Abstract—In present scenario with increasing of global economic competition, small scale industries have known as an economic growth engine and a tool for employment so they have important role in growth and development of countries. Simulation is a very helpful and valuable work tool in manufacturing. It can be used in industrial field allowing the system’s behavior to be learnt and tested. Simulation provides a low cost, secure and fast analysis tool. It also provides benefits, which can be reached with many different system configurations. In my paper, a generalized model is developed for process optimization of small-scale industries for competitive production within the acceptable quality level of production. It is observed that most small-scale industries do not lend themselves to flexible production processes, therefore making it difficult for them to optimize production.

Keywords— small-scale industries, process optimization, manufacturing, modelling, simulation.

I. INTRODUCTION
Small industrial units are industries with limited scale of manufacturing operations, producing a product or few products with limited levels of employment and investment and are many in number than large scale industries. In many developing countries, the roles of these industries are crucial as they provide employment to a large number of people.

Breaking the size barrier (limited levels of employment and investment) is a measure of success of the small-scale industries. Small-scale industries are dependent for their equipment and process technology on a limited number of resources that start with:

(a) The entrepreneurs’ own technical expertise probably gained during earlier stages of paid employment.
(b) Large firms that provide the technology as a component within a sub-contracting arrangement.
(c) Government institutions desirous to support a measure of indigenous Technology.

The demand for the products of small-scale industries is crucial to their growth. Therefore this work focuses on process re-engineering of a small-scale industry for economical and competitive production.

For this purpose modelling of complex systems such as manufacturing systems is an arduous task. Simulation has gained importance in the past few years and allows designers imagine new systems and enabling them to both quantify and observe behaviour. Whether the system is a production line, an operating room or an emergency response system, simulation can be used to study and compare alternative designs or to troubleshoot existing systems. With simulation models, how an existing system might perform if altered could explored, or how a new system might behave before the prototype is even completed, thus saving on costs and lead times.

For these investigation and simulation I have chosen the corrugated box manufacturing industry. Because cardboard packaging is one of the most widely used form of packaging. And also corrugated cardboard is stiff, strong and light in weight material made up of layers of brown craft paper. These brown craft paper rolls are transported to a corrugation machine where this paper gets crimped and glued to from corrugated cardboard called as single face corrugated board and then this single face corrugated board is cut according required dimension on the cutting machine. According to requirement by adding another corrugating medium and a third flat liner creates a double wall corrugated board or triple wall corrugated boards on gluing or bonding machine.

Then these card boards are transferred to creasing and cutting machine where extra material is removed and creasing operation is performed (i.e., from where the box get folded).

The next operation is slotting operation and finally with stitching operation corrugated box is manufactured.

II. OBJECTIVES

- To find out an optimal production line process.
- To minimize the process time.
- To formulate the optimize model for different variables.
- To formulate the input and output model of system.

III. LITERATURE SURVEY

[1] A generalized model was developed for process optimization of small-scale industries for competitive production within the acceptable quality level of production. It was observed that most small-scale industries do not lend themselves
to flexible production processes, therefore making it difficult for them to optimize production when there are fluctuations in prices of production inputs.

[2] Simulation is a very helpful and valuable work tool in manufacturing. It can be used in industrial field allowing the system’s behaviour to be learnt and tested. Simulation provides a low cost, secure and fast analysis tool. It also provides benefits, which can be reached with many different system configurations. Topics to be discussed include: Applications, Modelling, Validating, Software and benefits of simulation. This paper provides a comprehensive literature review on research efforts in simulation.

[3] Based on a field investigation of 399 small scale industries in three Indian states, i.e. West Bengal, Haryana and Maharashtra, collected during April - June 2000, the present paper analyses the pattern of awareness, acquisition and adoption of technological changes in small scale industries. It also examines possible constraints of non- adoption of improved technologies. The pattern of use of various components of Information Technology (IT) by small entrepreneurs is also discussed. Following a broader definition of technological changes, the paper identifies major causes that are inhibiting the adoption of improved technologies and examines the role of existing policies and programmes in overcoming them; it also analyses the present procedure for availability of finance to SSI units for upgrading and modernizing their technologies and suggest measures for facilitating such services to small scale entrepreneurs; further it evaluates the requirements of improvements in skills, education and training both of entrepreneurs and workers among the SSI units to absorb and implement technologies in their diverse manifestations. Rural urban contrasts are brought out markedly while discussing these issues.

For the critical analysis of existing system method study is best tool. In which various charts such as Man/Material charts, Man and Machine charts are prepared which are available in standard format in Introduction to Work Study by International Labour Office, Geneva. The success of the whole procedure depends on the accuracy with which facts are recorded, because they will provide the basis of both the critical examination and the development of the improved method.

IV. PROBLEM IDENTIFICATION

It is observed that most small-scale industries do not lend themselves to flexible production processes as well due to inefficient utilization of floor space the sequencing of machines are not in proper order and these results in greater process time.

V. EXPERIMENTATION

The first step to minimize this problem is the critical analysis of the system. For the critical analysis Method Study is the best tool. In the method study various charts such as man charts and man and machine charts are prepared for all the workstations.
VI. CONCLUSIONS

For the problem identification the method study conclude insufficient utilization of floor space the sequencing of machine are analysed using critical analysis method and from the man chart, decrease process time using proper sequencing of machine.

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