

# IMPROVEMENT IN THE DESIGN OF THE FIXTURE AND PATTERN

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**Abstract** - The Moto of this paper is to show how the improvement in the design of the skirt fixture and the change in the pattern were made, so as to meet the requirements. [1] By making some minor changes in the design of the pattern, a new masterpiece can be developed and through that further production can be made. Also by changing the design of the skirt fixture, the fitment of the skirt on the fixture was much easier. [2]

**Key Words:** pattern, fixture, skirt, fitment, part, etc.

## 1. INTRODUCTION

A pattern is a replica of the object to be made. Patterns used may be made of wood, metal, plastics or other materials. Patterns are made to exacting standards of construction, so that they can last for a reasonable length of time, according to the quality grade of the pattern being built, and so that they will repeatedly provide a dimensionally acceptable casting. Molding is the process of manufacturing by shaping liquid or pliable raw material using a rigid frame called a mold or matrix. [3] This may have been made using a pattern or model of the final object. A mold or mound is a hollowed-out block that is filled with a liquid or pliable material such as plastic, glass, metal, or ceramic raw material. [4] The liquid hardens or sets inside the mold, adopting its shape. A mold is the counterpart to a cast. The very common bi-valve molding process uses two molds, one for each half of the object. Piece-molding uses a number of different molds, each creating a section of a complicated objects. This is generally only used for larger and more valuable objects. The part is then made of the exact same shape and size that of mold. After removal from the mold, final part is obtained. The second case study was manufacturing of the skirt gauge fixture for the CNH part skirt. [5]

### 1.1 LITERATURE REVIEW

- It is the pattern of A/C gas charger of Manatec-Pondicherry. The following are the features of the part: LCD Monochrome display
- Suitable for Cars & LCVs
- Fully Automatic machine (Recovery, Recycling, Vacuum, Leak test & Recharging)
- Filter in recovery line to eliminate humidity & acidity
- Manual air purge from refrigerant tank

- Automatic High pressure protection for Compressor
- Dedicated gauge for Inlet pressure
- Audible indication / alarm
- Caution & error message / prompt
- Self-diagnosis for checking the fitness of the machine
- Check valves to facilitate Quick, easy & safe servicing
- Vehicle data base (up to 500 vehicles)
- Software update through USB interface
- Vehicle data update through USB interface
- Thermal printer to print Refrigerant Recovery & Recharge report
- Heater for Refrigerant bottle

CNH is a one of the world's largest capital goods companies, registered in the Netherlands with corporate offices in London. Their products are as follows as:-

- Agricultural Equipment
- Construction Equipment
- Trucks and Commercial Vehicles
- Buses, Special Vehicles
- Industrial and Marine Power trains [5]



### 1.2 PROCESS DETAILS

The process of making the final part of the front cover, rear and side cover of this A/C gas charger machine involves making of pattern and mold, then the final part is made. The pattern is made by the CNC Router machine. After the pattern is made by the CNC, it is surface finished by hand process. The pattern is then further used for making the mold. The mold and pattern is the exact replica of the final part that is to be manufactured. For making the part, glass mat of 450 GMS is used, with the help of resin it is attached to the mold until it gets dried up. After it gets dried up, the final part is removed from the mold.

### 2. PROBLEM IDENTIFICATION

As the final part was checked on the fitment, the part was falling. The arrow indicates from where the part was falling. Since in the FRP parts, overall part is manufactured together. Two different parts are not manufactured and then joined. Because the overall part is manufactured together, there tends to be some dimensional inaccuracy from the edges of the part, which results in falling of the part on the fitment.



Fig -1: pattern of the part

### 2.1 PROBLEM SOLVING

To rectify the problem a new masterpiece was manufactured in which all the edges from the corner were corrected. After the manufacturing of masterpiece, the parts were checked and all were coming ok. This is how the problem was corrected. Another solution to this problem that was suggested is that, two different molds were to be made i.e. upper mold and lower mold and then

making two different parts from it, thereby attaching them together later. But the first suggestion was the best to make the new masterpiece.



Fig -2: masterpiece of the part

### 3. PROCESS DETAILS

The pattern of the skirt is made. After that the mold is made and through it the FRP part is made. The design of the skirt fixture was made to check if all the slots qualify or not as per the requirement. The design of the fixture was very complicated, making it hard for manufacturing it and checking it. The Quality Head changed the design of the fixture such that, the new design was very easy. The new design had very few pipes for checking the skirt part and was easy to manufacture and check the part. The design and manufacturing of the fixture was such that, the part could be easily checked and was qualifying as per the requirements.



Fig -3: finished parts of skirt

### 3.1 PROBLEM IDENTIFICATION

The design of the skirt fixture that was designed was very complicated, such that it was unable to manufacture and fabricate the fixture according to the design. The design proposed was very hard to understand and fabrication of it was becoming very hard.



**Fig -4:** fixture of the skirt

### 3.2 PROBLEM SOLVING

As the Quality Head was working on this project, it was getting tough to understand the design of the fixture and fabricating it. So the Quality Head decided to change the design of the fixture such that, there would be less no. of pipes involved in the manufacturing of the fixture and also the part would qualify with ease. After the design was changed, the part was qualifying easily in the fixture also fulfilling the requirement.



**Fig -5:** fitment of the skirt on the new designed fixture.

### 4. CONCLUSIONS

As in the manufacturing industry, there can be some cases in which the part, gauge or the fixture may not be according to the requirement or may be hard to fabricate according to the design. During that time decision must be taken whether to change the design, or make some changes in the manufacturing process so as to meet the

desired results. Such decisions are taken in the manufacturing industries.

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