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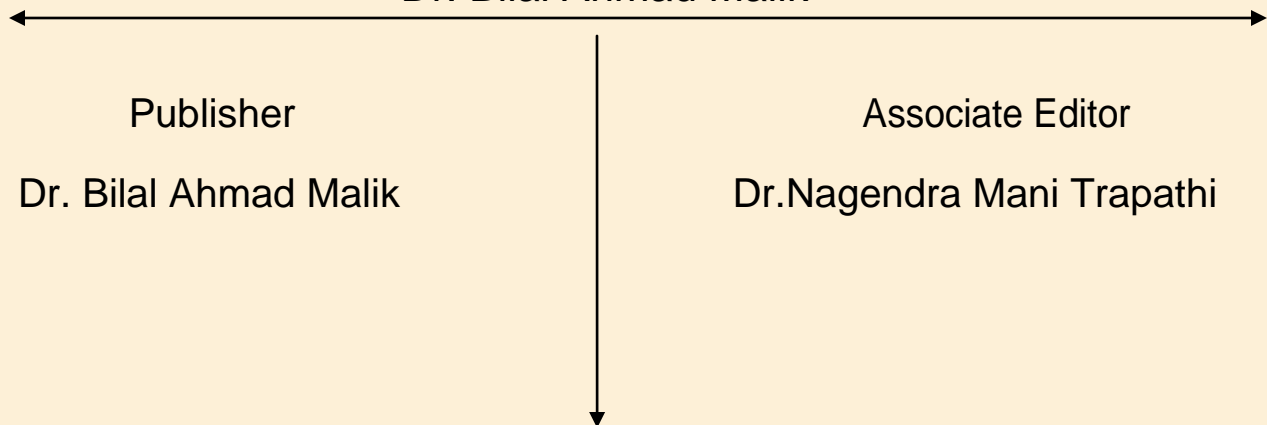
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DESIGN OF FIXTURE WITH SLIDING MECHANISM

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Abstract— *In conventional method, fixture designed is half the requirement and extra work has to be done to lift the fixture, also it takes more cycle time for the process.*

In this paper, we have developed a new fixture with sliding mechanism, where the fixture slides along the guide ways having linear motion.

The major advantage of this project is, the manual efforts required to lift the fixture are minimized and also cycle time is reduced.

Keywords— *Fixturer; Guideways; sliding mechanism.*

I. INTRODUCTION

The crucial components in a compression moulding machine are fixture and die of which fixture is used

to remove the product out of the machine. In this project fixture is designed for a better outcome.

The process starts with raw material being put in die, the process takes a while and at the end, the product formed requires fixture for removal. Fixture with maximum capacity of product removal is designed in this project. With existing fixture sixteen products are removed in one shot using the fixture twice i.e. it removes eight products only at a time. Fixture is designed such that it can remove sixteen products at a time. Increasing the productivity and reduce the cycle time required for process.

In addition to this, fixture is employed with sliding mechanism minimizing the labour efforts of manually handling the fixture. With the newly designed fixture the overall productivity is increased and also the efficiency is increased.

II. EXISTING METHOD

The existing fixture of compression moulding machine that removes 16 products using the fixture twice costs around 2800 rs. In a shift of 10 hrs around 60 to 65 shots of products are taken out, each shot containing 16 products. For each shot the time required to manually remove the products is 140-150 seconds. Using the fixture twice doubles the cycle time. According to the results the no. of products obtained in 3 days are 1024 in day1, 976 in day2, and 960 in day3. Averages of 986 products are obtained in a day.



Existing Fixture

III. PROPOSED METHOD

The proposed fixture of compression moulding machine that removes 16 products at a time costs around 9800 rs. In a shift of 10 hrs around 80-85 shots of products are taken out, each shot containing 16 products. For each shot the time required to remove the products is around 45-50 seconds. Due to sliding mechanism employed with the fixture the

time required to remove products is reduced to 3 times lesser than the existing fixture. According to results the no. of products obtained in 3 days are 1344 in day1, 1312 in day2, 1280 in day3. An average of 1312 products obtained in a day.



Proposed Fixture

IV. DESIGN OF FIXTURE WITH SLIDING MECHANISM

The proposed fixture is employed with sliding mechanism for easy handling. Fixture is designed in such a way that it slides in and out of machine beneath the die as per the requirement, so that the product removal becomes easier. The fixture and guide way is designed as a single unit. The designing is done in CATIA. The newly designed fixture has following specifications.

To permit accurate linear relative motion between two machine members, linear motion guides are used. They are frictionless, noiseless and vibration free.

There are two parts of linear motion guide –

1. Linear motion bearing carrying
2. Linear motion shaft or rail

They are classified into 3 categories:

- Sliding contact- Thin lubricating film sliding contact
- Rolling contact - hydro-static sliding contact guides
- Magnetic field

For the above fixture rolling contact guide way is used because its coefficient of friction is less or equal to 0.01, its life estimation is easy, operation is efficient in high speed.



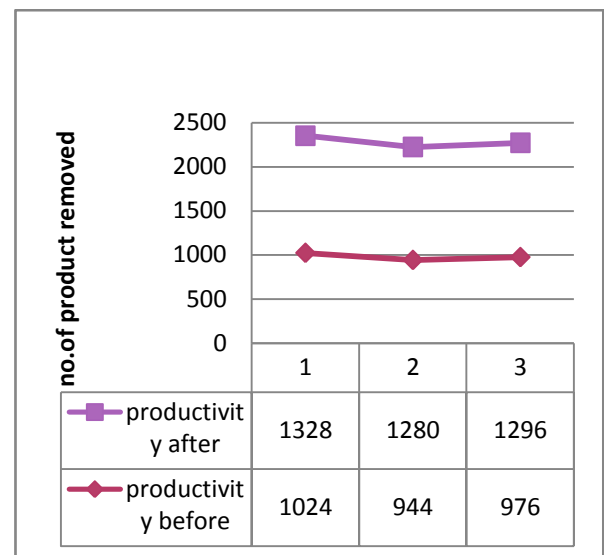
Rolling Guide Way

V. OBSERVATIONS:

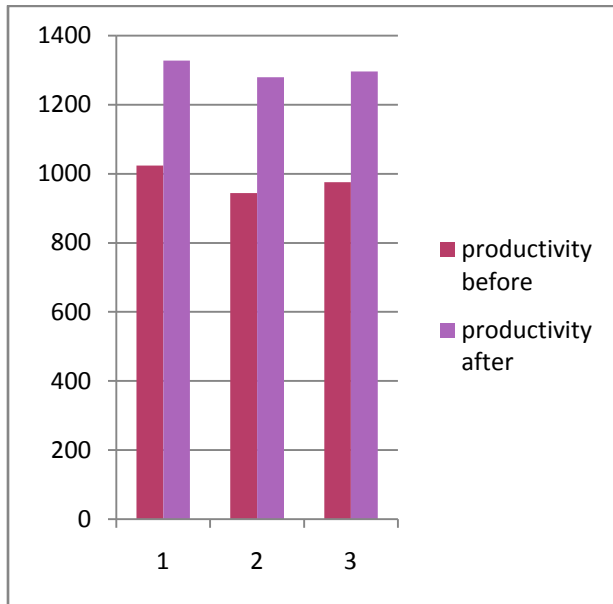
Here one shot is equal to 16 products.

Day	Time	Productivity	
		Before	After
1	10	1024(64shots)	1344(84shots)
2	10	976(61shots)	1312(82shots)
3	10	960(60shots)	1280(80shots)

From above observation table following graph is obtained



Productivity Vs Day graph



VI. RESULT TABLE:

Parameters	Before	After
Cost	3000	3500
Total time(sec)	400	250
Total shots produced	60-65	80-85

VII. ADVANTAGES OF NEW FIXTURE

- No manual lifting of heavy fixture which reduces worker efforts.
- Use of sliding mechanism instead of manual handling reduces cycle time.
- Removal of all sixteen products in one step.
- Long life through simple maintenance

VIII. CONCLUSION

1. A fixture has been developed which is capable of removing all the products in one step.
2. Manual effort of handling the fixture is minimised due to sliding mechanism being employed with the fixture.
3. Time cycle per shot of product removal is reduced by three times lesser.
4. From the result table, we concluded that the productivity has been increased by 33%.

IX. ACKNOWLEDGMENT

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