Designing and Development of Product with Lean Manufacturing

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Abstract— This paper gives the general introduction to the arrangement, design and some basic concept of designing the die. CAD plays an important role in this type of die design. Some losses due to design parameters are also discussed. To meet the requirements of low cost, good performance and manufacturing feasibility. This paper will provide a design overview of the die designing, main characteristics, key subsystems and control strategies. This gives better understanding about working principle of lean manufacturing to avoid the un-necessary operation and minimise the waste materials. Effect of design consideration can be further studied during its application in various conditions. In the CAD model actual design has also been explained. The design approach is in the way of improving the efficiency of manufacturing efficiency. Lastly there is the solution given to the analysed error. Advantages, disadvantages and various practical applications are also discussed.

Key words: Die, Lean Manufacturing

I. INTRODUCTION

A. Background

This paper also examines the drivers and barriers that influence the implementation of lean manufacturing. The findings show that most of the respondent firms are classified as in-transition towards lean manufacturing practice. Service organisations are now pursuing lean thinking and actively deploying lean principles. One part is using clip function and another part is using tick function. In the computer-aided design (CAD), two plastic parts were drawn in 3dimension (3D) view by using Pro-Engineer (Pro-E) parametric software. These firms believe that the factors that drive the implementation of lean manufacturing are the desire to focus on customers and to achieve the organisation's continuous improvement. In the computer-aided manufacturing (CAM), Pro-Manufacturing from Pro-E parametric software was used to develop the Machining program.

B. Literature Review

The concept of LM was pioneered by a Japanese automotive company, Toyota, during 1950's which was famously known as Toyota Production System (TPS). The primary goals of TPS were to reduce the cost and to improve productivity by eliminating wastes or non-value added activities. During 1980's there was an intense interest on LM implementation among the western manufacturers because of growing Japanese imports. It became a serious concern to the western producers. After the oil crises in the early of 1990's, in a published book named Whereas, Operations strategy is the total pattern of decisions which shape the long-term capabilities of any type operation and their contribution to overall strategy, Slack and Lewis (2002). Firms and companies which focus is on the production of goods use to refer their operations as Manufacturing. Thus, Manufacturing Strategy (MS) comprises a series of decisions concerning process and infrastructure investments of a production firm, i.e. what the manufacturing has and what it does. It aims to provide the necessary support to develop strategic competences, which will enable the company to develop a sustainable competitive advantage in its markets. Competitive advantages that might be considered as qualifiers (Q), those that get and keep the company in the marketplace or as order winners (OW), and those that let the company win orders in the marketplace, Hill (2000).

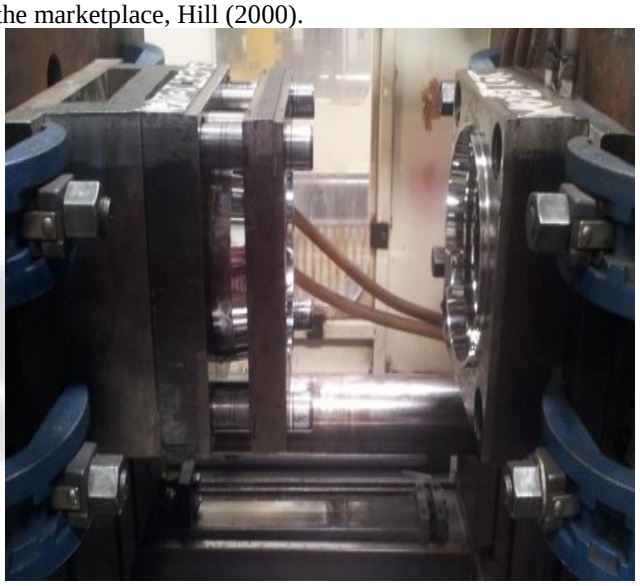

Fig. 1: Components

C. Materials

Sr.no.	Raw material	Drying temp.	Time
1	PE, PP	80 ^{0}c	2 hr
2	PS	82 ^{0}c	2 hr
3	Acrylic ABS,AS	82 ^{0}c	2 hr
4	Cellulose series	71 ^{0}c	3 hr
5	Poly carbonate	120 ^{0}c	3 hr
6	Hylon	82 ^{0}c	2.5 hr
7	PVC	71 ^{0}c	1.6 hr

Table 1: Material

D. Components of Injection mould Die

- Cavity
- Cavity back-up plate
- Core
- Core back-up plate
- Stripper plate
- Ejector plate
- Ejector pins
- Bottom plate

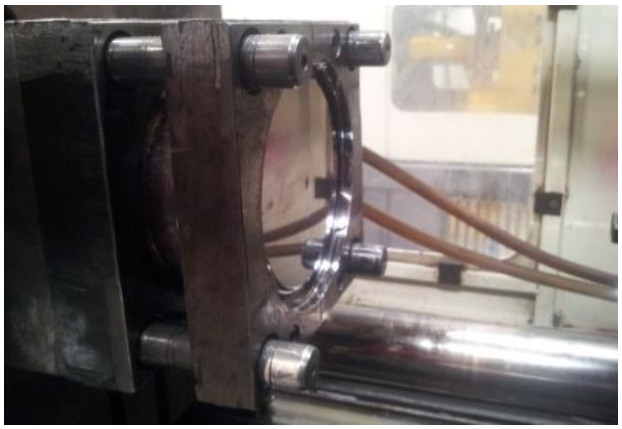

Fig. 2: Components

II. DESIGN OPTIMIZATION

Now a days, the technology of the tool and die fabrication in plastic injection is one of the world's fastest growing industries. Plastic is now used in almost every application, ranging from house hold articles to space travel, from transportation to packing, from medicine to toys, from bridge building to sports. Generally, injection moulding is a process that forms the plastic into a desired shape by melting the plastic material land forcing the plastic material under pressure into the mould cavity. The shape of the Plastic that is desired is achieved by cooling in thermoplastic or by chemical reaction for thermosetting.

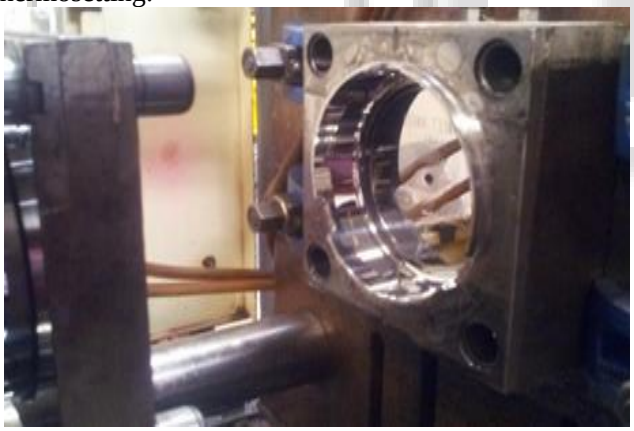

Fig. 3: Design

III. LEAN WASTES

A. Different kinds of wastes in a process are categorized in following categories.

- Overproduction
- Waiting
- Unnecessary Transport
- Over processing.
- Excess Inventory
- Unnecessary Motion
- Defects
- Unused Employee Creativity

IV. LEAN THINKING

A. Five Step Approach:

- Find a change agent.
- Find a sensei (to get the knowledge.)
- Seize or create the crisis.
- Map your value streams.
- Get started on creating better value streams.

But…how do lean leaders lead this process?

V. RESULT

This study analyzed the existing state of manufacturing and testing the medical devices in batches. An implementation plan was developed to implement lean manufacturing principles to support one-piece flow. The plan was implemented and the results of the implementation resulted in improved productivity and resulted in a reduction in work-in-process.

VI. CONCLUSION

Manufacturers are under intense, remorseless pressure to find a new ways to production cost, elimination of waste, enhance high quality of product, increase the productivity, and better customer satisfaction through the implementation of lean traditional manufacturing practices are indicated inadequate representation in lean Manufacturing. This project manufacturing implementation in manufacturing industries. Hence, appropriate lean education, training, and research setup in association with manufacturing industries are to stimulate the lean awareness and technologic in all type of manufacturing industries. This helps to industries and researchers create awareness about Lean Manufacturing opt suitable lean practices for implementation, continuous in the competitive environment of current scenarios. There is our final product is decided according to which we have calculated only overall cost which will be up to 32000-35000 rupees.

A. Designs in 3D

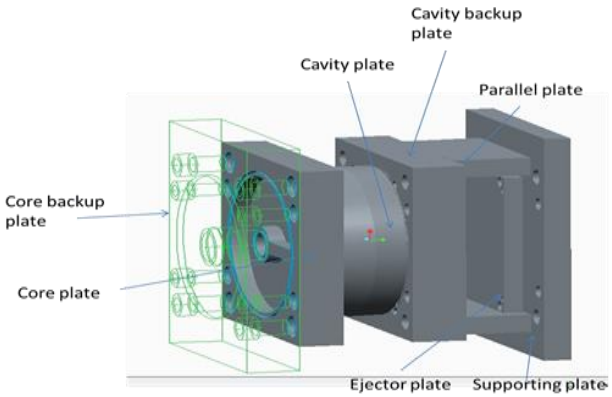

Fig. 4: Design in 3D

VII. FUTURE WORK / SCOPE

This is a general decision methodology, which can be adapted and enriched with the information of a firm, and according to its specific needs. Also, as new alternatives and techniques come out, they can also be considered in this framework. There are some alternatives that can be adapted to combine different production processes, e.g. using a focused facility it is possible to have separate production processes for different products. But it wasn't found any framework including different alternatives, or any proposal

for deciding which one to use. As the existing theories and proposals do not seem to be enough, it was necessary to propose a solution for the problem of deciding a manufacturing strategy for products with different life cycles. A solution for this decision problem was already proposed and explained in the present paper. Now the question would be to apply the proposed methodology in real cases, in several companies, and evaluate the results.

ACKNOWLEDGEMENT

First of all we thank the almighty for providing us with the strength and courage to do the research study.

We avail this opportunity to express my sincere gratitude towards our guide Prof. Aswad Sagdeo of mechanical engineering department, for permitting us to do the research study. We also at the outset thank and express our profound gratitude to our guides for their inspiring assistance, encouragement and useful guidance.

We are also indebted to all the teaching of the department of mechanical engineering for their cooperation and suggestions, which is the spirit behind this report.

Thanks to all our seniors who gave us the information and basic important knowledge about the topic.

Our best regards go to all my colleagues for their pleasant cooperation last but not the least, we wish to express our sincere thanks to all our friends for their goodwill and constructive ideas. .

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