2nd International Conference on "Innovative Trends in Science, Engineering and Management"
YMCA, Connaught Place, New Delhi ICITSEM-16
05 November 2016, www.conferenceworld.in ISBN : 978-93-86171-10-8

DISCRETE SIMULATION AS A TOOL FOR PROJECT MANAGEMENT

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ABSTRACT

The success of a project is usually based on the clarity of its objectives and how well team members will coordinate project activities but still an astounding proportion of projects fail because the desired outcome is poorly defined and the organization and procedures to accomplish it are ill understood . With dismaying frequency , people complete the "wrong" project , producing at best a somewhat less than desired result or , at worst a complete waste of time and resources so even a short time spent clearly defining and organizing the project generates tremendous benefits . Basic problems with traditional method include that they are static , and they are based on simplifying assumptions . The assumptions might not reflect the underlying production process in an appropriate manner . Another all too common outdated practice is the traditional design approach of constructing subsystem capacities to match conservative assumptions or worst-case scenarios . This tends to lead to substantial overcapacity - especially when the worst – cases are added several times on each other The solution can be obtained by using Discrete simulation modeling as this approach supplements traditional static approaches by using simulation for managing the functionality of the project scope. Simulation modeling is introduced as a tool that enables continuous management of the functionality of the project product already during the project implementation . The objective of this project is to put discrete event simulation in place to the project management framework with management emphasis on project scope . The case provide understanding of the project phases , where the simulation was used .

Keywords- *Project Scope, Project Management, Simulation, Discrete Simulation, Static Approach*

I. INTRODUCTION

A traditional phased approach identifies a sequence of steps to be completed. In the "traditional approach", we can distinguish 4 stages in the development of a project:

1.1 Project initiation stage;
1.2 Project planning or design stage;
1.3 Project execution or production stage;
1.4 Project monitoring and controlling systems

Like living organisms the project follows a life cycle spanning from conception, beginning, growth, maturity, decline and termination. Most projects go through similar stages on the path from origin to completion, called the Life Cycle. The project is born (its start up phase) and the manager is selected, the project team and initial resources are assembled, and the work program is organized. Then work gets underway and momentum quickly builds and the progress is made.

Fig. (1) - steps of traditional project management

Not all the projects will visit every stage as projects can be terminated before they reach completion. Some projects probably don't have the planning and/or the monitoring. Some projects will go through steps 2, 3 and 4 multiple times although project cost management is generally concerned only with the cost of the resources needed to complete the activity, it should also consider the effect of decisions during the project on the cost of using the project product. For example, reducing efforts in design phase may reduce the cost of the project at the expense of an increase in the customer's operations so It is important to understand that the technical and operational functionality of the final deliverable taken over by the customer at the end of the project matters as the most important parameter that contributes to the benefits obtained from the investment.

II. PROBLEM OCCURRED DURING IMPLEMENTATION OF PROJECT MANAGEMENT

The main problems faced by project manager during implementation are poor monitoring of progress, not handling risks and poor cost management.

2.1. Poor Monitoring Of Progress

Project managers sometimes tend to spend most of their time in planning activity and surprisingly very less time in following up whether the implementation is following the plan. A proactive report generated by project planner software can really help the project manager to know whether the tasks are progressing as per the plan.

2.2. Not Handling Risks

Risks have an uncanny habit of appearing at the least expected time. In spite of the best efforts of a project manager they are bound to happen . Risks need immediate and focused attention. Delay in dealing with risks cause the problem to aggravate and has negative consequences for the project.

2.3. Poor Cost Management

A project manager's success is measured by the amount of cost optimization done for a project. Managers frequently do all the cost optimization during the planning stages but fail to follow through during the rest of the stages of the project. The cost graphs in the Project planner software can help a manager to get a update on project cost overflow.

III. DISCRETE SIMULATION AS A TOOL FOR PROJECT MANAGEMENT

Simulation modeling is introduced as a tool that enables continuous management of the functionality of the project product already during the project implementation. The objective of this project is to put discrete event simulation in place to the project management framework with management emphasis on project scope. Computer simulation is not a new method. Simulation is widely applied, e.g. in system engineering design. In project management, simulation can be used either in simulating the project product or the implementation, e.g. with aspects of time, cost, or other parameters. The main advantage of discrete event simulation is that it incorporates the impact of time into performance evaluation.

An empirical case is introduced in order to put discrete-event simulation into place in project scope management throughout the project implementation. Further, the case provides more detailed understanding of features and practical application of the discrete event simulation approach.

IV. CASE STUDY: CHOCOLATE PASTE DEPARTMENT

Fig. (2) - chocolate paste department

This case describes a feasibility-phase investment planning situation occurred in a chocolate paste department of a confectionery manufacturer. The chocolate paste is consumed either by the confectionery manufacturer on its six production lines or sold to outside customers. In connection to renewal investments and anticipated increase in demand simulation was applied in the chocolate paste department to:

4.1. Analyze how much more capacity is required to meet a future demand forecast of 20% consumption increase.

4.2. As the production increase achievable with a proposed new piping arrangement that would connect all except two processors to all chocolate tanks.

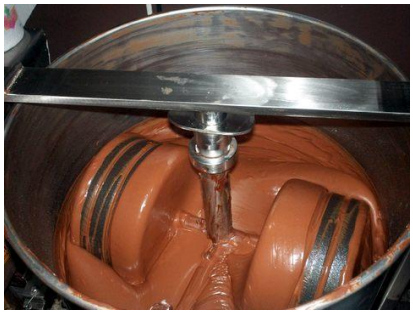
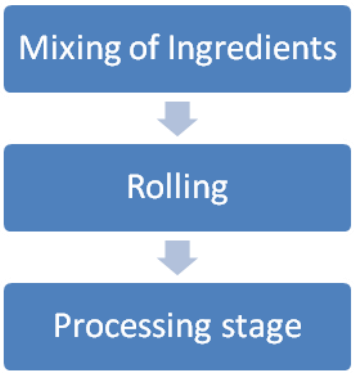


Fig. (3) - mixing of chocolate paste

V. STAGES OF CHOCOLATE MAKING PROCESS-

TABLE 1- Stages of Chocolate making



Chocolate paste is produced in three processing stages that are mixing the ingredients, rolling and a processing stage. The pastes are then stored each in their own dedicated tanks or containers either for further consumption in the manufacturing lines or direct paste deliveries to outside customers. The variables whose effect were evaluated were. Consumption (present situation versus 20% increase).Piping (present situation versus investment in piping) .Tank initial conditions before the test period (tanks half full versus tanks full) A full

experimental design was performed with the three variables at two levels each. The performance of the paste department was measured primarily by delivery shortages and secondarily, to indicate potential for such shortages, by capacity utilization of roller and processors. The simulation showed that the increased chocolate paste consumption can be met with the present capacity. The system output was generally restricted by con-sumption, not production capacity. It also showed that the projected consumption increase can be met without capacity increase, saving Rs- 500,000/- on roller investment.

6. CONCLUSION-

It is discussed the management of the project product side of scope management rather than the more traditional content of project scope management with a focus on how to put the component parts of the project product together. It introduced discrete event simulation as a tool to support major decisions associated with early management of project product content that enables the desired functionality. The case study demonstrated that discrete event simulation can be applied throughout the project life cycle as a continuous management and decision making procedure. This way a strategic view is adopted that enables considerations of the project product in its operation environment. Modeling of the technical and operational functionality of the final project deliverable in its production environment and simulating the operations phase

Finally, this suggests that:

Management principles are applied throughout the project where the functionality of the project product handed over to the customer is actively managed as an important parameter that contributes to future profit accumulation in the customer's business.

The means to manage the functionality should incorporate experimenting with a dynamic environment that supports decision making and management of future outcomes, rather than just dictating well designed activities for project implementation.

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