

Cycle Time Reduction & Quality Improvement for Manufacturing Manifold of Power Pack Assembly

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Abstract

Manifolds maintain the flow of a system or line in processing applications. Instrumentation manifolds are key components when customizing your process line. Other valve types, like needle valves and check valves, with the same threaded connections can easily connect to them. Hydraulic manifolds are typically made using machining processes such as milling, drilling, and turning. Overall, the machining process for hydraulic manifolds requires specialized equipment and expertise in CNC programming and machining techniques. The process is critical for ensuring the proper function and reliability of the hydraulic system.

Keywords: *Cycle Time Reduction, Power Pack Assembly, Quality Improvement, Hydraulic Manifolds*

INTRODUCTION

Hydraulic manifolds are typically made using machining processes such as milling, drilling, and turning.

Here is a brief overview of the machining process involved in making a hydraulic manifold:

a. Material selection

The first step in the machining process is selecting the appropriate material for the manifold. Common materials used for hydraulic main folds include aluminum, brass, steel, and stainless steel.

b. Design and programming

Once the material has been selected, the design of the manifold is created using computer-aided design (CAD) software. The CAD file is then used to create a computer numerical control (CNC) program that will be used to guide the machining process.

c. Roughing

The first stage of machining involves removing the majority of the material from the work piece. This is done using a mill machine programmed to cut the work piece to the required size and shape.

d. Drilling

After the roughing stage, the manifold is drilled using a drilling machine. The drilling machine is used to create holes for the hydraulic fluid to flow through. The size and location of the holes are specified in the CNC program.

e. Finishing

Once the roughing and drilling stages are completed, the manifold is finished using a turning machine. The turning machine is also used to create a smooth surface finish on a manifold, which is important for ensuring proper

operation of the hydraulic system.

f. Inspection

Finally, the finished manifold is inspected to ensure that it meets the required specifications. Any defects or deviations from the design are corrected, and the manifold is ready to be installed in the hydraulic system.

LITERATURE SURVEY

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Proposed Methodology

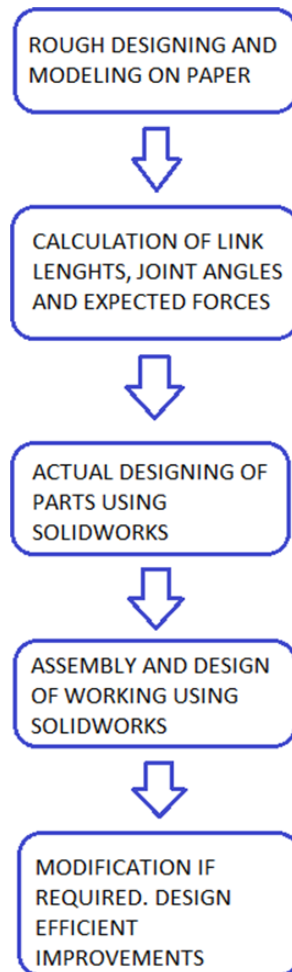


Fig: Methodology of Project

Study of Process and Material

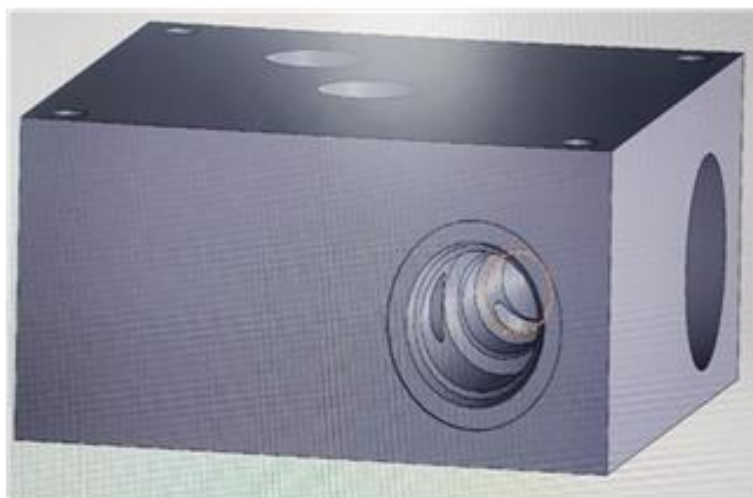


Fig: Mainfold Component_1

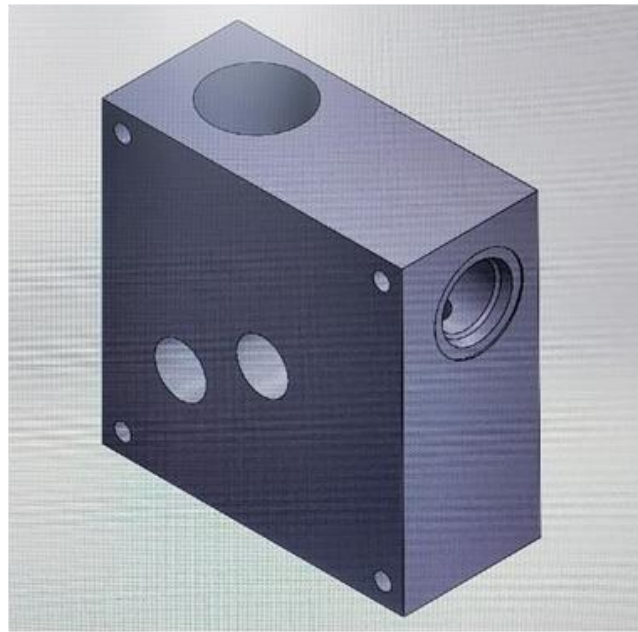


Fig: Mainfold Component_2

- Study of idel time
- Study of material
- Study of tool ware and tool life
- Process timing production rate
- Where time reduction can be achieved
- Material machining cost
- Factors affecting on quality

Testing of Materials

- Material grades can be changeable
- Higher quality tooling and effect on material
- Tooling life and ware
- Effective time method or not
- Rate of production is increased or not
- Cycle time

Quality and Time Analysis

- Surface finish
- Tooling accuracy
- Time to be saved

FUTURE SCOPE

1. **Automizing** – By using automatic fixture we can save much time.
2. **Feedback system** – For achieving high accuracy itself by machines.
3. **Non-traditional advance machining** – Use of laser cutting or other advance cutter can also reduce time and increase accuracy.
4. **Use of sensors** – For getting quick assurance of accurate machining we can increase use of sensors.

CONCLUSION

We get low tool breakage by changing the material of tool i.e. HHS TO carbide so we get lower timing for resharpener & tool changing As we minimized much time of milling by performing milling in one stroke as earlier it requires two strokes of milling & that's why more timing to perform it Also we cancelled the milling of sixth set up so this helps us to reduce cycle time also Overall due to changes of tool for the process the cycle time required for the process has got reduce and increased the production rate and had high quality surface finish also increased the life of tool the wear rate decreased.

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