

A Research on Design of Die and Manufacturing of Hanger Welding Assembly

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ABSTRACT— In this paper, Hanger Assembly is mounted on leaf springs. Leaf springs are utilized as suspension as a part of trucks. The aggregate load of leaf spring mounting is on welding gathering as a result of that welding get together is more inclined to disappointment because of fluctuating load of trucks. This fluctuating load is because of uneven surface, uneven loading and over-loading of trucks. Hanger Assembly had high assembling cost. Because of disappointments, we changed the material, welding procedure and welding parameters. Hanger Assembly has 4 youngster parts. These Child parts are fabricated independently. After creation, these parts are gathered together to frame the required get together. An aggregate of 12 such gatherings are utilized as a part of trucks.

KEYWORDS— Hanger Assembly, Leaf springs, Fluctuating load, welding.

I. INTRODUCTION

The issue comprises of outlining a support for leaf spring mounting utilized as a part of trucks. This support is given with the assistance of Hanger Welding get together. Holder Welding Assembly is mounted underneath sham/label hub. This idea is being presented in India interestingly. Prior it was produced in China and after that sent out to different nations. Our point is to build up this item in India at low assembling cost.

Hanger Assembly is mounted on leaf springs. Leaf springs are used as suspension in trucks. The total load of leaf spring mounting is on welding assembly because of that welding assembly is more prone to failure due to fluctuating load of trucks. This fluctuating load is due to uneven surface, uneven loading and over-loading of trucks. Hanger assembly had high manufacturing cost. Due to failures, we changed the material, welding process and welding parameters.

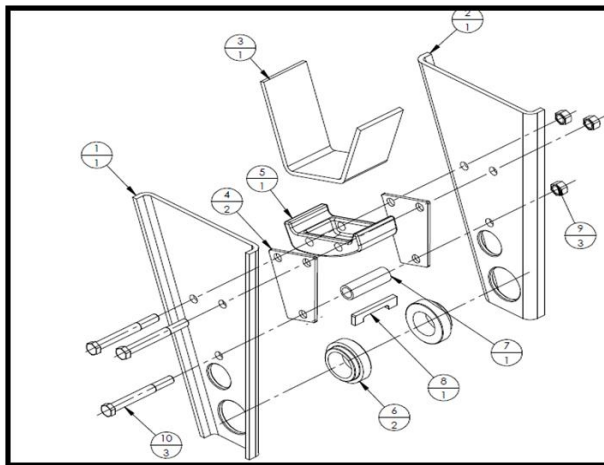


Fig.1 Front Hanger Welding Assembly PD900382

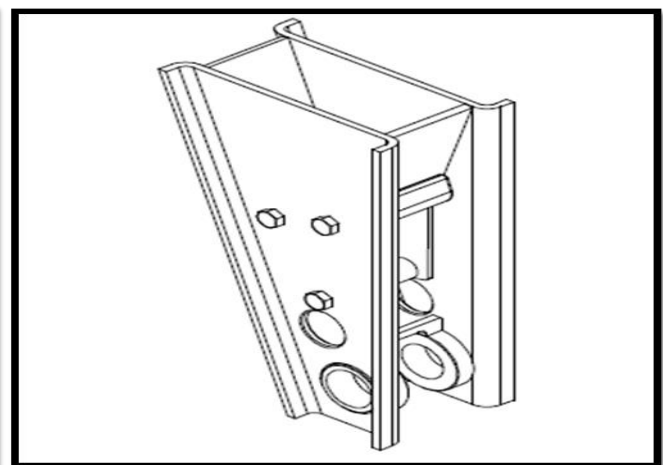


Fig.2 Isometric View

Hanger assembly has 4 child parts. These child parts are manufactured individually. After production, these parts are assembled together to form the required assembly. A total of 12 such assemblies are used in trucks.

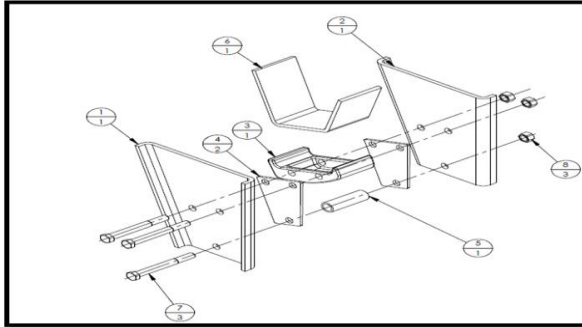


Fig.3 Rear Hanger Welding Assembly\PD900390

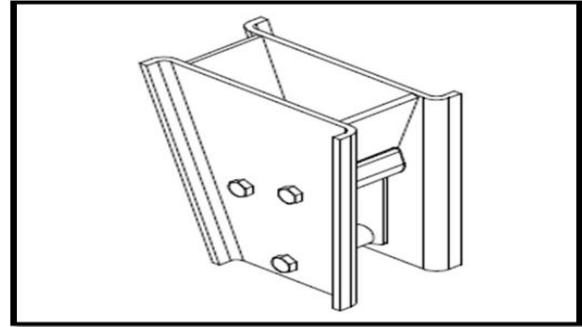


Fig.4 Isometric View

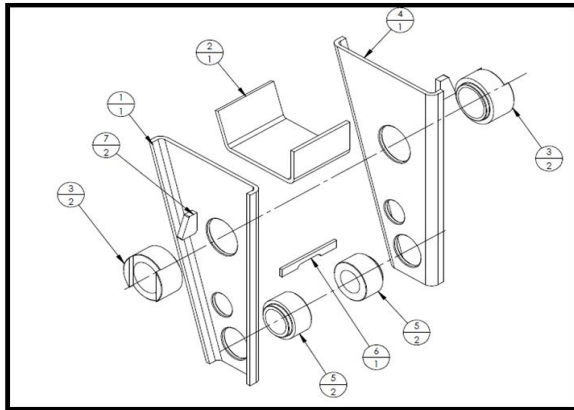


Fig.5 Equalizer Hanger Welding Assembly PD900392

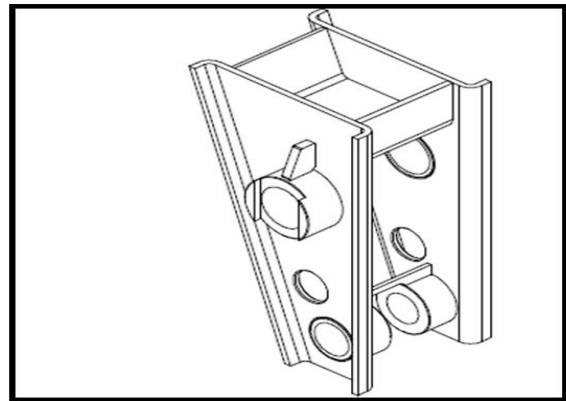


Fig.6 Isometric View

II. LITERATURE REVIEW

Assembling is a worldwide business that was begun amid the mechanical upset in the late nineteenth century to provide food for the substantial scale generation of items (Jovane et al., 2008). From that point forward, the assembling business has changed colossally through the advancements of innovation, procedures, materials, correspondence and transportation. As per Chryssolouris et al. (2008), the real test of assembling is to deliver more items with less material, less vitality and less work contribution. Keeping in mind the end goal to confront these difficulties, fabricating organizations must have system and focused need with the goal for them to contend in a dynamic market (Thun, 2008). As indicated by Skinner (2007), "an assembling technique is an arrangement of assembling strategies intended to augment execution among exchange offs among achievement criteria to meet the assembling undertaking controlled by a corporate procedure". It is the obligation of the top administration of the organization to guarantee that there is a reasonable assembling methodology and strategies got from inward and outside wellsprings of data to bolster the entire organization's central goal (Paiva et al., 2008). As per Miltenburg (2008), an aggressive quality of an organization depends on the basic and infrastructural preparation. There are four basic territories that are included limit, offices, innovation, and sourcing. The infrastructural ranges are workforce, quality, creation arranging, and association. As indicated by Swink et al. (2007), the organization must have a particular and vital objective in view of the 13 individual aggressive quality, so as to contend in the commercial center. Besides, as per Balakrishnan et al. (2007), the worldwide aggressiveness of financial assembling requires excellent items and low costs. This is because of element rivalry among the makers to secure their clients (Kost and Zdanowicz, 2005). Thus, the interest for top notch, minimal effort and ontime conveyance has expanded item assortment. Quality conformance forms accomplish decreased cost, higher profitability and higher notoriety in the worldwide market. As indicated by Amoako-Gyampah and Acquah (2008), quality methodology assumes a critical part in catching consumer loyalty that can conceivably prompt to expanded deals development and piece of the pie. They additionally included that, an organization which builds up a procedure to

accomplish volume and blend adaptability while keeping low expenses and high caliber will have the capacity to respond quicker to market requests lastly accomplish higher execution. A late review by Karim et al. (2008), uncovered that item quality and dependability has turned into the fundamental focused figure the worldwide pattern. As indicated by Stewart (2010), a lot of development sought after likewise removes center from quality with consequences of imperfections in completed items, for example, the case for Toyota Motor with coming about colossal costs (money related and notoriety) for the organization. The procedures examined above are identified with the assembling forms appeared in Figure 2.1. Contingent upon the way of business of an organization, the disintegration of assembling procedures is arranged as high volume, medium volume and low volume.

High Volume Manufacturing- High volume fabricating (otherwise called large scale manufacturing) includes creating items in vast amounts (Váncza and Egri, 2006). As indicated by Partanen and Haapasalo (2004), the term large scale manufacturing is utilized in light of the appeal rate of the specific item. Typically, for high volume fabricating, just little quantities of various items are produced by the organization. This sort of assembling is connected with long mechanical production systems where assembly line laborers or machines ceaselessly turn out a similar item a seemingly endless amount of time. There are two classes of high volume generation; amount creation and stream line creation as appeared in Figure 2.2. As indicated by Özcan and Toklu (2009), the conspicuous normal for a high volume generation is that operations are connected together in a mechanical production system. After culmination of one operation on an item, it moves straightforwardly to the following operation in the mechanical production system. The procedure is preceded until the last station in the sequential construction system where the completed item is normal.

III. DESIGN OF MANUFACTURING PROCESS

We are utilizing bite the dust and installations for various little parts. Every one of these parts shaped or machined separately and after that gathered together to frame the last get together. Pass on has fundamentally three parts in particular Upper Die, Pad or Holder and Lower Die. Crude materials are gotten and machined by processing, boring, crushing, machine, VMC, CNC Machine. After every one of the procedures, parts are sent for solidifying process. We are utilizing Dies, Assembly installations and Welding apparatuses for Hanger Welding get together. Every kid a portion of Equalizer Welding Assembly has distinctive assembling process. Every one of those procedures are make Equalizer youngster parts. These parts are welded together in Welding gathering. Fabricating Process like framing with the assistance of bite the dust, puncturing in pass on, trimming in pass on, welding-manual and also mechanical, turning, CNC turning, Hardening, Surface crushing and Spot welding are utilized for assembling of youngster parts. Welding Process, for the most part we are utilizing CO₂ MIG welding. In that we are utilizing CO₂+Argon (Ar) in proportion of 80:20 % individually. In that we are utilizing wire of breadth 1.2 mm to 3.2 mm. By keeping voltage and current in suitable proportion, we can keep up welding infiltration according to required detail.

Welding Penetration- Profundity of combination (otherwise known as "entrance") is the separation that combination reaches out into the base metal or past go from the surface liquefied amid welding. Demonstrates a cross segment of a filet weld, where the infiltration profile can be seen.

The welding variable that has the best impact on the level of weld infiltration is present (measured in amperage or amps). Simply, as welding current increments (i.e., more amperage), weld infiltration increments and as welding current reductions (i.e., less amperage), weld entrance diminishes. Delineates this point with three welds made at various current levels and where every other variable were held steady.

Dies- A kick the bucket is a specific apparatus utilized as a part of assembling businesses to cut or shape material for the most part utilizing a press. Like molds, bites the dust are by and large tweaked to the thing they are

utilized to make. Items made with kicks the bucket run from basic paper clasps to complex pieces utilized as a part of cutting edge innovation.

Assembly Fixtures- An installation is a work-holding or bolster gadget utilized as a part of the assembling business. Apparatuses are utilized to safely find (position in a particular area or introduction) and bolster the work, guaranteeing that all parts created utilizing the installation will keep up similarity and compatibility. Utilizing an installation enhances the economy of generation by permitting smooth operation and fast move from part to part, lessening the prerequisite for gifted work by disentangling how function pieces are mounted, and expanding similarity over a creation run. An apparatus varies from a dance in that when an installation is utilized, the instrument must move with respect to the work piece; a dance moves the piece while the device stays stationary.

Welding Fixtures- Settled Automation welding is frequently connected to welding hardware performing devoted developments on a weld joint that is very repeatable in shapes, for example, circle, circular segment and longitudinal creases. The welding machine frameworks can be adaptable and can be adjusted to a contrasting scope of weld mechanization application. The weld gear operations are typically settled to play out a fundamental geometric welding application. Welding position gear and machine frameworks are spine of settled welding computerization as a rule including welding machines, turn tables positioners, circle welders, and longitudinal crease welders. To address this issue, we outlined and built a model welding installation with upgraded portability. The standards of situating are the same for all weldments, extensive and little. Many organizations expands their aptitude in outlining and assembling of sheet metal welding apparatus, get together installation, checking apparatus, examination apparatus and take into account the prerequisites of a solitary apparatus to turnkey arrangement. They have skill in outline and assembling of manual, pneumatic, water driven apparatus alongside establishment and charging. With the assistance of advanced CAD and Simulation instruments attainability study is done comprehensive of weapon approach, weld study and line format. All apparatuses are approved and bolstered inside house CMM gear reports for record.

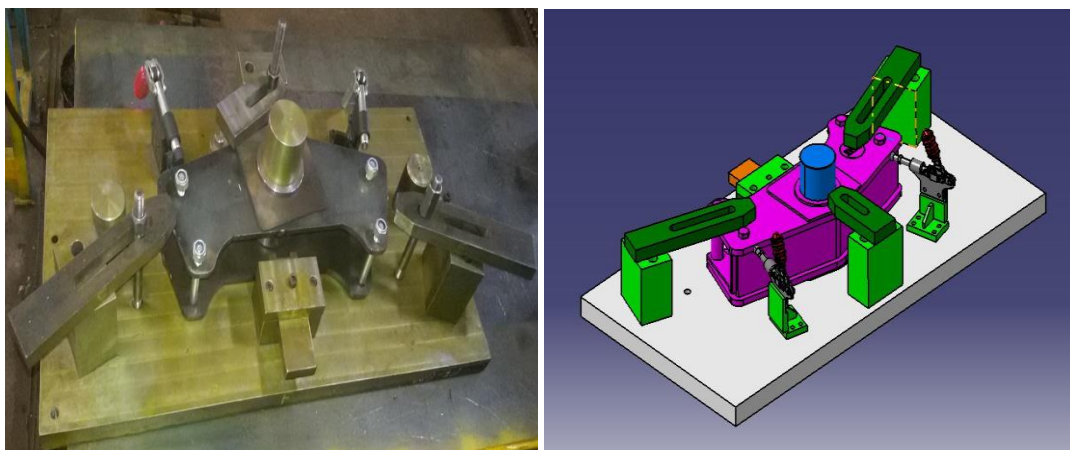


Fig.7 Actual Welding Fixtures

IV. RESULTS

1. We have successfully designed the die and manufactured the product.
2. The product has been manufactured at low cost.
3. Failure of leaf spring mounting has been considerably reduced by the product.
4. The product was tested and approved by ARAI, Pune.
5. The product has been manufactured for the first time in India.



Fig.8 Final Manufactured Product

V. CONCLUSION

In this paper, we have successfully designed this product first time in India by ARAI laboratory Pune at low cost by reducing failure of leaf spring. & in the future work Welding process can be done by fully automatic robotic machine rather than semi-automatic machine. Material input weight can be minimized by optimization of child parts material. Total cost of product can also be further reduced by optimization of child parts material.

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