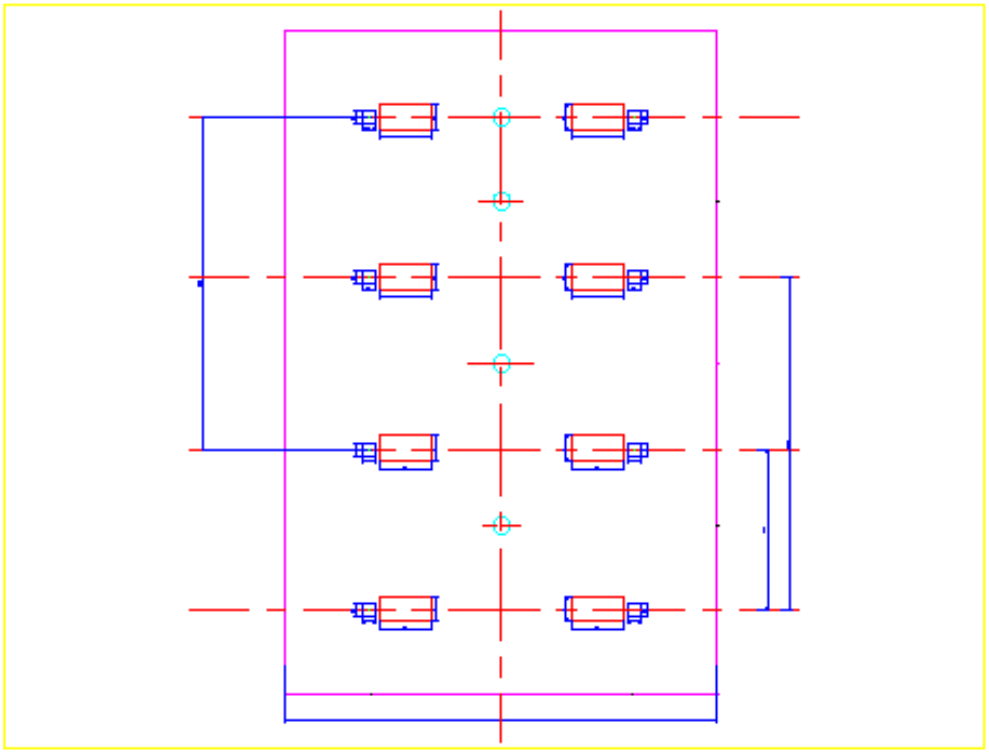
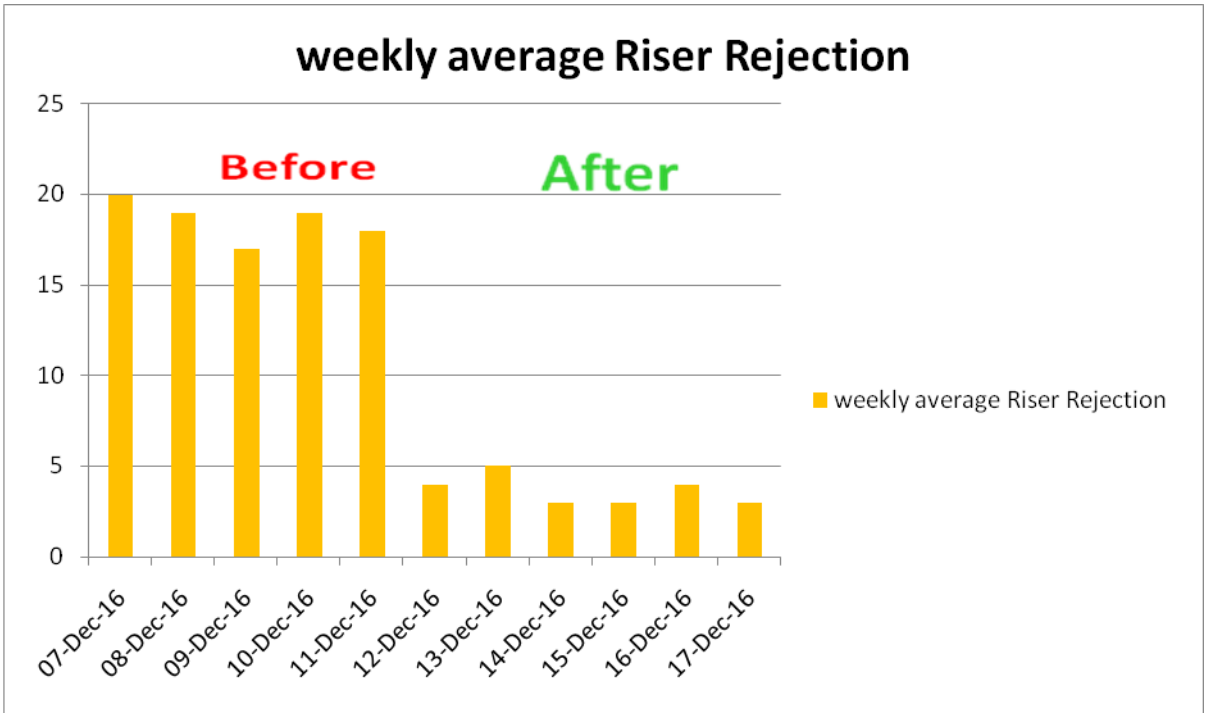


Fig. 3 Improved Fixture drawing

V RESULT



After action implementation level of Rejection 20% is reduced to 5%.

ISSN (O) 2454-9665
ISSN (P) 2454-0663

VI .CONCLUSION

Variations in Riser were found due to manual fixture clamping method. So the modification in fixture is suggested to minimize variation. Manually operated clamps are replaced by pneumatically operated clamps. It reduces unnecessary deformation of frame, product cycle time, dimensional variability, rejection, rework. It also saves time and money. Operators working become comfortable due to auto pneumatic clamping. Semiskilled operator can be assigned the work that reduces manpower cost. The modified fixture more economical to increase productivity and maintain quality. Rejection level is considerably reduced from 20 percent to 4 percent.

REFERENCES

[1] Mr.Vineet V. Gosavi and Dr. K. H. Inamdar, Analysis of Load Test Fixture Acting Under Static Loading Condition, *IJSR - International Journal For Scientific Research|Vol. 3, Issue 06, June 2014 ISSN (Online):2319-7064.*

[2] Charles Chikwendu Okpala, Ezeanyim Okechukwu C., The Design and Need for Jigs And Fixture in Manufacturing, *Science Reaserch 2015;3(4):213-219,ISSN:2329-0927(Online).*

[3] Shivaji Mengavade, Vaibhav Bankar, A Review on Design And Analysis of Work Holding Fixture,*International Journal of Engineering Research and General Science, Volume 4,Issue 2, March-April,2016,ISSN 2091-2730.*

[4] Parvesh Antil, Amit Budhiraja, A Case Study on Tool and Fixture Modification To Increase The Productivity and To Decrease The Rejection Rate in a Manufacturing, Industry,*International Journal of Advance Research in General Science and Engineering IJARSE, Volume no. 2,Issue no.9 , September2013.*

[5] Shailesh S. Pachbhai, Laukilk P. Raut, Design and Development of Hydraulic Fixture For Machining Hydraulic Lift Housing, *Int. J. Mech. Eng. & Rob. Res. 2014 ISSN 2278 – 0149, Vol. 3, No. 3, July, 2014. © 2014 IJMERR.*

[6] Mr. Mayur Muthe, Mr. N. K. Kamble, Study & Review Of Automotive Seating System, *IJSRD - International Journal For Scientific Research & Development| Vol. 2, Issue 06, 2014 | ISSN (Online): 2321-0613*

Books:

[1] V.B. Bhandari, *Design of Machine Element* (McGraw Hill, third Edition- 2010).

[2] D. V. Lohar, *Textbook of Industrial fluid power.*

[2] R. K. Jain, *Machine* Design (Khanna publication- 2013).