

**SARVESH ENGINEERING**

**PRESENTATION ON PROCESS OPTIMIZATION  
OF  
INJECTION MOULDING PROCESS.**

## **PROCESS OPTIMIZATION\_INJECTION MOULDED PRODUCTS.**

Process optimization is the implementation of structured methods, strategies, disciplines and tactics to improve a specific process within the parameters of a project or initiative.

Process optimization is a scientific process of setting the mould parameters to achieve the optimized performance in terms of –

- Weight,
- Overall quality,
- Cycle time,
- Various speeds and pressures,

When optimizing a process, the goal is to maximize one or more of the process specifications, while keeping all others within their constraints. This can be done by using a software, discovering the critical activities and bottlenecks, and acting only on them.

Process optimization increase the productivity and produce the component at a minimum cost, there by increasing profitability.

The most common goals of process optimization are minimizing cost and improvement in productivity.

**Process optimization** is a composite of steps –

- Identifying – identify the process that need to undergo optimization.
- Reconsider – if there is a better way to perform the process.
- Implement – this refers to the application of process in a new and more efficient manner, analyse the results and make adjustments if any required.
- Automate – this refers to automating the process to achieve the benefits from automation like cost reduction, improved reliability, higher productivity etc.
- Monitor – This refers to monitoring the process after successfully integrating it.

## **Benefits of process atomization –**

1. **Reduced risk** – Implementing a method successfully can reduce the risk of leaving an inefficient process unchanged.
2. **Creating more consistency** – Improving the consistency of a process ensures that you're able to remove redundancies.
3. **Improving quality** – An optimization is really useful for improving quality of process, project or work flow.
4. **Streamlining operations** –Streamlining operations is primary benefit of optimization method, ensuring transition through little or no disruptions. This makes easier to perform in a unified and collective manner.
5. **Improving resource management** – Optimization help preserve the scares resources, and reallocate them to better purpose and uses.
6. **Savings money** – If implemented successfully optimization method increases the revenue and financial gain.
7. **Increased productivity** – Process optimization increases the overall productivity by eliminating the inefficient process.

## Process of optimization –

Fundamentally, there are three areas that are addressed to affect optimal performance.

- **Equipment optimization** – Existing equipment is used to its fullest advantage by examining operating data to identify equipment bottlenecks.
- **Operating procedures** – Operating procedure may vary from person to person or from shift to shift. Operating procedure is simplified and standardized for individual mould and saved on the machine.
- **Control optimization** – In a plastic processing there are many control loops responsible for process. Each control loop is responsible for controlling one part of the process, such as maintaining a temperature of mould.

If the process runs below its optimum level it will be more expensive to operate, and the equipment life may also be at stake.

Process optimization some times require automation or up-gradation of equipment at additional investment.

Process optimization in Injection moulding industry targets 5 M, man, machine, materials, Moulds, & Method. If these areas are optimized it gives the best quality product at minimum cost.

**The process optimization has shown enlisted encouraging results –**

- 1) Cycle time reduction of average 10% plus on all the moulds. Minimum Cycle time reduction is 10 % and maximum 21.05%.
- 2) Improved productivity on all moulds.
- 3) Improved Aesthetics and quality of product, No shrink marks.
- 4) Savings In the energy consumption per cycle.

Reduction in cycle time, reduction in energy consumption and higher productivity with improved quality minimizes the cost of the production and there by add on to profit margins

Injection mould is an important and critical area in Injection moulding.

Following points to be considered for optimisation of Mould –

- Materials to process,
- Throughput required per day,
- Mould design & life expectancy,
- Cooling/heating channel design,
- Materials of construction, and built quality,
- Surface treatment,
- Product removal automated/semi automated or manual.

### **Third party mould validation –**

Once the mould design is freeze and mould is developed it is necessary to validate the mould preferably by a third party, to ensure the mould will run in plant without any difficulty to give the desired throughput and quality.

### **Preventive maintenance of mould –**

In order to ensure the trouble free operations, preventive maintenance and upkeeping of mould is extremely important. If the maintenance is plan too frequent it increases the maintenance cost as well reduces the availability of mould. On other hand if the maintenance is not adequate it may under go breakdown disturbing the production schedules and diverting attention to fire fighting to set the mould right and bring in production. Preventive maintenance is extremely important in hot runner moulds.

## **Injection machine –**

During process optimization Injection moulding machine plays an important role.

Machine should have adequate clamping capacity, Injection capacity, and multi stage controls.

Machine maintenance, wear and tear on screw barrel/Plunger, quality of hydraulic oil, etc. is also important considerations.

In case of insert moulding/automated product removal machine needs the adequate in-put and out-puts on control system.

For mould optimization setting up the process parameters to the exact level is extremely important.

Arriving at the particular parameters is assisted by the soft ware

## PHOTOGRAPH OF SOME OF THE OPTIMIZED PRODUCTS –



## **Brief introduction --**

Mechanical engineer backed up with post graduation in Marketing and Production management (two main subjects simultaneously).

By virtue of job having hands on experience on mechanical, hydraulic, pneumatic systems, automation, LT power generation, and distribution, RE power generation etc.

Having wide experience of about 47 years (22 years plus over seas) in industry of repute.

Last assignment in India Managing director of BERICAP India Pvt Ltd. a German MNC, having 21 manufacturing plants world wide, 2 inhouse R & D centres and tool development centres.

Nominated member of Kenya Bureau of standards – (Plastics and rubber), for setting up the standards for country.

Executed more than 25 projects successfully in Kenya, Tanzania, Nigeria, South Africa, Kuwait, and India.

First fully automated PET bottle recycling project of 1 TPH capacity started in 2010, at Patalganga.

First fully automated Woven sack recycling project of 1 TPH capacity (100% EOU) started in 2011 at Kandla.

Well experienced in Injection moulding, Blow moulding, Film Extrusion, profile extrusion, Rotational moulding, Stretch blow moulding, Injection stretch blow moulding, etc., Renewable power generation, etc.

Well experienced in multicavity balanced hot runner/cold runner mould design, development and maintenance.

Owner of 8 no Intellectual property (IP – Design registration)

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