반도체 R&D BPR 시뮬레이션

Resource Based Simulation in Semiconductor Business

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Abstract

Simulation --- The ideal tool for BPR. Work flow and CASE tools are static modeling tools. Based on our own customers surveys, we have discovered that the use of process modeling tools thus far has focused on modeling the current(What-Is) state of a business. We have found that 90 percent of reengineering projects, the modeling tools of choice have been flowcharting tools. Static models offer help in understanding the overall nature of an existing process. However, static models can not really help you see the step by step motions towards completion of your goals. In static modeling, you see two pictures in time, usually taken at the current state and final state models of your reengineering project. Static models are usually not object oriented, therefore can not show facility or office layout and movement of entities and objects throughout the facility. However, this does not mean that static modeling does not have its application nor add value to the user as in a few success stories.

Simulation helps the team analyze the complex aspects of the project. Many times a plan that looks good on paper might turn out entirely different when put into action. Therefore, simulation helps you look at how situations might work before actual implementation. In particular, computer simulation models help you view a reengineered condition before they are rolled-out. Items such as a lead time and resource allocation.

1. 서 론

Simulation helps you sell the idea of change to all persons affected by the change.

Persons can view the current state and see the features and benefits of the proposed change before it is done. The risk associated with the change can also be minimized by the animation of the impact of the change.

Dynamic simulation tools provide ways to model entity flow including parallel flows, and the dynamic behavior process. Realities such as randomness, uncertainty and interdependencies of resources can be accurately modeled using a simulation tool. Typically, simulation helps you make the following process design decisions:

1. What is your activity and process performance measures for cycle time, cost, quality, and customer satisfaction?
2. What is the maximum throughput capacity of the process?
3. What is the capacity of the services and waiting areas(bottle necks) where the process is being performed?
4. What are the resources, volume, equipment and facility locations to maximize productivity and reduce cost while improving quality?
5. What are the technology requirements and demands?
6. How long the customers need to wait and how many people must they have contact with to find the service they need?
7. Where should the service areas be located to accommodate customer throughput, quality, and maximum use of personnel?
8. How can this process be streamlined?

Typical process ***management decisions*** made by simulation software are:

1. What is the best way to sequence the activity and resource?
2. How can I best schedule activities, resources, and equipment to minimize risk and cost while maximize customer satisfaction?
3. Where is the best location for resources?
4. How do I prioritize customer request?

Simulation models can provide accurate and insightful means to analyze and predict the performance measures of a service system

Common sense rules for process redesign

No matter what redesign tool you select, here are some common sense rules:

1.Identify current problems and prevent them from continuing. Eliminate or rectify the source of the problem.
2. Assure information and data is available in the first step and in the right format for all subsequent steps.
3. Find the right sequence of activities to occur and collect information just in time to process it.
4. Replace specialist to generalist functions by increasing the scope of responsibility of personal jobs descriptions.

5. Simplify the process

6. Replace after the fact reconciliation with front-end edits, validation and QA checks.

7.Eliminate approval, authorization processes. If still warranted, make them after the fact.

2. Simulation Model Introduction

2.1 Inputs

*Subject Matter Experts knowledge

-Functional and line area experts

*Process information

-Task descriptions, times, staffing

(bottom-up data)

*Business rules governing workflow

*Product Development project starts

2.2 Assumptions

*Business case focus of simulation

-Identify, quantify and validate technical issues

-Help prioritize and evaluate To-Be Recommendations in terms of impact on Operational KPIs

*KPI focus

-Throughput (project starts/year)

-Resource bottlenecks

-*Not* cycle time reduction

*PDP Integration Team has created a valid process model

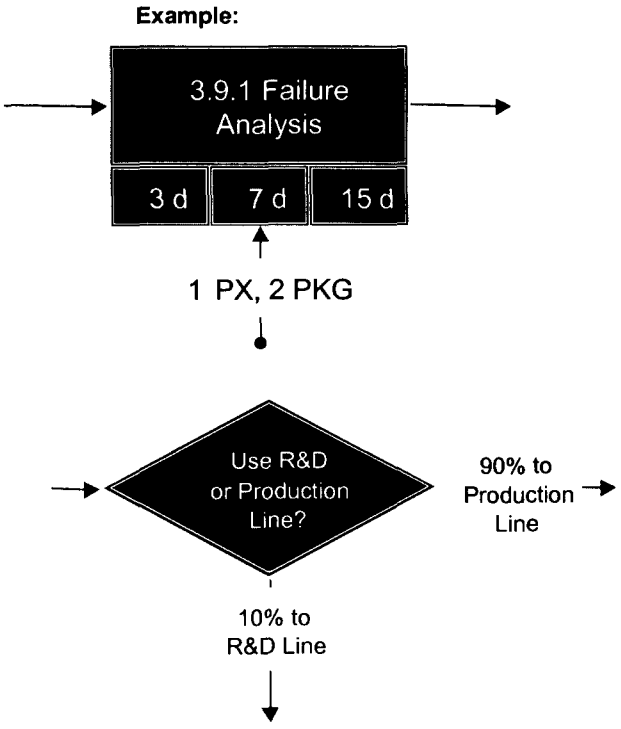
*MTO / FAB mask insourced / done in-house

2.3 Outputs

*Resource requirements to support various PDP Throughput levels

*Identification and quantification of bottlenecks on resources and PDP activities

*Value of PDP improvement initiatives as KPIs change from As-Is to To-Be



-Throughput

-Staffing

3. Analysis of Current Process

3.1 Task modeling

*Expert subjective estimate of low, most likely and high time to perform task treated as a triangular probability distribution

*Data-driven objective estimate that fits a probability distribution to many (>20) observed task times (lack of task time observations prevented modeling with this

approach)

3.2 Business Rules modeling

Typically determine task-to-task entity flow

3.3 Validity of the customer PD Process Model depends entirely on the high quality of data and information provided by customer's informed Subject Matter Experts

4. Results

4.1 Sensitivity analysis further shows that in order for the process to reach stability throughp PA PB PC PD PE at current capacity levels.

*Limited staff resources constrain throughput (project starts/year) of As-Is PDP causing:

Floating bottlenecks

Exploding (infinite) queues

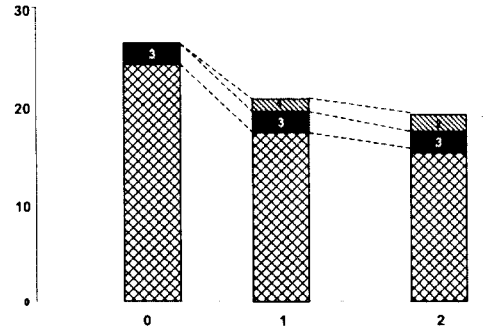
*Running the simulation at lower throughput suggested stability:

Average queue lengths reached steady state

All resource utilization less than 100%

*At the nominal a project starts/year, the simulation showed:

4.2 Further analysis indicated that saturation pertains to specific areas and associated resources.



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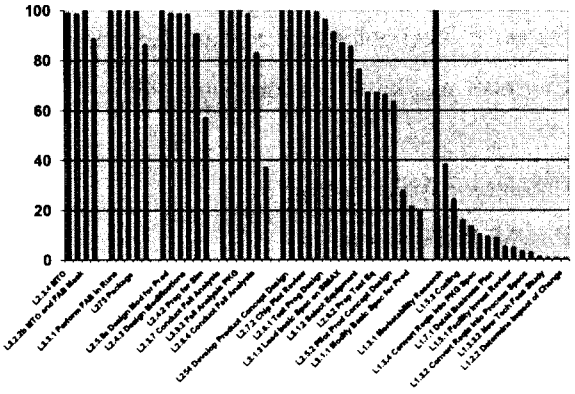
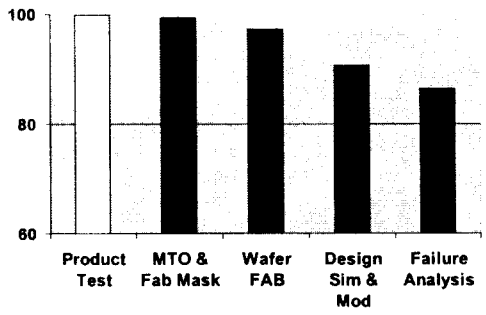


*Assumptions and Interpretation

-Critical tasks and associated resources extended well into saturation

-Resource / task saturation causes process unpredictability making it difficult to manage

Insufficient process margins cause excessive redesign and iteration



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