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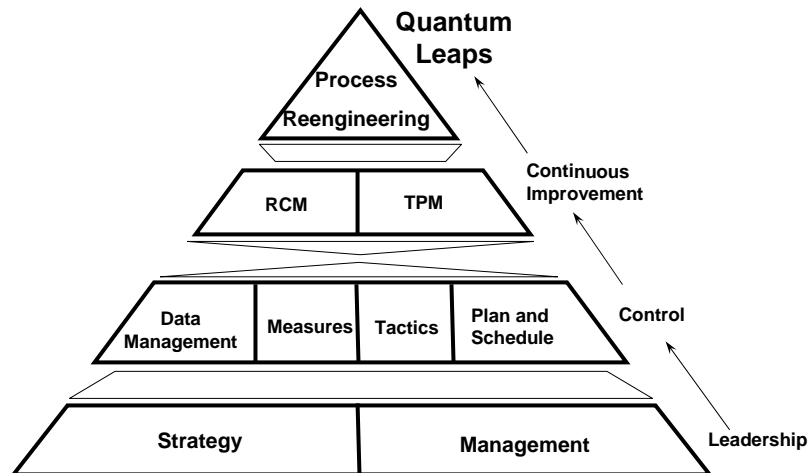
# Reengineering Maintenance Process Section 9

Uptime  
Strategies for Excellence in  
Maintenance Management

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World Class Maintenance



## OUTLINE

- ❖ INTRODUCTION
- ❖ MAINTENANCE: A PROCESS OR A FUNCTION
- ❖ BEGINNING REENGINEERING
- ❖ ANALYZING MAINTENANCE PROCESS FLOW
  - ❖ PROCESS MAPPING
  - ❖ PROCESS ANALYSIS
  - ❖ VISIONING
  - ❖ REENGINEERING



## INTRODUCTION – 1/2

- ❖ Process reengineering was first discussed in Michael Hammer's *Harvard Business Review* article, "Don't Automate, Obliterate."
- ❖ It is no less a fundamental rethinking and radical redesign of business processes.
- ❖ The goal is to achieve a dramatic performance advances in critical areas such as cost, quality, service, and speed.
- ❖ Instead of fine-tuning the status quo with continuous incremental improvement, reengineering focuses on core business of processes, such as the new product development, order fulfillment, and maintenance management.
- ❖ It's zeroes in on those that are crucial to success the cause of the increase customer and shareholder value. (see figure 9-1)



## INTRODUCTION – 2/2

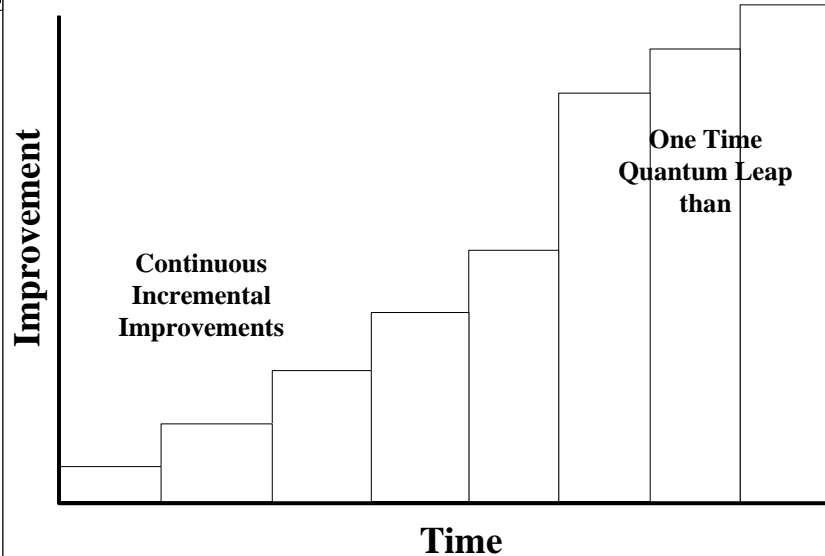


Figure 9-1: Quantum, Leaps in Improvement

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## MAINTENANCE: A PROCESS OR A FUNCTION – 1/4

- ❖ The first step in reengineering maintenance management is to stop thinking of it as a function, a discipline, a professional “silo.”
- ❖ Maintenance management begins with a need, often expressed by a “customer,” and ends with it being satisfied.
- ❖ The maintenance of *process* is what makes it possible .
- ❖ The problem with the functional view is that it makes you optimize the function and not the overall process.
- ❖ Maintenance as a function usually covers only the trades.
- ❖ As a process, it covers trades, but also purchasing, stores, production scheduling, operations , engineering, and several other management and administrative functions.

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## MAINTENANCE: A PROCESS OR A FUNCTION – 2/4

- ❖ One example of the problem of maintenance as a function is maintenance in stores. Each silo has its own agenda to optimize performance:
  - ❖ **Maintenance** – Because it is responsible for equipment availability, maintenance does not want to be caught without any part on hand to respond to breakdowns. It minimizes these failures by scheduling time for PMs and components replacements. Maximizing inventory optimizes its performance as a function, and open stores access across all shifts is preferable.
  - ❖ **Production** – Its mandate is to produce during scheduled runs, so it does not want any equipment delays, not even for scheduled components replacements. Production is usually measured on income statement accounts and is not concerned with balance sheet accounts, such as stores inventory.



## MAINTENANCE: A PROCESS OR A FUNCTION – 3/4

- ❖ **Materials** – Minimizing freight charges are personal costs dictate slow logistic and single – shift coverage for stores. Also, maximizing space and orderliness makes the function run smoothly. Day--shift, controlled access ensures minimal discrepancies in inventively reconciliation. The prime driver for this function is control, not necessarily service.
- ❖ **Finance** – Concerned with controlling the balance sheet, it therefore likes to minimize stores investment and carrying costs, often to an arbitrarily, fixed level.
- ❖ **Engineering** – As part of capital project planning, engineering sets rigorous specification, and follows a conservative route to maximize reliability when planning capital and basement spares.
- ❖ **Purchasing** – Going out for numerous quotes and taking the lowest cost, while meeting the minimum specifications, ensures that cost saving targets are met but adds excessive variation in spare parts.
- ❖ **Plant management** – Often with roots in production or engineering, cost – cutting measures tend to be aimed at support functions like maintenance and stores



## MAINTENANCE: A PROCESS OR A FUNCTION – 4/4

- ❖ Too often, the various departments involved negotiate an uneasy balance that favors one or two of them.
- ❖ The solution, of course, is to view equipment effectiveness and cost efficiency as results of the entire maintenance process.
- ❖ That depends on developing rational principles that get the most from all functions, not any particular one.
- ❖ If you can do that, maintenance and process reengineering can improve your results radically.



## BEGINNING REENGINEERING – 1/2

- ❖ To start, you must pull together a multidiscipline team from all the functions that makes the process work.
- ❖ These include production, materials, engineering, maintenance and, in part, administration, depending on your organization structure .
- ❖ Then the techniques and tools should be chosen : at the very least , process mapping, process analysis , and customer interviews or surveys .
- ❖ York could also include automated tools to simulate how the reengineered process will work, and benchmarking to help set goals and provide insights.
- ❖ The team must clearly understand the overall vision of the business and what drives competitive advantage in your particular sector.



## BEGINNING REENGINEERING – 2/2

- ❖ Next , map of the main working elements, such as how maintenance links or interfaces with other core processes, like production and engineering.
- ❖ Broad, aggressive goals -- to achieve zero breakdowns in scheduled runs within 36 months, for instance – are defined at this point .
- ❖ Such visionary goals are unrealistic without the following expectations:
  - ❖ There would be a major restructuring – in the way you are organized, the roles each person will play, the skills required, the way you are evaluated, the supporting technology, indeed, in the company culture.
  - ❖ The top executive will commit an enormous amount of time at the site is sponsoring and supporting the effort.
  - ❖ There will be constant communication about the effort and progress that relate directly to profitability.

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## ANALYSING MAINTENANCE PROCESS FLOW – 1/10

- ❖ A process is a set of linked activities that take an input and transform it into an output.
- ❖ In maintenance, inputs involve identifying an equipment need and various materials, skills, and information.
- ❖ They linked activities include planning , scheduling, and the actual work.
- ❖ Outputs are available equipment, histories, and satisfied customers.
- ❖ To reengineer maintenance, you need to understand clearly how the current process is actually conducted.
- ❖ Your objective is to simplify it to reduce cycle times, work-in-process, waste, and duplication.

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## ANALYSING MAINTENANCE PROCESS FLOW – 2/10

### ❖ Process Mapping

- ❖ A straightforward , activity -- based mapping technique using block diagrams is usually quite sufficient, except for complex processes, say, the in -- situ rebuild of a major equipment system.
- ❖ Use a hierarchy and you can map at different levels, as shown in figure 9-2.
- ❖ The first level may be the planned maintenance process.
- ❖ Level 2 delineates planned maintenance into the steps: notify , prepare , fix and review .
- ❖ Level 3 and 4 breaks down these steps further.
- ❖ Of the finest level of detail, you can pinpoint where improvement is needed most, because of high cost, long cycle time, frequency, quality problems, or overall impact on the entire process.
- ❖ In mapping, you need to define the boundaries of the process, the beginning and end.
- ❖ The same is true for each activity within the process, and also who is the one actually doing the activity.



## ANALYSING MAINTENANCE PROCESS FLOW – 3/10

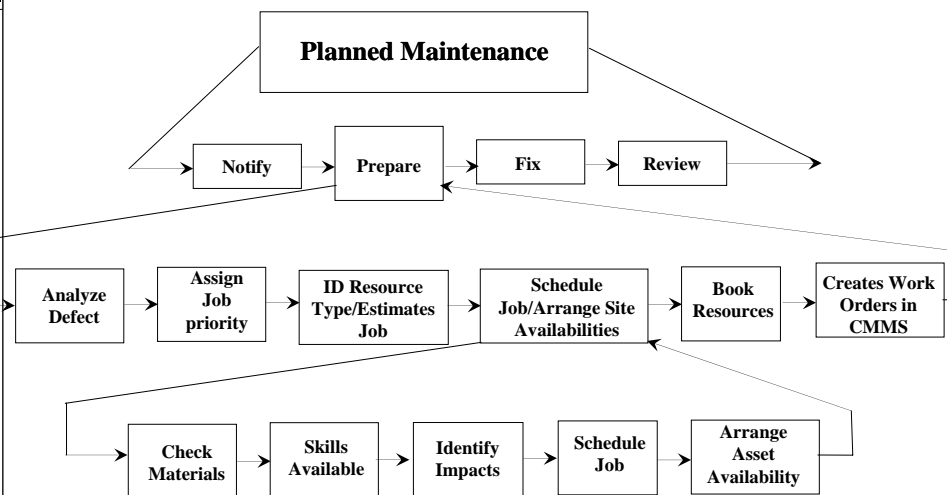


Figure 9-2: Process Flow Mapping



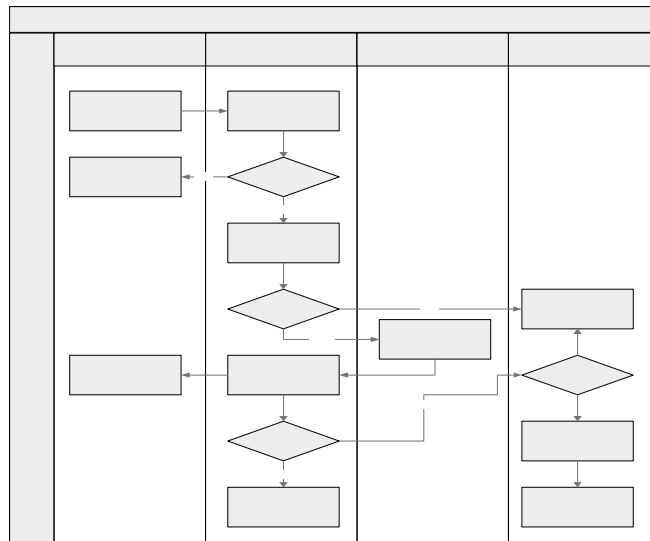
## ANALYSING MAINTENANCE PROCESS FLOW – 4/10

### ❖ Process Analysis

- ❖ For each activity, you need to know what is being done, how it is done, why it is done, what the volume is, who is Involved, how long it takes, and what it costs.
- ❖ You must be able to answer the question, “Does this activity add value?” In other words, would customer pay for it if they knew you were doing it?
- ❖ List which activities don’t add value: move, inspect, file, store, retrieve, count, travel, wait.
- ❖ They all can’t be eliminated, but they are good places to start streamlining.
- ❖ Figure 9–3 shows how to begin the value test, using an emergency maintenance request as an example.



## ANALYSING MAINTENANCE PROCESS FLOW – 5/10



Quantitative Data on activities	
Position : Local Plan	
Process: Emergency Requests	
Input:	18 requests / day
Output:	18 requests / day
Cycle Time:	20 min/ request
WRP:	3 requests
Labor hours:	9 hours/day
Cost per hour:	\$19.50 / hour
Materials cost:	\$21.50 /request
Other cost:	\$0.60 / request
Total activity costs:	\$12.50 /request
Cost of inventory:	\$1.50/request
Cost of quality:	To \$0.50/cost of

Figure 9-3: Process Analysis





## ANALYSING MAINTENANCE PROCESS FLOW – 6/10

- ❖ These are tests that can be applied to each process and activity to determine its value.
- ❖ Can bureaucracy be reduced to eliminate unnecessary communications?
- ❖ Are there excess moves, waiting, filing, or rework?
- ❖ Is there an easier, simpler, or more streamlined approach, perhaps by changing the order, balancing tasks, or combining them?
- ❖ Publication can often be eliminated by looking at redundancy or multiple versions.
- ❖ Often, you conduct activities in sequence when they can be done in parallel or along a critical path.
- ❖ When you look at the root cause of errors or quality problems, error – proofing is often a matter of standardization or using a specialist.
- ❖ Finally , automate the simple , repetitive tasks.

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## ANALYSING MAINTENANCE PROCESS FLOW – 7/10

### ❖ Visioning

- ❖ Once the current process is understood in detail, you need an even more exact picture of what the engineered model than would look like.
- ❖ This is the core of the exercise, where you can easily get tipped up after or your careful planning. If you're lucky, said one frustrated maintenance manager, "then a miracle occurs."
- ❖ There is a series of creative and innovative tools to make this "miracle" happen:
  - ❖ Ask the basic, hard questions, such as, "Why do we maintain our own equipment?" or "Do time-based PMs actually reduce or failure rates?"
  - ❖ Brainstorm , use cause – effect diagrams, ask the "Five Why's," and use the tools of quality.
  - ❖ Benchmark, particularly in businesses not related to your own but facing similar challenges.

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## ANALYSING MAINTENANCE PROCESS FLOW – 8/10

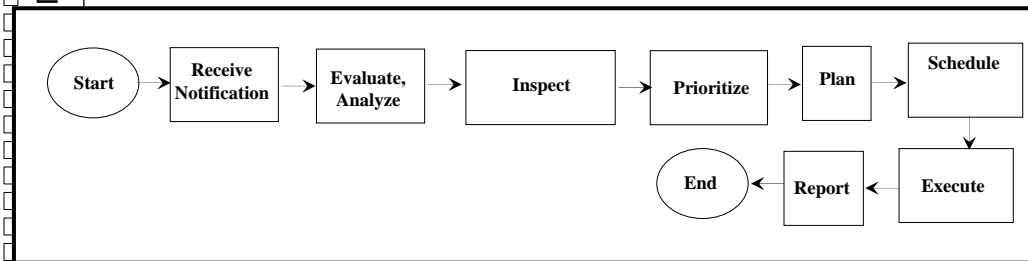
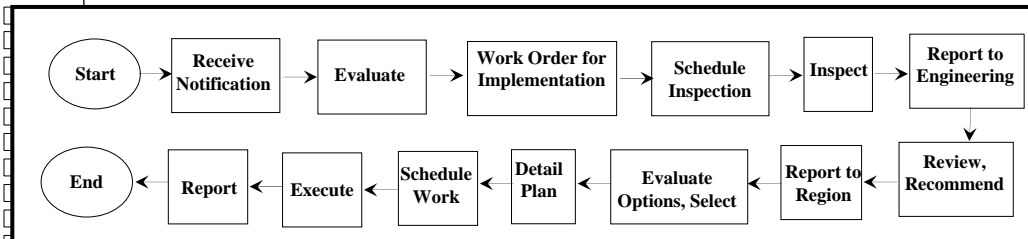
### ❖ Reengineering

- ❖ The vision you build is the foundation of the reengineered process.
- ❖ The detailed plan, costs, the cycle times – these are the mechanics.
- ❖ Figure 9 - 4 shows how one company took out 21 steps and two positions in their corrective maintenance process.
- ❖ Barriers to change the adjustments that must be made will soon become evident.
- ❖ The real issue will take shape as the organization struggles to restructure .
- ❖ Supporting it all is senior executive leadership.
- ❖ Management commitment to change cannot be stressed enough.



## ANALYSING MAINTENANCE PROCESS FLOW – 9/10

### BEFORE



### AFTER

Figure 9-4: Simplifying the Corrective Maintenance Process



## ANALYSING MAINTENANCE PROCESS FLOW – 10/10

- ❖ One utility company recently recognized into business units, consolidating many of its maintenance specialists into a service unit. The makeover progressed rather smoothly .
- ❖ People were becoming comfortable with the change, when one of the managers introduced a maintenance process reengineering exercise for the civil works.
- ❖ The team took up this initiative with glee, producing celebratory results that were to clearly superior to the status quo.
- ❖ Executive management cheered the reengineering exercise as a new approach to cost – effectiveness.
- ❖ But it wasn't prepared to implement the result, which basically contradicted the earlier maintenance centralization effort.
- ❖ Everyone went back to their familiar ways.
- ❖ Reengineering is radical and dramatic. It can provide gigantic leaps in contemporary measures of performance. And it can also shake your operation to its roots. It is not for the faint-hearted.



*Thank You*