Strategic Maintenance Management 101: An Introduction to What, Why and How

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Table of Contents

Overview

If a business exists to produce or deliver some kind of product or service, it is essential that there be as much strategic planning in the maintenance of the equipment upon which it relies as there is in any other part of the business plan. Obviously, efforts taken and costs involved to maintain their machinery or equipment have a direct impact on everything that affects the overall health and welfare of any manufacturing or other capital-intensive industry.

Unfortunately, many organizations see equipment maintenance as an expense instead of an investment. They take a "least-we-can-do-to-get-by approach" of doing just enough to keep things running or assume a much worse "band aid" mentality of temporary repairs to keep things going with some wire and duct tape. These "just-get-by" quick fixes are always temporary and may fail before correction.

"Working from can to can't" is a common refrain among operating engineers and maintenance technicians when employers reduce workforce-staffing levels to rein in costs farther.

Ultimately, this leaves the remaining staff to deal with an increasing workload. Morale and productivity continue to decline, as those still on the job cannot conduct preventive maintenance and enter a reflexive mode of running from one problem to the next as the downward maintenance spiral and workforce morale deepens.

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This course provides two solutions to that situation:

- A fundamental guide to understanding the need for, and a blueprint to create, a strategic maintenance management plan for your employer

- A guide to developing the internal talent necessary to provide the machinery and equipment maintenance necessary for the continued life of the business

By adopting strategic maintenance, companies can shift from reactive to proactive maintenance, such as predictive maintenance, which prevents failures before they occur. This approach is particularly valuable in high-risk sectors like oil and gas, where a case study showed a major producer ***improved efficiency by 5-10 times*** using advanced asset strategy management [i]

Learning Outcomes

After taking this course, the student will at least:

1. Learn how to integrate your maintenance program into the business plans of the company
2. Be able to identify the four broad generational stages of the evolution of maintenance
3. Know how to develop the internal talent necessary to maintain the equipment and machinery of your business
4. Be able to identify several major changes in the external business environment that present an increasing challenge to maintenance professionals today
5. Be able to identify four reasons why people are one of the major changes in the business environment
6. Be able to identify two reasons why processes are one of the major changes in the business environment
7. Be able to identify three reasons why plants are one of the major changes in the business environment
8. Be able to list four reasons for the "WHAT" of strategic maintenance management (SMM)
9. Be able to list six reasons for the "WHY" of strategic maintenance management.
10. Be able to list four reasons for the "HOW" of strategic maintenance management
11. Be able to ask several relevant questions about talent *development* issues
12. Be able to ask several relevant questions about talent *deployment* issues
13. Learn to analyze the cost/risk relationship graph beyond the generic responses
14. Identify at least 12 miscellaneous planning issues to consider regarding SMM
15. Construct a three-step model for building a strategic maintenance plan
16. Learn how to construct a functional jib description that can act as a foundation for internal training
17. Identify common problems to avoid when attempting to develop an internal training program
18. Develop a training curriculum for maintenance operators

The WHAT of Strategic Maintenance Management

Strategic (business) planning is the *process of determining a company's long-term goals and then identifying the best approach for achieving those goals*[ii].

Strategic maintenance management (SMM) is latest generation of the age-old need of maintaining your equipment or machinery. (About twenty-five years ago, around the turn of the century, the term was Enterprise Asset Management – EAM.) This new name for an existing process appears to fit a trend of "when something doesn't work, rename it, and try it again." [iii]

Basically, the concept of strategic maintenance management is the *integration of your maintenance program into the business plans of the company for the least amount of production disruption while maintaining the equipment*.

Success in a market requires an ability to orchestrate many business functions simultaneously. Companies must integrate the functions of financing, marketing, supply chain management, data collection, workforce training and development, new hire recruiting, and retention programs to keep production humming along at optimal capacity. SMM means that those who maintain the physical means of production must have a seat at the business-planning table because the company cannot sell what the machinery cannot produce.

When the industrial age began, it was enough for the machinery maintainers to make sure it stayed sharp, they kept it well-oiled and tightened all the nuts and bolts when they were loose enough to notice. They knew that good maintenance paid off and the reliability of their equipment improved while their cost of owning it declined.

We consider the cost of ownership as part of the cost of production.

(Other costs include raw materials, fixed costs of the facility, wages, insurance, distribution, marketing, product development, etc.)

For example, if a machine cost $1000 and made 1000 products, the ownership cost of each product is $1.00. However, if it produces 10,000 products, the ownership cost of each drops to $0.10 per unit.

The Evolution of Maintenance Management

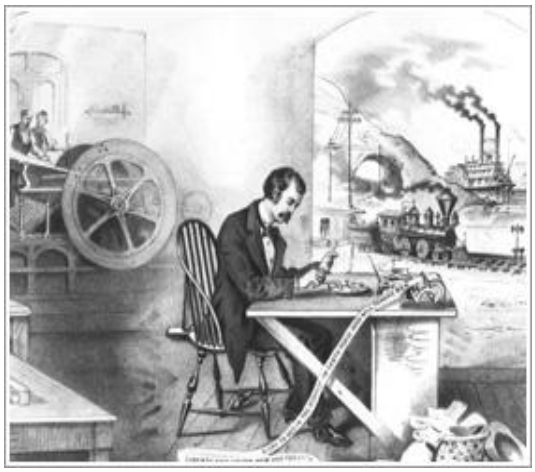
This is a broad review of the evolution of maintenance management. (These are time estimates given only to identify broad changes.)

	1st generation < 1940-1960	2nd generation 1960-1985	3rd generation 1985-2000	4th generation >2000
Intentions	Downtime was a fact of life	Greater plant capability, definite equipment life, lower unit costs	Greater plant reliability, longer equipment life, improved work efficiency, higher safety standards, environmental damage control, sustainable higher product quality	Greater on-demand reliability, longer equipment life, greater efficiency, control complexity and quality, near zero waste, zero tolerance on safety and environmental issues, greater costs controls and business flexibility
Methods	Fix it when it breaks, run it until it stops	Scheduled maintenance, development of systems to control work, big (and slow) computers, introduction of cycle time strategy	Plants and equipment designed for reliability and ease of maintenance, greater skills at failure analysis, improved system controls, hazwop reviews, improved computers, condition-based strategies	Advances in plant and equipment design for "maintainability" by lesser skilled technicians, improved supply chain management skills further reduces maintenance downtime and costs, shorter equipment life cycles, more integration into the business strategy, greater reliance on computers

The First Generation

The need to protect and maintain your property is as old as human history. Ancient farmers cleared stumps and stones out of their fields to get a better crop while the hunter checked his bow and sharpened his arrows.

Over time, the need to maintain those assets and tools became more narrowly focused and trades such as blacksmithing emerged. The industrial revolution made our tools more mechanized and increased the specialization of the trades. Maintenance trades emerged to keep the equipment running or repairing it when it broke down. Some particularly gifted "mechanics" occasionally made improvements in the machinery.
This was effectively the start of the first generation of maintenance, where owners ran their equipment until it failed, and downtime was a fact of life. Since the equipment frequently had to withstand harsh use, it was built solidly (even overbuilt in some cases). This made breakdown maintenance the most cost-effective maintenance practice.

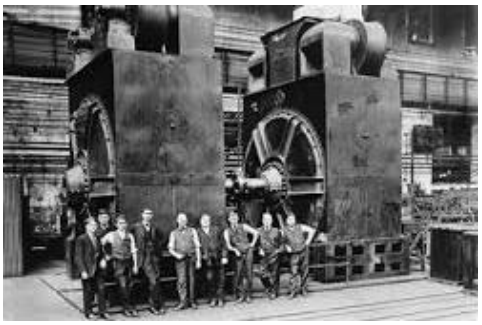


In the early eighteenth century, there was a scarcity of trained artisans, and the low level of education meant that there was no real way of supporting or spreading any improvements in performing maintenance.

People could easily understand why equipment needed fixing when it was broken. But it was difficult for them to comprehend any other form of maintenance, hence the old adage of "Why fix it when it isn't broken?"

The Second Generation

Eventually, Man's inventive mind introduced newer design technologies. The equipment and processes started to become bigger, faster, more specialized, and in many cases, better. The newer designs included equipment with a finite life and identified key components as replacement or consumable.



Maintenance specialists and artisans immediately felt the impact of this and introduced the concept of planned shutdown periods to replace these consumable parts. Although these planned shutdowns did not eliminate breakdowns, they were able to reduce the number and frequency of them by replacing key components.

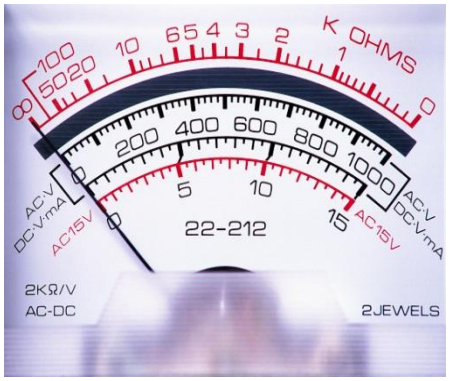
This was the introduction of the second generation of maintenance, and the beginning of maintenance schedules. Gradually, this evolved as mechanics and engineers identified wearing parts that deteriorated in proportion to the usage of the equipment, and *cycle-based maintenance* emerged.

These planned outages and component replacement activities also drove a higher expectation and skill level into the maintenance environment, and the development of formal trade training became the norm throughout the industrial world.

The Third Generation

Over time, these planned outages became an unwanted focus of attention as their costs spiraled outside of the budgets. Owners began asking financial questions about what parts actually needed replacement and the frequencies of these shutdowns / turnarounds. They stretched maintenance intervals forcing the maintenance crew to reuse or repair the wearing parts during these turnarounds. This "bare bones" approach introduced a new level of risk and increased the potential for breakdowns and safety hazards.

The unintended consequences of this minimalist approach drove maintenance engineers into finding innovative ways of identifying failures before they had actually caused any downtime. This allowed them the chance to plan for the event and replace the components when it suited the operational teams best. Soon, the wisdom of condition monitoring as the solution to all maintenance problems became the rage and a wide range of gauges and specialties emerged.



- **Vibration Analysis** uses probes to convert vibration into electronic signals.
- **Wear Particle Analysis** helps engineers understand the nature of contaminants in oil. This became the discipline of Tribology where practitioners study the effects of friction on moving machine parts and of methods, such as lubrication, of obviating them.[iv]
- **Thermography,** which started as trying to identify abnormal heat generating sources with temperature probes has evolved to infrared temperature sensors that finally drove the cost of infrared cameras down low enough to be a cost-effective technology.
- **Non-Destructive testing** allows the analysis of machinery and equipment without invasive procedures. Common NDT methods include ultrasonic, magnetic-particle, liquid penetrant, radiographic, and eddy-current testing. It is a commonly used tool in forensic engineering, mechanical engineering, electrical engineering, civil engineering, systems engineering, aeronautical engineering, medicine, and art.[v]

Inevitably, this greater ability to monitor the equipment requires a greater level of specialization, skills, and knowledge. Unfortunately, the same market economy that drives the innovation demonstrated by these techniques can create and market them faster than it can develop the experts to use it and interpret the findings. As a result of too much technology and

too few skilled users, it is easy to bring down a production line when overzealous analysts cannot interpret the results accurately and raise the alarm bells too soon (or not all).

In reality, these three generations of maintenance need to co-exist in a well-balanced, well-planned maintenance plan, where we define the **first generation** as a *Run-to-Failure (RTF)* strategy, the **second generation** as a *defined time or cycle-based strategy*, and the **third generation** as a *condition-based strategy.*

For example:

- Lighting in an office is usually managed via the first generation or a RTF strategy. If a light burns out, we replace it.

- Lighting in a production environment where light levels are very important could be subject to the second-generation maintenance or a time-based replacement strategy (batch replacement) based on calculations of diminishing light levels due to the age of the bulbs

- Lighting in a highly complex environment could be subject to a third-generation maintenance environment or condition-based maintenance strategy, which would trigger the standby lighting to be brought online and a maintenance request to replace the failed bulb.

All three of these generations of maintenance or maintenance strategies should be applied in all maintenance environments based on the criticality of the equipment being maintained, at any point in time.

The Fourth Generation

A fourth generation is evolving as several major changes in the external business environment present an increasing challenge to maintenance professionals today. These external factors include:

People

- More and more of the baby-boom generation are retiring. This is draining a wealth of experience from the maintenance environment and leaving a potential skills shortage that can only be made up by new emphasis on employer training and development.

- Although an increasing number of two-year technical schools have emerged in the United States, an employer may still need some kind of internal "apprenticeship" program to tailor the general skills taught in the technical school to the specific needs of the employer.

- The younger generation are also less inclined to get their hands dirty, preferring to apply their skills in managerial roles[vi] when everyone is titled an engineer (i.e., heavy equipment operators being called "operating engineers"[vii]) whether they have an engineering degree or not.

- Due to affluence and changing technology, we have lost the skills-development breeding ground of former generations.

  For example, very few growing up in the 1950s and 60s could afford to pay someone to service and tune their cars, so they bought a Chilton manual[viii] and learned to do it themselves. (In all fairness, today's cars are much more complicated to repair[ix] but oil changes are not too complex.)

  This hands-on learning fostered a number of generations of engineers and artisans who were driven by the desire to try and understand how things worked and tried to get them to work better.

Process

- Information technology has developed in leaps and bounds over the last few years, so much so that many of the older generation of maintenance engineers would never have seen or worked on computers in their youth but cannot do without them in their work life now.

- The internet has become a way of life for many people in the western world, with information almost freely available. The Boomers generation may have had an encyclopedia in their homes, and when they needed to do research, would go to the library to find the information needed. Today we can go online with our cell phones and find a wealth of information at our fingertips through a search on the internet. (YouTube seems to have a video for nearly everything!)

  Not only has the information become freely available, our means of accessing this information has also become portable. We can access information from virtually anywhere in the developed nations on our mobile phones.

Plant

- Due to the advances in materials technology and our understanding of fundamental design parameters, we have been able to develop equipment that is smaller and lighter with higher throughput and performance characteristics. This means that in many cases, the equipment is running closer to the edge of its ability. This places a higher demand on artisans to work to closer tolerances, as well as understanding the impact of not working to the correct tolerances in terms of performance and cost.

- Modern equipment designs such as industrial robots have integrated IT components, added complexity, but also resulted in huge advances in control. This has added a whole new maintenance skill set to industry within the space of 15-20 years - the IT Technician who is responsible for keeping IT systems and networks running.

- The equipment we use and how its integration has also become more intelligent, with error logs and operational information almost being universally available.

The WHY of SMM

If you have read carefully the pages preceding this chapter, the "why" of SMM should be fairly clear and will not require much additional explanation. Essentially, business owners choose to maintain their equipment for at least three broad reasons:

1. As a means to grow their share of the market for their products or services.

2. As a means to maintain their share of the market while they adjust their plans to do something else.

3. As a means to not self-inflict economic, legal, and/or safety damage by being a cause of events like these while trying to maintain or grow their share of the market:

    a) **Visakhapatnam Gas Leak (June 2020)**: A gas leak at a chemical plant in India resulted in 13 deaths and numerous injuries, attributed to insufficient maintenance of storage units.[x]

    b) **Neyveli Boiler Blast (July 2020)**: A boiler explosion at a thermal power station in India killed six and injured many, occurring during maintenance activities[xi].

    c) **Delaware City Refining Company Accident (November 2015)**: A flash fire at a US refinery burned a worker, linked to faulty maintenance procedures.[xii]

    d) **Upper Big Branch Coal Mine** explosion, **(April 4, 2010,)** when 29 died[xiii]

    e) The **BP oil well disaster** in the Gulf of Mexico, **(April 2010)**[xiv]

SMM gives a company the best chance of achieving its business goals while attending to the necessary functions of equipment maintenance. The need for it will continue to increase for these reasons:

- System owners are requiring higher on-demand reliability and performance from their equipment, in the sense that 100% availability with zero demand is a waste of energy.

- Equipment and component development is taking place at a faster pace and this pace will continue to increase, which will lead to component obsolescence occurring faster than ever before. We need to learn how to balance this against the expectation that

systems have longer productive lives.

- Efficiency demands are increasing in terms of both system performance and in spares stock holding.

- With the reduction in the cost of IT and control systems, equipment and system complexity is increasing and building in more functional. The level of expertise required to maintain systems increases and diverges further as this control complexity increases.

- The elimination of waste of all kinds is a huge driver in the current business environment. This includes waste in terms of:
    - **Personnel** – are all utilized fully?
    - **Processes** – are all clearly defined and focused?
    - **Equipment/systems** – are all performing at an optimal rate?

- The overall drive to improve safety has been increasing steadily over the last 15 years, and with recent changes in legislation, this will become even more important to senior executives. The overall driver will be a zero tolerance on meeting all safety requirements.

- Concern for the environment has and will become far more stringent over the next few years.

- We have seen a huge drive to ensure tighter quality control on products, and we will see this drive continue.

- Cost control has and always will be a serious driver in business, and we will see even tighter costs controls being applied to the maintenance environment as we try to prolong equipment life and reduce operating costs through efficiency improvements.

- Businesses have learned to their detriment that they need to remain flexible, and business models and environments will continue to change rapidly. Maintenance teams need to be increasingly flexible with their maintenance plans in order to respond to the changing needs of the business.

The practice of maintenance has gained enough status to form a professional organization, Association for Maintenance Professionals, complete with its own website, forums, and blogs.

The HOW of SMM

Once they are convinced of the value of strategic initiatives, many companies rush to develop and implement their plans of "World Class" or "Best Practices" strategies. Unfortunately, the results often fall far short of expectations. When they analyze their failures carefully, the root cause usually is due to some very common issues.

Here is what we suggest. Before ordering their "World Class – Best Practices" hats, T-shirts, and memorabilia for the inevitable cheer-leading launch of their maintenance initiatives, we urge potential maintenance managers to look back to the definition of strategic planning, "…the *process of determining a company's long-term goals and then identifying the best approach for achieving those goals."*

If the practitioners of maintenance management want to be considered "strategic" and an integral part of the business, they must take care to align the objectives of their maintenance practices with those of the business. Failing to do that risks their being lumped in with the machinery and equipment they maintain as necessary business costs that should be reduced at every opportunity – including workforce layoffs!

Here are some issues for initial strategic planning consideration:

1. **How closely do your maintenance management objectives align with shareholder and stakeholder expectations?**

    a. If business expectations are for a particular level of production, can the existing maintenance plan support them, or do we have to develop a new one?
    b. What is the capacity level at which the machinery must operate and for how long to meet those expectations?
    c. Can the equipment even perform to those levels? How do you know?
    d. Does this greater performance requirement increase the risk to the operators and maintenance technicians?
    e. Do you have the spare parts available to do it?
    f. Do you have the skilled technicians available to maintain the equipment at these higher levels? Have you developed any "bench strength" within your maintenance ranks in case your primaries are out?

2. **How well do your (or <u>will your</u> if planning for a new business initiative) maintenance objectives meet customer expectations?**

   Customer expectations vary with the industry. Transit customers want a smooth, clean, and reliable ride. They will not care how often you change the oil or brakes on any given bus as long as there is a bus at the corner when the schedule promises there will be one.

   Unnecessary oil changes and brake replacements will drive up operating costs without improving customer satisfaction. The maintenance objective is to find the optimal combination of maintenance schedule (without getting into repair or replacement) and customer satisfaction that will generate the greatest profit with the lowest costs.

3. **Where do the business needs of other functions within the company – human resources, sales and marketing, financial, procurement, etc. - intersect with the maintenance objectives?**

   a. **Human Resources** – Do you have the available (in-house or 3rd party contract) maintenance talent needed to meet corporate objectives? Can they recruit the talent that you need for maintenance? Do they have strong relationships with technical schools and professional associations? Do they have workforce development and training initiatives that will help develop the talent internally? (We will discuss this in greater depth later.) Do they have the policies and initiatives to retain the critical talent?

   b. **Sales and Marketing** – Can your equipment and machinery support the kinds of commitments sales and marketing are making to customers?

   c. **Financial** – Can they raise more capital or increase credit based on the condition of the equipment and machinery? Can any gains be realized in reduced insurance premiums based on the maintenance objectives and practices?

   d. **Procurement** – Can you get the best quality parts (or raw materials) at competitive prices on a reliable basis to minimize impact on production? Do you have a sufficient supply of on-hand parts? Do you have enough confidence in their supply-chain management skills to reduce your in-house inventories and stocking costs?

   e. What is our realistic **self-assessment** of our ability to meet the desired business objectives?

When assessing the ability of the existing equipment and/or machinery to meet the desired business outcomes, there are only two choices:

- We can meet them with our existing capacity (Note: "Capacity" includes the total organizational capabilities of the equipment and its operators and maintainers, the materials suppliers, the product marketers, etc.)

- We cannot meet them with our existing capacity

If we decide that we <u>can meet</u> the new business objectives, these options are available:

- **Administrative, operational, or procedural changes in the existing maintenance practices** – Small "fine tuning" adjustments using any lessons learned from the past that can help to optimize productivity.

- **Workforce configuration** – Can we make any changes in the training programs or skill level requirements to maximize productivity in the next year?

- **Renewal and replacement policies** – Should we evaluate the existing renewal and replacement policies for potential cost reductions or production impact?

If we decide that we <u>cannot meet</u> the new business objectives, these options are available:

- **Change expectations** – can we adjust the expectations or productivity or risk management?

- **Redesign** – can we redesign the workflow, the work floor, or anything impacting production to help us meet the new objectives?

- **Acquisition** – Can we acquire resources through either purchase or contract to help us meet these new objectives?

***Please note a word of caution here**. There is more to determining whether the business can meet the desired objectives than by simply comparing them to past productivities.*

Just because the machinery, equipment, and staff met the desired goals last year doesn't mean they can do it next year.

The business environment may not be the same when you consider:

- ✓ ***Regulatory issues** – Have they changed or expected to change soon enough that may impact our plans?*
- ✓ ***Political or economic issues** – Recently (2024) many businesses have been hesitant to make long-term plans for the future based on uncertainty in the political and economic climate.*
- ✓ ***Reliable performance data** – Are we are confident that we have a grasp on the condition of our equipment and/or machinery to forecast capabilities confidently?*
- ✓ ***Past history** – Do we have a reliable history of our performance ("lessons learned") so we can avoid a repeat of past problems?*
- ✓ ***Contractual agreements** – Will our existing contracts with vendors (and possibly labor) allow us to meet these new business objectives? Do our vendors have any potential issues that may keep them from supplying us?*
- ✓ ***Maintenance management practices** – Are we are comfortable with our abilities to manage and maintain our assets? This means the human (the maintenance "bench strength" that we mentioned earlier) and knowledge capital as well as machinery and equipment.*

Skills and Talent Development Issues

The availability of highly skilled and experienced technicians available to any single employer is on a downward trend as we identified earlier. This is due to retirement, competitors lure them away, and poorly planned and executed efforts to attract, develop, and retain skilled replacements.

Some questions that employers should ask themselves about skills and talent development in their SMM planning are:

- What is the maintenance skill level for each machine or piece of equipment required to deliver the performance of the business demands?
  - Is there preferred or requisite previous experience associated with the positions?
  - Do we have a means to develop those skills levels?

- Do we have a plan to locate, recruit, retain, and develop future technicians?
  - Do we have a benefits package that would help us retain this (and all other companywide) talent?

Unfortunately, many employers rely on less skilled technicians to do more work or attempt to train others to help them. The problem with this is that skilled technicians *are not skilled trainers,* and the novice rarely gains much useful knowledge in this attempt. (We include a model later in this course as a resource for managers who may not have the luxury of a training-and-development function within their organization.)

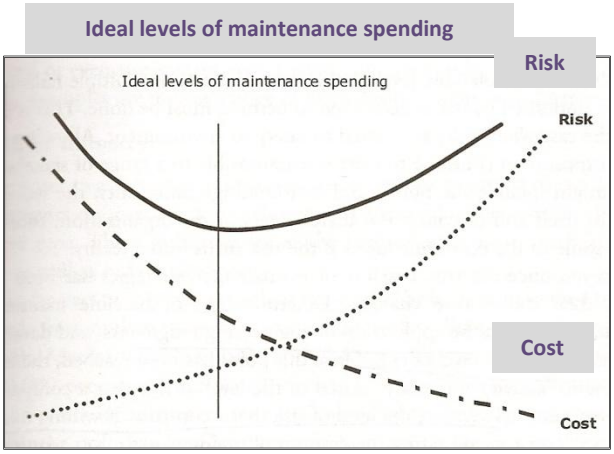
Skills and Talent Deployment Issues

Some questions that employers should ask themselves about skills and talent deployment in their SMM planning are:

- How many people are required (as opposed to assigned) to maintain the equipment or machinery for the site?
- How much reactive work should there be - and how much planned work?
  - How do we know?
- Where is the best place to locate the response teams, and what do they do when not responding to system malfunctions?
  - How do we know that is the best?
  - Where should they not be located?
  - What should (can) they not be doing when not responding?
- Who should be responsible for the general equipment cleanliness?
  - Why are they the best choice?
  - What is the optimal plan for that work?
- Which teams provide the best response times?
  - Why are they better?
  - Can we duplicate the reason to other teams?
- Which teams complete the most planned maintenance activities?
  - Why do they complete more?
  - Can we duplicate the reason to other teams?

Reliable Measurement Issues

A simplistic view of maintenance management would be to envision an automobile's dashboard with its various gauges for fuel level, electrical charge, engine temperature, engine speed, vehicle speed, and oil pressure that gives the driver a remote, yet real-time status report on the vehicle. Although it tells the driver what is happening, it does not provide a cost/risk analysis of each piece of data.



For example, what is the cost/risk of running out of gas? Is it different for on a city street than it would be on the open prairie? What is the cost/risk of running your engine without sufficient oil pressure? While it is nice to know how much fuel or oil pressure we have, that knowledge is only part of the value of the data. Sometimes we forget the message behind the familiar gauges we see every day.

The traditional graph of the cost/risk relationship discussion almost always simplifies the greater issues beneath the surface, and we fail to assess it critically for our situation.

Look at these pairs requiring maintenance. It becomes evident there is much more to this discussion than a simple inverse relationship:

- Contrast a *soft drink bottling plant* with a *nuclear power plant* (both are "plants" but are the potential risks the same if you manipulate the cost or maintenance frequency variables?)
- Contrast a *bank's check processing* center with a *pharmaceutical processing center* (similar names – processing centers – but different potential risks if something stops or goes wrong)
- Contrast a collection of machinery called a *diesel locomotive* with a collection called a *nuclear-powered submarine* (If the collection of machinery called a locomotive is not well maintained, it stops. What happens if a submarine's crew does not maintain the machinery and it stops?)

These paired examples should make the point that *there is not always a direct link between the cost of maintenance and its associated risk level.* Do not let the graph mislead you.

Miscellaneous Issues

Some additional SMM planning questions and issues for consideration are these:

- Which issues regarding any aspect of your maintenance are on-going and which are new?

- What is the impact of on-going issues on your maintenance planning (financial, scheduling, production, supply chain ripples, etc.)?

- What SHOULD we measure to support our strategic planning as opposed to what we CAN measure? In other words, do we start with identifying the information we need to know and then ask, "How can we get this" or do we start with the information easily available and ask, "What can we do with this"?

- Can we measure and predict how the system copes with changing live production volumes (as opposed to test volumes)?

- Can we identify existing and potential load balancing issues?

- What measurables should we use to determine equipment performance over time to understand and predict potential downtime?

- Do we understand the relationship between error reports and the actual cause of the problems? Are there any common causes or trends that we should investigate?

- How can we determine the worst performing equipment? Why is it performing at undesirable levels? Has it always been or just recently? If always, why do we still have it?

- Do we have a business-wide understanding of what "optimized production" means? Do we have measurables as part of that definition? What measures will help us determine the effectiveness of the maintenance in optimizing production performance? What are the various components of "optimized production performance" for our operations?

- How do we identify when it is best to perform maintenance on the system? Can we develop prioritized maintenance schedules within various scenarios dealing with unexpected supply chain problems, power outages, labor disputes, etc.?

- Have we established a baseline of system performance prior to performing the maintenance or enhancement so we can monitor the effectiveness of the maintenance or enhancement post-implementation

- Do we have a strategy for component replacement? Do we have a means of determining whether we should refurbish or replace a component? What criteria do we use for determination?

- How do we identify potential equipment breakdowns in advance of system breakdown?

- Is our maintenance regime optimally effective and are we working on the right equipment? How do we determine "optimally effective"

- When there are problems in specific areas, can we determine whether it is an adjustment issue or is it a flow saturation issue? How do we know? Are these problems predictable?

- Has the improvement had a negative ripple effect to another piece of equipment further down the line?

A Model for SMM

Here is a sample plan that will illustrate some of the considerations involved with developing a strategic maintenance program if you do not have one. Sometimes, the most daunting question is, “There is so much here. Where do I start?”

If you are a novice to this topic, this model will give you enough of an understanding about the process to discuss it intelligently with senior management or any consultants the company may bring in.

We will use a hypothetical situation of developing the maintenance requirements for a baggage handling system in a new airport terminal.

Step 1 - Identify all Assets

Assets are assets, what can be difficult about identifying them? Well that depends entirely on how extensively you want to define one. Take a baggage conveyor for example - do we take the asset structure down to component level, such as the drive motor, or do we leave the asset at conveyor level and take a motor as a component? Either approach will work but you cannot have it both ways. The importance here is not how you identify the assets but that you are consistent throughout your system.

Ultimately, asset identification becomes a fine balance between the identification of local classes (similar equipment) and discrete equipment (one of a kind, dedicated equipment.) This may sound simple, but there is an art to doing it in a way that helps to simplify the development of your overall maintenance strategy. (We will try to clarify what local classes mean in Phase 2.)

Step 2 – Identify their Criticality

Once you have identified all of the discrete assets in your system, you will need to define how critical they are to the performance of your business. A practical way of doing this (using our airport model) is to take a process layout of the system, and mark off large areas such as "Check-In area A" or "Bag delivery area B,” which has a measurable impact on your production or business.

Next, apply a series of business-related questions with five possible realistic answers to each one such as:

1. What would happen to our business if "Check-In area A" was out of operation for 24 hours (or the time needed to repair it)?
   a. Production loss of over $1Million
   b. Production loss of over $500k
   c. Production loss of over $X (some number of your choice)
   d. Significant production loss that we could supplement somewhere else (must get agreement with all stakeholders of the criteria for "significant")
   e. Minor production losses that we could supplement somewhere else (get a similar definition for 'minor")
2. How would our customers react to the identified section being out of operation for 24 hours (or the time needed to repair it)?
   a. Losses in sales in excess of $1Million
   b. Losses in sales in excess of $500k
   c. Losses in sales in excess of $X (some number of your choice)
   d. Significant losses in sales that we could supplement somewhere else
   e. Minor losses in sales that we could supplement somewhere else

Be sure to apply these questions to the various aspects of your business, such as environmental impact, media coverage, customer perception, reputation, supply chain, and any other issues that have a direct impact on them and their ability to function and operate.

The questions and their relevance might change over time as the business and its environment changes. Once the business criticality for an area has been determined, you will need to consider the failures that could take place on the equipment in that area, and the frequency at which these failures might occur.

These should not be operational issues (such as bag jams, power outages, or understaffing), but rather equipment failure issues (labeled A-C in the table sample that follows) that would require component replacement or adjustment, such as motor failure or belt adjustment.

At this stage, you should ignore the length of time it takes to repair the failure – just focus on the frequency and business risk of it happening.

Plot these two factors, **business risk** and **failure frequency**, in a table using a numerical score (we suggest 1-5) where 1 is the lowest and 5 is the highest. This will help you allocate your maintenance resources and convey to all not intimately familiar with your world of machinery and equipment (such as finance, sales, and marketing – all of the other groups within your organization with whom you have to compete for resources) the rationale behind your maintenance strategy. Repeat this analysis for all of the areas you have defined on your process layout.

Failure Issue	Business Risk	Failure Freq
Issue A (Primary conveyor belt motor failure)	4	1
Issue B (All belt tension)	3	3
Issue C	1	4

Two items you will need to be aware of when performing this activity:

- You should seriously consider any business risks that include a health and safety question in relation to people performing maintenance on the equipment. While the resulting injury could be extremely serious, an owner can readdress the risk assessments and resulting method statements or redesign the maintenance process (if possible) without increasing the business risk.

  If the business risk is too high, then you might consider doubling up on the equipment to reduce it. (But remember, twice the equipment also increases an injury risk when maintaining it.)

Reality Check -

The preparation and presentation of your strategic maintenance plan is also a political tool to help you compete with any flashier, higher profile parts of your organization when competing for budget monies or facetime with the boss.

- All of the equipment and process routes in an area do not necessarily fall into the same criticality as the main routes for the area. You will need to identify the main process routes, secondary and tertiary process routes through the area and assign lower priorities based on their potential impact on the area.

This process should be kept as simple and flexible as possible, and ensure all decisions are well documented to eliminate the possibility of misinterpretation or to support any decisions made. (The CYA – cover your *assets* – concept applies here, too) .

Remember that the business need and market forces will change over time and this critical review will need to be re-evaluated fairly frequently (usually annually or in major shifts of the

economy) to ensure you are still applying the correct strategies. Changes to your environment could quite possibly change the maintenance plan you have adopted for the equipment on site over time.

When looking through all of the equipment on your site, you may notice that there are several pieces of equipment that are very similar. The probability is high that the maintenance strategy applied to them can be the same, while making allowances for various criticality levels.

An easy way to identify these equipment groups is by giving them a Local Class designation. Develop the maintenance strategies for each of these local classes while defining different frequencies (and strategies if necessary) for all five criticality levels at the same time.

Based on your list of local classes, you will need to:

1. Draw up a list of every maintenance activity that you will possibly perform on this equipment/local class, including:
    a. **Component replacements** where you need to consider the level at which you want to carry out your maintenance. For example, if a bearing on a motor failed at a site in a large city, the replacement unit cost less than $50 and it was easy to get, you might choose to replace it instead of repairing it. But the same situation in a more remote location where replacement may cost the same but not be as readily accessible may mean you choose to repair it.

    b. **Component adjustments** cover activities such as belt tensioning, oil replacement, parts realignment, or defragmenting hard drives on system controllers.

    c. **Cleaning activities** are all that cover the equipment and the immediate surroundings. Although cleaning could fall to a lower skill level, it should never be ignored from the maintenance plan as it forms part of a holistic approach to maintenance. Simple cleaning in some systems can reduce downtime by reducing dirt in the system and identify potential problems if your staff just observe their surroundings instead of blindly focusing on the equipment they clean.

    d. **Conduct inspections** including visual inspections, stoppage inspections, and regulatory inspections.
    e. **Make condition-based inspections** such as vibration, thermography, and ultrasound. If there is no in-house expertise to perform these activities, you could contract them out to specialist companies to perform the work.

2. Estimate the following:
    a. How long each of the identified tasks will take to complete (Mean Time to Repair [MTTR]), and how many people will be needed to complete the work.

    b. Predict the Mean Time between Failures (MTBF) for replacements and adjustments. To define the MTBF, you might want to look at the design or predicted life of a component that you intend to replace or adjust.

    c. Decide if the work will require the equipment to be isolated in order to complete the work.

    d. Define one of the following strategies for each of the criticalities you are using
        i. **Time based** where you define a set frequency to perform the maintenance activity. Unless the equipment vendor can provide recommended time intervals, you may have to rely on thermal inspection (thermography) or vibration inspection (vibration monitoring) and excellent record keeping to build your database for maintenance frequency.
        ii. **Operational based** which sets out the flow or operations required between maintenance activities (hours of running, units produced, etc.)

        iii. **Condition Based** using an inspection or other strategy which will identify the onset of failure and allow for reaction time to address the failure.

        iv. **Run to fail** which allows the component to fail before replacement or adjustment. (Changing burned out lights or fuses)

    e. As part of the creation of the maintenance strategies, you can also develop safe working practice method statements and generic risk assessments for all of the maintenance tasks that you have identified. These method statements and risk assessments are an ideal way of helping to develop a training plan for new employees.

Step 3 – Construct the Maintenance Plan

You can develop steps 1 and 2 simultaneously but need to finish them before starting step 3. By now, you will know:

- All of the equipment you plan to maintain

- How critical it is to your business
- What maintenance you will perform
- The strategies you will use to maintain it

We now need to construct a maintenance plan for each piece of equipment. Taken together, these equipment maintenance plans become your strategic maintenance management system. You can combine them into large binders, online files on your internal system (if you have one), or your Computerized Maintenance Management System (CMMS) if your company is that advanced.

In a spirit of complete disclosure, this task can become very daunting! Do not quit now! If you calculate the number of equipment units you have needing maintenance and the number of maintenance activities per unit, you will have created a very intimidating mountain of PM tasks.

(This can also be to your advantage if you consider the documentation you put together to get this result. **Imagine dropping several huge binders of supporting documentation on the table in front of you during budget meetings to justify your requests when you are competing with other groups in your company for funding.** The sheer size and volume of your "props" should sway the decisions in your favor. If a picture can speak a thousand words, imagine what 20 pounds of documents in a budget meeting can do for you!)

In order to develop a manageable maintenance plan, you will need to identify and group these PM tasks together, based on frequency, strategy, skill and on a physical grouping of equipment to restrict the impact on the system during an inspection when you must turn it off.

We suggest you consider one person for a maximum of 4 hours per maintenance route. This will minimize the impact on the system if you have to shut it down and increase the likelihood of task completion during a shift.

At this point, there are a few key items to consider:

- Your maintenance plan needs to be flexible:
  - It should allow you to review and enhance the strategy, adding/modifying/deleting tasks or check list items.
  - It should allow you to review criticality (impacting on the frequency and strategy applied)

- Every time these change, you must consider the ripple effect upstream and downstream in the maintenance routes and update any associated checklists.

- Reassess any changes in risk

As additional benefits, the development of a strategic maintenance management process can also help to:

- determine *and* justify the labor needed to support and maintain the system
- anticipate the equipment spares consumption for the future
- create the training material used to train the technicians on the maintenance of the equipment

Model for Developing In-house Talent

This section is part of a staff development and training guideline the author created for a client in the banking industry. The client was small enough that it did not have a dedicated training department but was fortunate in having quite a few talented department managers and supervisors who were able to take these basic concepts and apply them successfully in their respective areas.

These are some benefits they reported as results from using these guidelines – AND YOU CAN GET THEM, TOO!

- Improved their abilities as leaders to articulate the performance expectations of their employees
- Learned how to define their expectations in measurable terms
- Learned how to develop useful training aides that made learning, retention, and application much greater
- Learned how to provide "bullet-proof" documentation based on measurables to Human Resources supporting their recommendations to retain, promote, or terminate employees.
- Learned how to construct evaluation events ("tests") to determine confidently whether the trainees where learning the intended material
- Were able to develop skilled operators much faster than their traditional "watch me" practices
- Gaining new hires or transfers with a clear understanding (based upon measurables) of what the organization expects of them and what they can expect in return
- A method to document objectively through testing whether the new hire understands what is expected and you have done your job.
- A reduction in the risk of potential litigation for your employer by providing fair, consistent, reasonable, and performance-based training for new hires

Do not be put off by the banking references you see here since you do not work for a bank. Just consider the fundamental lessons and apply them to your maintenance situation. You will be surprised at how universal these teaching elements will be.

Like the world of maintenance, the training profession has had its periods of true evolution and growth and its eras of simply giving a new name to the old practices and pretending something new is happening.

Employee training became employee development which evolved into workforce development followed by workforce learning, etc.

Regardless of what you call it, welcome to the world of teaching people to do new things!

The Foundations of Internal Talent Development

Employee training should never occur in a vacuum without:

1. Some specific behavioral outcomes in mind (they must be able to do something new, better, or different)

2. A planned method and means to reinforce the training afterwards

   This can be via teaching others what they have learned via "lunch-and-learn" meetings, one-on-one training of coworkers, mentoring, or getting on-the-job feedback from their management. We recommend the trainers communicate frequently with management at all levels so they (management) will know the course content supports business goals.

3. A foundation for desired behavior in every job function based on measurable activities for quality, quantity, and time as much as possible

4. An organizational understanding, from top to bottom, of the need to express employee performance in measurable terms of quality, quantity, and time as much as possible.

The Value of Setting *MEASURABLE* Goals

There are at least four reasons why you should set *measurable* goals:

1. **Knowing where you are going will help you design the training to get there.** If you do not know what your training target is, how will you know when you have reached it?

2. **Measurable goals (milestones) along the way to your ultimate destination help you track your progress.** If you cannot tell whether you are making progress, how will you know if your training is working?

3. **It is easier to link your training to business outcomes.**
   Executives are more willing to fund and expand training if they can see measurable outcomes that either increase productivity or reduce expenses.

4. **Finally, achieving measurable training goals that are linked to business outcomes increases your value to the organization.**

Workforce Training – Expense or Investment

Research conducted by the National Training Laboratories identified average training retention rates by method of training/teaching used. Here are their findings:

Training/teaching Method	Retention Rate
Teach Others or Use Immediately	90%
Practice by doing	75%
Discussion Group	50%
Demonstration	30%
Audio-visual	20%
Reading	10%
Lecture	5%

This tells us that we must create an environment or organizational culture that requires and supports post-training practice and teaching of others for maximum retention. This teaching of others can occur as departmental "lunch-and-learn" sessions, direct one-on-one training of someone who did not attend class or a mentoring program for the topic learned in class.

A simple way to increase retention by teaching others is the use of the teaching technique called "triplication" which is explained later on in this course.

Training employees without a structured way to reinforce it is simply a waste of valuable resources such as:

- The instructor's time and wages
- The employee's wages and lost productivity while in training
- The patience of senior management waiting for tangible and enduring outcomes

Some common problems with internal training conducted without a plan:

- We show them what to do without explaining why or when to do it.
- We do not provide useful documentation.
- We provide little or no instructional material.
- We use jargon and acronyms without defining their meanings.
- Other people are usually interrupting the training.

- We forget they may be nervous and not able to retain everything we throw at them.
- Our training may not be consistent with a series of new hires.
- We are in a hurry because our personal production goals are not diminished even though we are doing new hire orientation and training development.
- We do not have a way of measuring learning.
- We tell them all that we *remember* to tell them not what we should be telling them.
- We sometimes tell them all the things to do but *forget to tell them the things not to do.*
- We tend to pass on bad habits that can lead to problems later such as short cuts.

The Employee Development "Big Picture"

Risk Avoidance

- Safety
- Workplace Violence
- EEOC topics

Employee Development

- New Hires
- Leadership Development
- Future Leaders
- Operational skills (OJT)
- Executive Development
- Professional Refreshing

Compliance

- OSHA
- Government Regs.

All employees' training must be based on achieving measurable performance outcomes. These outcomes have direct links to business needs.

The organization has a performance assessment system based on quarterly employee performance reviews that allows employees to self-manage their performance.

Functional job descriptions throughout the organization include performance standards with quality, quantity, and time references.

The organization's management from top-to-bottom understands the difference between "busy" and "productive" and uses that understanding to define all activities.

(We define "productive" as activity outcomes described in measurable terms of quality, quantity, and time. *He produced 10 widgets, with zero defects in an hour*.

If it does not have all three elements, he was just busy. *If he produced 10 widgets with no quality criteria or produced 10 with 0 defects without a time specific means nothing for planning purposes.)*

Training Beliefs Quiz

Take a moment to think about these questions...

- How does ***learning*** differ from ***training?***

  Learning focuses on "gaining knowledge" while "training" focuses on 'applying knowledge". Employers do not pay employees just to KNOW things but to APPLY that knowledge in making it easier for customers to deal with the organization

- Why would it be important for an effective trainer to know the difference?

  So, the trainer focuses on trainee PERFORMANCE OUTCOMES not just knowledge. In other words, the focus is what they can DO, ***not*** *just what they KNOW.*

- Who is responsible for the *identification* of the new hire orientation and training needs?

  The department manager identifies what the employee will be paid to do and at what performance levels.

- Who is responsible for the *design and delivery* of an effective new hire orientation and training program?

  The trainer designs and delivers training that will enable the trainee to achieve the performance defined by the department manager.

- Who is responsible for the *implementation* of the new hire orientation and training material?

  The department manager can assure that the trainee applies the training on the job. The trainer has no authority on the job unless they are also part of management in that department.

- Who is responsible for the *measurement* of new hire orientation and training results?

  The trainer's responsibility is to design the training so trainee progress can be measured. The department manager is responsible for getting the measurements collected.

- Who is the **ORP person** and why should you care? (This is the *Ordinary, Reasonable, and Prudent* person who may sit in judgment of your actions at an administrative hearing or as a member of *a jury;* this is not a legal term but meant to convey the concept of a non-biased, rational person.*)*

- *What concern would the ORPman have about an employee who was injured on work-related equipment?*

  The ORP person would want to see documented proof that the employer trained the employee in the safe operation of the equipment. Otherwise, the ***possibility of negligence*** *via a lawsuit exists for the employer.*

Remember, **"IF IT**(the employee's completion of a training program**) ISN'T DOCUMENTED, IT DIDN'T HAPPEN**"

Two Broad Reasons for Discharging an Employee

An unpleasant fact of being a supervisor is that eventually you may have to recommend an employee for termination for one of two reasons:

1. The have demonstrated they **CAN DO** the job but **JUST DO NOT WANT TO** for some reason.
2. They may want the job but **CANNOT PERFORM TO THE MINIMUM EXPECTATIONS.**

If you have also been acting as a trainer to help them develop the maintenance skills necessary for your operation, it hits you even more because they have not been able to learn, retain, or apply what you have been trying to teach them.

However, if you have a written training plan based on this model and have documented the employee's progress (or lack thereof) through it, you should have little difficulty getting support for your recommendation to terminate.

You can expect questions like these when you want to discharge an employee.

1. **How did you determine *objectively* that the employee *can meet* the requirements but does not?** (His or her graduation from training certificate or records of training completed means *he/she does know how to do the job*. It is essential that you demonstrate they <u>can do the job but are not doing it</u>.)

2. **How do you know it was *willful disregard* of policies and not just ignorance of the policies?** (See the answer for #4 below.)

3. **How do you know it was *insubordination* and not just a typical behavior?** (If you have been consistent in documenting behavior, his records will show that this is not his typical behavior.)

4. **How do you know it is lack of <u>interest</u> and not just lack of <u>ability</u>? (They can do the job but just do not*!)*** *Hint: If you can document they met your standards at least once, you will have proof they can do it!*

Negligence and "Deep Pockets"

NEGLIGENCE*: "The failure to exercise that degree of care that, in the circumstances, the law requires for the protection of other persons or those interests of other persons that may be injuriously affected by the want of such care"*

"Pertaining to or involving a civil action for compensation for damages filed by a person who claims to have suffered an injury or loss in an accident caused by another's negligence: a negligence suit; a large negligence award."[xv]

Your training program documentation can save your employer – and YOU - significant financial risk! You can try to protect yourself and your employer by providing documentation for the ORPman (or jury) that can help to break the link between the employer and the employee.

When employees do something through negligence that causes harm to themselves, other employees, the public, or customers, their victim can sue the employee *and his employer* for damages resulting from the negligent act. (In the U.S., people can file a lawsuit for nearly any reason. However, that does not mean they will automatically win.)

Since employers typically have more money available to pay a financial award from a lawsuit, attorneys will link the employer to the employee in the lawsuit because the company is thought to have "deep pockets" containing a lot of money. A successful organization is a very tempting target for someone wanting to reach into deep financial pockets.

Two proven causes of **NEGLIGENCE** that have been expensive for large employers are **failure to TRAIN** and **failure to SUPERVISE.** "You knew or should have known" is a key phrase that can be very expensive in situations like this:

- ***"As their boss, you should have trained them to do their job correctly! You knew or should have known they did not know how to operate the equipment safely. Therefore, you should help pay for the injury to the employee caused by your equipment!"***

- ***"As their boss, you knew or should have known they didn't know how to do the job properly! Therefore, you should help pay for the damages the employee caused when you failed to supervise them!"***

Here are some potentially expensive problems that can occur in these litigious, everyone-is-a-victim times:

- Employee or non-employee personal injuries from operating machines where the employer cannot provide documentation they trained the employee to use it safely ("*You knew or should have known they didn't know how to operate the equipment safely!"*)

- Your employees driving company vehicles and have an accident-causing personal injury or property damage *("You knew or should have known they didn't have a valid driver's license in your state."*)

- Customer service employees saying or doing inappropriate things when dealing directly with company customers *("You knew or should have known they were not qualified to help customers"*)

- An employee harassing another employee *("You knew or should have known they were a potential threat to other employees"*)

- The termination of an employee because they could not learn to do the job. ("*You cannot prove that you gave them a reasonable chance to learn the skills to do the job."*)

Productive or Busy

Do you think a person can be very busy but not very productive? How could this happen? Do employers pay employees to be **busy** or **productive?** Is there a difference?

This course takes this position*: activity without a defined outcome that cannot be measured for quality, quantity, and time is just being **"busy."***

However, *when you describe a task with those three critical performance standards, you establish goals, and the employee becomes **"productive."***

Effective Work Performance Goals

Employees are paid to be productive which means their goals should have elements that define quality ("how well"), quantity ("how many"), and time ("by when").

- The ***functional job description*** defines (or should define) a job's work performance elements.

- The **employee performance assessment** documents the employee's productivity over the year. Typically, it covers the entire spectrum of possible performance from "worst" to "best" with "minimal acceptable behavior" roughly in the middle.

You must base your maintenance-training program on the functional job description for the position with the "minimal acceptable behavior without getting into trouble" description as the goal of the training. (Think of the *"minimally accepted behavior"* as a 'C' from grade school. Parents may tell a child, "You have to get at least a 'C' to keep from being grounded this semester!") If you do not have a functional job description available, the first step is to create one! It gives you the training roadmap you need to identify performance expectations.

Here is an example of what we mean. Suppose your employer is a financial organization with a position called *"Customer Statement Machine Operator."* The functional job description for that job will (**or should**) tell us about the requirements for the job in terms of quality, quantity, and time.

For example, "The minimum requirements for this position include:

- Demonstrate an ability to conduct a "pre-run" check on the machine (This would have measurable descriptions such as a particular pressure reading, safety locks engaged, etc. Remember, visually seeing that something is engaged, or present is also considered a 'measurement.' "Demonstrate an ability "is a provable concept while just saying *"Understand how to do something"* is open to interpretation.)

- Start the machine for the day's work within 15 minutes (***time)*** of coming on shift.

- Produce a minimum of 2,500 ***(quantity)*** statements per hour ***(time)*** with not more than 3 errors ***(quality)***."

The employer's performance assessment scale runs from 1.0 (worst) to 5.0 (best) with 3.0 as the "minimal accepted behavior without getting into trouble." Our new-hire training program for this position should have its goal as ***the 3.0 performance level!*** In other words, get them trained to begin gaining relevant experience safely without supervision. We will develop this concept farther in a later section.

To go beyond that n training is a waste because:

- He can improve his skills while being productive on real work. We define the 3.0 performance level as the ***lowest productive performance level***.
- You can be working with another employee as the trainer.

Think of a driver's education class you may have had in high school. The fundamental purpose was to teach you the *"least you needed to know to start getting experience safely."* It would have been a waste of time to keep you in class driving once you had mastered the basic requirements.

The same rationale applies to learning how to maintain your equipment and machinery. Once your trainee is competent to perform at a minimally acceptable level, why waste time to train them beyond that? The employer pays them to be productive, not to be a student.

Check for Understanding

Read each situation below and put a checkmark under the appropriate "Productive" or "Busy" column. Remember, we define "productive" as having all three elements of **how much (quantity)**, **how well (quality)**, and **by when (time)** present in a situation.

The situation	Productive	Busy	If "busy," what is missing?
Grant has been pushing the cart loaded with statements up and down the hall for the past 45 minutes.		**X**	No "quality" included although it is obvious he is not accomplishing anything.
Logan has processed 2,000 documents in the past 3 hours.		**X**	There is no "quality" element. Are they the correct ones? Were they processed accurately?
Murphy has the sorter running items at a speed of 37,500/hour and a reject rate of .82%	**X**		This has all 3 elements of quality (.82% reject rate) and quantity + time.
Cindy completed 6 hours of accounting classes this quarter at the junior college.		**X**	There is no quality. If she took the class and got an "F," she wasted her time.

From Functional Job Description to Training Manual

Although different human resource departments may define functional job descriptions in many different ways, there are some common traits that you should know. After all, there is a strong possibility that your organization may not have any, or at least defined well enough for your training purpose and you may have to develop some of your own.

A functional job description describes the **functions necessary to do the job.** It assumes all the tasks associated with a job consist of a critical few and the trivial many. Think about a position called "Entry Level Operator" in the maintenance department of our hypothetical plant.

Take a sheet of paper and start breaking down the position like this to create the functional job description:

1. List the 5-7 essential tasks a person in this job MUST DO. (Do not include things you would like them to do that someone in a similar position could do, also. Focus on the critical few that are specific to this position.)
    a) Essential task examples:
        i) Conduct all pre-start machinery and equipment sequences on a daily basis at the beginning of your shift
        ii) Start all machinery and equipment according to proper procedures and bring to operating levels awaiting start of production
        iii) Conduct appropriate Tier 1 maintenance on all machinery and equipment according to the appropriate schedules in the maintenance manual
        iv) Monitor all operating instruments during production as indicated in the operations manual
        v) Conduct post-production shut down of all maintenance and equipment according to the operations manual.

    b) Non-essential task examples that can be done by anyone available:
        i) Answer the phones
        ii) Take messages
        iii) Help to keep the work floor clean

You can tell the department to share the responsibilities of the non-essential tasks. We have separated them to make it easier to focus on the few critical things they must do. Otherwise, it becomes very tempting to list all the things you would like employees to do, and the job description becomes too broad and generic to be useful in developing training.

2. Having identified the critical functions of the job (see #1a above), we must define the activities within each task in terms of **quality, quantity,** and **time** to use in their performance reviews and as the foundation for their training.

   Conduct all pre-start machinery and equipment sequences on a daily basis at the beginning of your shift

   We will use a 1-5 range where 3 is the minimally acceptable performance level and 5 is the best. *HINT: It is easiest to do if you begin with the "3'" performance level – the least they can do to get a satisfactory rating - and then adjust the performance higher/lower to get ascending/ descending scores*.

Functional Activity	Score
Have all (**quantity)** of the primary and secondary units tested and running at levels specified in the maintenance operating manual (the specs are the **quality** standard) within 12 minutes (**time**) of the beginning of your shift. *[The time element changed downward while quality and quantity remained the same.]*	**5**
Have all (**quantity)** of the primary and secondary units tested and running at levels specified in the maintenance operating manual (the specs are the **quality** standard) within 20 minutes (**time**) of the beginning of your shift. *[The quantity element changed while quality and time remained the same.]*	**4**
Have all (**quantity)** of the primary units tested and running at levels specified in the maintenance operating manual (the specs are the **quality** standard) within 20 minutes (**time**) of the beginning of your shift.	**3**
Have all (**quantity)** of the primary units tested and running at levels specified in the maintenance operating manual (the specs are the **quality** standard) within 25 minutes (**time**) of the beginning of your shift. *[The time element changed upward while quality and quantity remained the same.]*	**2**
Have any amount less than all of the primary units tested and running at levels specified in the maintenance operating manual within 25 minutes of the beginning of your shift **OR** all of the units running but taking more than 25 minutes. *[The quality element does not change but quantity and/or time is variable.]*	**1**

3. Use the minimally accepted performance level of "3" – the least they can do to get a satisfactory performance assessment – as the goal in training that skill.

Example: "Have all (quantity) of the primary units tested and running at levels specified in the maintenance operating manual (the specs are the quality standard) within 20 minutes (time) of the beginning of your shift."

Now you can focus on teaching the testing and running of all of the machines using the operations manual as a guideline. Allow them to keep practicing until they can get them all running within 20 minutes.

There is one final point to make about the performance criteria example above using quality, quantity, and time elements. You are not limited to what we did in the example above.

You can adjust any one of the three elements that is reasonable within your system to create progressive achievement levels. Your progressive goals can vary with time, quality, or quantity. As long as all three are present in any single task requirement, you will have productivity.

At this point, we will not go farther down into the training development. Rather, it is time to step back and take a long look at the entire forest before we start analyzing the trees.

Developing Your Maintenance Training Plan

Start by giving your trainee an overview of **WHAT** your department does. You can provide this with a video, or a written explanation accompanied with a tour of the department. In our banking example, we would say something as, "*We do research on customers' account when they have lost an item, their account doesn't balance, or anything unusual impacts their account and causes them concern.*"

Then talk about **WHY** your department does this. Once again, this can be provided with a video (a video taken with any home camera can be sufficient to help employees understand the big picture and it gets the employee with the camera involved) or a written explanation accompanied with a demonstration of examples from the department. "*Sometimes customers forget they have written a check and do not deduct it from their check register. Then we do this (demonstration) to find that check. Finally, we contact them to explain that it has their signature, and it IS their check.*"

Now you can talk about **HOW** your department does this and tie it to your new person. Again, this can be provided with a video or a demonstration of a clerk actually doing it. Be sure the new person is told the WHY of the clerk's actions. "*"Sandra receives the problem from this log. It contains this information and describes the problem. Then she starts her research by going online and pulling up the customer's account.* ***This investigative work is what we'll train you to do"***

The Big Picture Strategy

These are additional questions you should ask yourself as you develop your training material.

1) **What do we expect people to be able to DO because of this training?**
   The purpose of the training must result in some new behavior such as running a machine, following the company policies, or using a new software package.

   DO NOT say the expectation is non-behavioral such as "*The trainee will have an understanding of the safety issues involved with machine operation*" because you must have some kind of skills-learned documentation for the ORPman. How could you prove their understanding?

   IF YOU CAN HELP SOMEONE UNDERSTAND THE "WHY" OF SOMETHING, THEY CAN USUALLY FIGURE OUT THE "HOW" FOR THEMSELVES.

   You could reword the expectation to say, "The trainee will be able to list, demonstrate, and explain the safety steps involved in performing maintenance on the Acme 2020 machine."

   The trainee's written (and dated) list in his/her own handwriting, their verbal discussion of the steps, and physical demonstration to the trainer would be strong proof that they had learned. (It would be nearly bulletproof if you could film their actually doing it safely while describing their actions.)

1) **Will I be delivering the right content?**
   What is the "right content"? A simple guideline is anything that helps you accomplish the purpose of the training. If it helps the trainee understand and learn, then it is the 'right' content!

2) **How can I prove I covered the right content?**
   The easiest proof is when the trainee can perform the desired behavior within the desired time at the desired quality level.

3) **How can I measure the effectiveness of the new hire orientation and training?**
   If the training manual describes the desired behavior in terms of quality, quantity, and time, and it delivers the desired trainee behavior, then by default, it is effective.

4) **Are all the employees current on the training?**
   Are you sure your older, existing employees are current on the new material, too, or are you just focusing on the *new hires?*

5) **Will I Be Delivering The Right Content?**
   Always START WITH their job DECSRIPTION AS YOUR TRAINING GOAL! Their job description should identify what you pay them to do and have measurable performance levels. (You start at the end result and work backwards to develop the path to the goal.)

It tells them (and you), "Here is what 1.0, 2.0, 3.0, 4.0, and 5.0 performance levels look like in our department." If you have not clearly told them what success looks like, can you honestly expect them to achieve it?

Your training will focus on a path that will take the new hire to the 3.0 performance levels for 2 reasons:

- That is the lowest level for performance we will accept without counseling
- Training them farther will delay getting them to productivity. They must develop their own skills through practice to become more productive – not through more training.

Other potential topics include:

1. The "What's in it for me" (WIIFM) view helps them identify **IN THEIR TERMS** the advantages of working here and doing a good job

2. The **"world view"** tells them what happens in your organization's world and shows them how your department fits into the big picture.

3. The **general expectations** you have of them and that they can expect from the employer.

4. What, in measurable terms, will you expect from their performance regarding:
   a. HOW MUCH? (Quantity)
   b. HOW GOOD? (Quality)
   c. BY WHEN? (Time)

How Can I Measure the Effectiveness of the Training?

By testing them at each milestone along the way to graduation with a 3.0 performance level

QUESTION:
"How often should I test?" **ANSWER:** "How much re-training are you willing to do if they fail a test: one day's worth, one week's, one month's, or all of it? The most re-training you're willing to do will determine how often you give tests."

Will you include performance tests only, performance and written tests or take their word that they understand how to do it?

TYPE OF TEST	ADVANTAGES	DISADVANTAGES
Do not give a test. Just take their word they can do the task and understand the words, terms, policies, and procedures.	This is the easiest to administer. (Just ask them.) It is the least time consuming.	No documented proof they can perform the task or understand the associated material.
Performance test only	It is easy to observe and document how they could perform the task.	Time consuming.
Give a written test only.	It is easy to administer and gives the employer some documentation of learning.	***Knowing*** what they should do does not mean they ***can do it.***
Give a performance and written test	Easy to administer, observe, and provides the best documentation of understanding of words, terms, policies, and procedures associated with the task and ability to perform using that knowledge.	Even more time consuming.

- **How will you present the new hire with the words, terms, policies, and procedures you want them to know?**
  Will you include a glossary of all the words and a list of specific policies and procedures with directions to learn a few specific ones at a time? (The best way to learn.)

- **How will you know they have learned them?**
  Will you include written tests with each segment of training? What kind of written tests? Here is a guide to help you decide which kind of tests you will use.

TYPE OF TEST	ADVANTAGES	DISADVANTAGES
True/False	Easy to write and score.	50% chance of guessing right answer. No guarantee they know the material.
Multiple Choice	It forces them to select the correct answer from a list of choices. It is easy to score.	Students have a 33% (3 choices) or 25% (4 choices) chances to guess right without having to know the answer.
Matching	It is more interesting from a student's view.	Students can guess by eliminating sure answers. It is time consuming to score.
Fill-in-the-blank	Student must know the answer. Easy to score	Teacher must decide if exact match is required or "close" is OK. If close is OK, what words are considered close enough for credit?
Essay	It is the best way to determine understanding and knowledge.	It is very time consuming to grade. The instructor must prepare of list of words or terms that must be included for credit.

Quiz Samples

These are quiz sample format that you can use in your training from bank operations.

Fill in the blank

1. Items drawn on this bank branches are called _____ items.
2. A DDA account is commonly called a _____ account.
3. Incoming work that has been prepared for the reader/sorter is called _____ work.
4. The amount of daily-uncollected checks is called _____.
5. The Courtesy Amount Read amount is also called the _____.

Multiple choice

Circle the correct answer

1. What do the letters "MICR" stands for?
   A. Magnetic Image Carrier Return
   B. Magnetic Ink Character Recognition
   C. Magnetic Incoming Check Reading
   D. Mandatory Internal Check Return

2. Where are those MICR letters found on a check?
   A. Along the top side – front
   B. Along the bottom side – front
   C. Along the top side – back
   D. Along the bottom side – back

Complete the question

Notice that this format and discussion or essay requires the student to demonstrate knowledge – there is no guessing!

1. The line of MICR characters is called the:
2. What finger is used to key the numbers 7, 4, and 1 on the keypad?
3. What finger is used to key the numbers 9, 6, and 3 on the keypad?
4. What finger is used to key the Credit enter key and the Debit enter key?
5. What keys are found on the home row?

Discussion or Essay

1. Give three examples of a debit
2. Explain how to determine the amount on a Consumer Loan payment coupon, using the following information (according to today's date).

On Time Payment	Due On Or Before
$ 1176.62	( )
Amount	**Late Payment Date**
$ 1226.62	( )

3. What is the proper procedure of handling a check when you are unable to read the numeric amount of a check?
4. Explain the procedure for handling Savings Bond with an amount and without an amount.

Match each word or phrase in this list with a meaning from the list below.

Put the number of the definition from the list below next to the correct word.									
CAR (Courtesy amount Read)		DIN# (Also sequence #)		High Speed Item		Jogger		Sequence # (also DIN)	
Cash Item		Debit		Image POD		MICR		Proof Department	
Cash In Ticket		Deposit		Image Statement		On-us Check		Return Items	
Cash Out Ticket		Deadline		Image technology		On-us Item		Proof	
Code line		Encoding		Insufficient Funds		Payee		Stripped Item	
DDA		Float		Items Processing		Prepped Work		Transit Items	

#	Meaning of the Term
1	A bank statement that contains an image of the paid checks instead of the cancelled checks
2	A charge against a customer's balance or bankcard account
3	A check deposited or negotiated for cash given to a customer or when checks are cashed
4	A document used by a teller to represent cash given to a customer or when checks are cashed
5	A document used by a teller to represent cash received in a deposit
6	A number automatically assigned to items by the sorter as they pass through to help in tracing them during the processing
7	A placement of cash, checks, or other drafts with a bank for credit to an account
8	An item that read successfully on the first run through the sorter
9	An item with a white MICR line added below the original MICR line
10	Any item that a bank is willing to accept for immediate but provisional credit to a customer's account
11	Check, drafts, or notes that have been dishonored by the drawee (bank they were written on) or maker and returned to the presenter. "Bad checks" that were returned

More Typical Training Development Questions

- There will always be changes in the procedures and processes used in your organization. You must include these changes in your instructional material immediately and be incorporated into the course itself.
    - How will you make sure these changes stay current?
    - How will you "refresh" your department on the changes?

- What is the best training method?
  There is no single best method. Adult learners are individuals. Some learn better with visual demonstrations while others like to read it for themselves. Do not assume that one way works best for all.

A very useful method that will help with performance training such as maintenance is called **TRIPLICATION.** This is a three-step process of teaching and learning:

- **FIRST STEP:** The trainer performs the activity and explains to the trainee what they are doing.

- **SECOND STEP:** The trainee performs the activity while the trainer explains what they are doing. (The trainer "talks them through it.")

- **THIRD STEP:** The trainee performs the activity and explains to the trainer what they are doing.

What Training Topics Will We Cover?

We said earlier that the functional job descriptions would give us a start on skills training for their job but what about other training information they need to function here.
Topics such as:

- Where to park
- Starting and finishing times daily
- Dress code
- Attendance policy
- Any other non-performance topic that is still needed so they can keep their minds on the job we are paying them to do.

Identification of Training Topics

- List on Post-It notes in no specific sequence the TOPICS that you must cover in your training. The critical few they MUST know, not everything you would like them to know. Hint: What is the least they will need to know to get started at work safely? Remember, "safely" does not only mean physical safety but it can also refer to document, work, or CAREER safety. In other words, what is the least they need to know so they do not destroy any work or hurt themselves or others while learning?

- "What's the least they need to know WITHIN EACH TRAINING TOPIC to begin gaining experience safely?"

What are the Sub-topics to Teach?

TRAINING Sub-Topic	PREPARATION NEEDED	COMMENTS
A list of words, terms, expressions and their explanations	Pick out the ones they must know to get to a 3.0 level. They will learn the ones they should know as they gain experience.	Do not overwhelm them with a lot of new words and terms. Feed them these words in "bite-sized" chunks that they can "digest" as they go along.
Departmental policies and procedures	Pick out the ones they must know to get started safely. Tell them enough that they will not cause harm for the organization, coworkers, or themselves.	Do not try to tell them all the rules at first. They will learn the ones they should know as they gain experience.
The specific measurables of a 3.0 level of performance for this job	Take each core performance element and break it down in sequential training topic steps. For example, if this were a core performance element, "**Run 1,500 accounts/hour without assistance. This will include correct postage and fold.**" The sequential of training topics may be ***learn how to***: 1. Perform basic maintenance on the statement machine before starting it. 2. Set postage machine dates and amounts. 3. Set folds. 4. Start the statement machine. 5. Start the sheet feeder. 6. Set the speed of the machine. 7. Use the emergency stop procedure.	

The Topic Sequence

When possible, let them see or do the finished product ("the whole") before you start the training on the parts that make up the whole.

THE LEARNING SEQUENCE *DOES NOT ALWAYS* FOLLOW THE JOB SEQUENCE.

This is why a training manual is not a procedure manual! When possible, always search for the best learning sequence.

Did you know that sport parachutists are taught correct LANDING skills before they are taught to JUMP? Why would they teach out of sequence like that?

[There is so much emphasis on the last skill – landing – because that is the most dangerous part of the process. You can never get TOO GOOD in your landings!]

LOOK FOR A "CENTER OF INTEREST" THAT WILL CAPTURE THEIR ATTENTION THROUGH THE LESS INTERESTING PARTS OF THE ORIENTATION.

How Long Should the Training Take?

The basic answer is, *"It takes as long as necessary for them to function satisfactorily at the desired performance level."*

If you are tempted to say, "We can only spare 1 day for training!" be sure to ask yourself, also, "how much time can we spare for rework and fixing any problems they create from inadequate training?" In other words, **why is there never time to do it right but time to do it over?**

This may take some trial-and-error adjustments as trainees go through it. Some things to consider are:

- Does the vendor of the equipment we are training on provide any suggestions on training times?
- Are there any industry standards of training we can use for this position?
- Are there any government requirements of training length for this topic?
- How long did it take others in our department to learn this? Was that too much time, not enough (causing re-training) or just right?
- Are there any skills, knowledge, or abilities they should have before staring the training (prerequisites)? How much time should we allow them to learn that?
- Does this time allow for testing as they complete each topic?

Trainee rapport and feedback is critical!
Look for places where you can add discussions, questions, thought starters, and other activities in your planned material to engage the trainee as much as possible!

Additional Training Considerations

What materials will you need to have ready for the new hire orientation and training?

* Pens, pencils
* Forms to be filled out
* Materials or sample relevant to the work they will be doing.
* Policy Manuals
* Procedure Manual
* Visual aids
* Samples of work to show
* **WHAT ELSE?**

Useful Tools, Visuals, and Handouts

"A picture is worth a thousand words"

Without certain principles of visual communications, the 'fountains of information' turn into 'puddles of irritation". Plan your visuals as you develop your course.

Reminders for Visual Communication

- Increase the trainee's retention and attention
- Visual and text must be compatible (the text must explain the visual)
- Visuals are starting points
- Be consistent in visual element and type of visuals
- Talk to the trainees, not the board or screen
- When selecting videos, avoid 'talking heads', show them doing something
- It is easier to get information from USA Today than it is from The Wall Street Journal. Why? (A colorful format with pictures or a text-intensive format primarily in black-and-white.) Which format would make a better orientation and new hire training guide?

Simplicity and Impact

Use visuals that communicate a point

* Make the message big and simple
* Have a focus, isolate or highlight
* Use keywords
* Use number or bullet points
* Use color very selectively

Legibility

- Double check spelling and grammar
- Use sharp and bold type styles, avoid italics
- Mix capital and lower-case letters
- Use lots of clear space, white space
- Limit lines of text to about 6 lines per frame, and six words per line but you may need to use less, depending on the distance from which they will be viewed

Consistency

Be consistent in visual elements and style to reduce confusion.

HANDOUTS

Handouts are good references and make note taking easier.

Training Delivery Methods

Training Delivery Method	Using It	Avoid it if....
Structured Discussion	This allows the trainee to play an active role in the training process. The trainer's main role is asking probing questions, promoting productivity and posing problems. If you can maintain a very informal atmosphere, this will help to keep the trainee interest and participation at a high level. This provides sufficient feedback and again we are motivating through involvement.	You are short on time
Demonstration or Performance	This puts the trainer in the role of the demonstrator. It allows the trainee to learn by doing, while you stand ready to provide support. This method increases chances of retention of the learning and builds trainee confidence. This works well for user application training.	You do not have time for a thorough and clear demonstration - You cannot allow the trainee enough time to try it...with time to go through some trial and error
Laboratory or Problem Solving	This method is to soft skills what Demonstration -Performance is to application training. It allows the trainee to use what he has learned with the trainer being there to provide guidance. This affords the trainee the opportunity to test the validity of what he has learned. And time is the most important factor in making this method successful.	You are short on time
Story telling	This is an effective means of conveying knowledge. Could you develop a story to fit your topic?	You are short on time, or it is not clearly connected to the topic

Pictures can say 1,000 words	Can you convey parts of your training message in pictures?	It doesn't clearly connect to your topic
Relevant quotes or sayings	Relevant quotes can enhance your training and provide a stimulus for discussion. For example, this would be useful if your training involves getting people to follow new procedures. ***A definition of insanity: "Doing things the way you always have and expecting different results".***	It doesn't clearly connect to your topic

The Pilot Class

A pilot is a testing opportunity that helps you determine whether your training is as effective in practice as it seemed in design.

* The pilot is where you determine how the material flows and where the 'gaps' are. It identifies where your assumptions of knowledge got in the way.

* Present the pilot class to an existing employee of the organization who knows nothing about your subject. Tell them to ask questions about *anything that does not fit or seems to be assumed information.* They are the ones who will be able to tell you when something is missing.

* Pay close attention and make notes of the questions they ask during this session. These questions usually identify the content gaps which say that you should add this material to the course content.

REMEMBER the rule: "What is the least the student must know to perform the basic tasks?"

They will learn the 'fluff' as they go. Over teaching is a terrible waste of the student and instructor's time. It usually results in less learning, not more.

The Art of Asking Questions

The key to responding properly to questions is to ensure the participants feel free to ask them. This usually is assured when the environment is informal, relaxed, and focused on the learner. Strategies to encourage questions in your training

- **Be patient** Pause for a few moments after asking, "Are there any questions?". It may take them a few moments to frame their questions. Adults do not blurt out questions as they did when they were children.

- **Help them develop the question** Instead of asking, "Are there any questions about this entry?", *it is best to focus on a specific element within a general topic*. For example, *"Do you understand why we use this entry and not another one?"* This helps them as well as helps you reinforce the key learning points.

Now that you have built the

.

- **Redirect** (If you have more than 1 trainee at a time.) When asked a question, try *redirecting* to another participant. *"Good question, Logan. What do you think would be an answer, Grant?"* Be careful! You may embarrass someone who was not paying attention or does not know. Carefully consider the target of your redirection.

- **Probe** Answer a question with a question if there is the potential for greater understanding. You must help them find *their own answers* - not just become reliant on you or someone else. (Remember, if you can help them understand the why of something, they can usually figure out the how for themselves.)

Putting It All Together

The final question to ask yourself about your training program is…"Is this a *useful* new hire orientation and training manual or just a Data Dump?"

One final note:
Expect at least *three revisions* of your program after new hires have gone through it before you will be satisfied with your **work of art**!

Now that you have assembled the components of a strong training program, you will insert them into a **TRAINING SEQUENCE CHART.** This will help you see if you have overlooked anything and if your program will "flow" easily from one topic to the next.

Possible training components from which you draw material and/or to include in your training:

- Your list of training topics
- Training quizzes
- Procedure manuals
- Operators manuals

- Policy manuals
- Quality Service Standards
- Code of Ethics
- Equipment operating manuals from vendors
- What else?

Once you are satisfied that you have thought of everything you will need, you will be able to publish your department's training program.

The Training Sequence

Make a training sequence chart using this example to help you lay out your program, judge if topics "flow" easily from one to the next, and to see if you have left out anything. We will assume this is for a "Statement Machine Operator" position.

1. Write here the name of the job for which you designed this training: ***(Statement machine operator.)***

2. Explain briefly, what this job does and why it is important. ***(Machine operators produce the customer's statements every month. There is no document more important to a customer than a monthly statement of their banking transactions.)***

3. Specify the desired outcome of this training in measurable terms*: (**"Accurately run 1,500 accounts in an hour without assistance. This will include correct postage and fold".)***

3a1. What <u>prerequisites</u> are needed before they start training? ***(Review the vendor's operating manual so they understand how the machine works.)***

3a2. What <u>additional information</u> or training materials will you need at this time? ***(The operator's start-up manual from the factory and our maintenance log.)***

3a3. What is the <u>proof of learning</u> that you will use? ***(Trainee will be able to do it alone, fill out the log, and answer all questions right on the quiz.)***

3a4. What will be <u>your documentation that the trainee could perform this task</u>? ***(My observation logged in his training file plus the quiz with the trainee's name, dates, and score.)***

3b. What is the first training topic? How long and when will you allow for it?

Provide information like boxes like 3a1, 3a2, 3a3, and 3a4 above for each training topic you have.

Sample New Hire Training Schedule

This is for an Items Processing Department data entry clerk in a financial organization.

Day #	Activities
1	• The new trainees will report to the Training Room where they will introduce themselves to the other trainees. • The trainees will begin Banking 101: The Basics of Banking. This computer-based training program introduces the basic functions of a bank.
2	• The trainee will receive, review, and discuss an Introduction to Items Processing Booklet and an Image Ready Document Manual. • Introduction to Items Processing Booklet gives the trainee a general overview of the day-to-day operation of the Items processing Department. • Image Ready Document Manual shows a variety of documents that this bank uses on a daily basis. • An exam will be given on the training material. No score will be given. The results will be used to see how much they have learned and retained.
3	• The trainer will briefly discuss what is required of them while in training. • Before beginning the computer-based learning 10-key program, a general overview of the program will be discussed. • Continue One-on-One training with the computer-based learning programs every day to learn proper finger techniques and build speed and accuracy
4-10	• Continue computer-based learning training programs. • Start One-on-One training on the production floor, closely supervised, to review document recognition (show the difference between a debit and a credit).
11-30	• Continue One-on-One training with the computer-based learning programs for two 1-hour sessions. The trainee will be ready to key on the production floor when they have reached the advanced level of the training program. Stats on them will be gathered on a daily basis to inform the trainer of their progress. The trainee will be notified in writing of progress or failure in a Weekly Review given by the trainer. At the end of the first thirty days, they will receive a 30-Day Review indicating their progress or failure. • To insure comprehension of Data Entry, a Data Entry Exam will be given.
31-60	• Continue One-on-One training with computer-based learning training programs to continue learning proper finger techniques and build speed and accuracy. Once the training is complete for the day, the trainee will key on the production floor with all the Data Entry Specialists. The

	trainee will continue to receive a Weekly Review indicating their progress or failure. After sixty days, a 60-Day Review will be given indicating the extent of their progress. • To ensure comprehension of their job requirements, a Data Entry Terms Exam and an Data Entry Exam will be given.
61-75	• Continue One-on-One training with the computer-based learning training programs to enhance proper finger techniques and build speed and accuracy. There will be a 75-Day Review given to inform the trainee of failure approaching the end of the 90-Day probation.
76-90	• Continue One-on-One training with the computer-based learning training programs to enhance proper finger techniques and build speed and accuracy. Once the trainee has keyed a minimum of 2,000 items per hour, with an error rate of 1.0 or less, for 2 consecutive weeks, they are released from training. This gives the trainee the opportunity to key primarily on the production floor and earn incentive. The ninety-day probationary period is still in effect until successful completion of the Data Entry Training course.

Training Effectiveness Sample

A before-and-after assessment like this is useful to document gains in topic comprehension. It will also give the student a chance to offer improvement suggestions.

Date of Class: _____ Instructor:

Please use this range of scores to rate your understanding of our Items Processing work before and after taking this class: **1 = I understand very little…10 = I understand very much**

- Your understanding of the *purpose behind all of the time deadlines* we face daily. Before this class = ____ after this class = _____
- Your understanding of *how checks move through the Federal Reserve System.* Before this class = ____ after this class = _____
- Your understanding of *common words and phrases used in IP.* Before this class = ____ after this class = _____
- Your understanding of *how items flow through the Items Processing Department.* Before this class = ____ after this class = _____
- What else did you learn today that we did not ask?
- What was the most useful part of training in this class?
- What could we add to this class to make it better?

"Bullet Proof" Training Records

Now that you have developed a strong training process, you must be able to prove to anyone who asks:

- The trainee did or did not have a fair chance to learn the material
- The trainee knew what was expected from the training
- The trainee did (or did not) achieve the minimal standards required for all employees working at this level

These are sample documents that can help you provide this proof of your training. *(Legal Note: The course author IS NOT A LAWYER and makes no representation of being one. These documents are samples that should be used in conjunction with guidance from your employer's Human Resources department or legal advisors.)*

Weekly Training Review

The documented training reviews will make it difficult for a poor employee to say, "I never knew I wasn't meeting your standards" if you have to terminate them later for failure to master the basic skills.

To:
From: Trainer
Date:
Re: Weekly Training Review

It is the policy of the Items Processing Department that all Data Entry Specialists maintain the minimum production standards of 1,800 items per hour and a maximum error rate of 1.2% or less.

Steps have been set up for you so that you will see how you are progressing to make this goal.

- During your first thirty days, you will be required to maintain a minimum production standard of **1,000 items per hour** and a maximum error rate of 1.2% or less.
- After your first thirty days are complete, **your goal will then change to maintain a minimum production standard of 1,400** items per hour and a maximum error rate of 1.2% or less. This goal is set up until your sixty-first day.

- Beginning on your sixty-first day, **your goal will then change to maintain a minimum production standard of 1,800 i**tems per hour and a maximum error rate of 1.2% or less.

As of this date_____, you are averaging _____ items per hour with an error rate of _____%.

Currently, you (are / are not) meeting the requirements of a Data Entry Specialist. You will continue to receive training and a weekly evaluation indication of progress. This memo serves as a weekly review.

On _____, you will receive another written report of your progress.

Comments:

_____ _____
Employee Signature Date

_____ _____
Trainer Signature Date

30 Day Review

To:
From: Trainer
Date:
Re: 30-Day Review

It is the policy of the Items Processing Department that all Data Entry Specialists maintain production standards of 1,800 items per hour and a maximum error rate less than 1.2%.

Steps have been set up for you so that you will see how you are progressing to make this goal. This is your 30-Day Review, and you should be maintaining a minimum production standard of 1,000 items per hour and a maximum error rate of 1.2% or less.

As of this date, _____, which is 30 days after your hire date, you are averaging _____ items per hour with an error rate of _____%.

Currently, this (is / is not) meeting the requirements of a Data Entry Specialist. You will continue to receive training and a weekly evaluation indicating your progress.

This memo serves as a 30-Day Review. On_____ you will receive a second written report of your skills development progress.

_____ _____
Employee Signature Date

_____ _____
Trainer Signature Date

60 Day Review

To:
From: Trainer
Date:
Re: 60-Day Review

It is the policy of the Items Processing Department that all Data Entry Specialists maintain production standards of 1,800 items per hour and a maximum error rate less than 1.2%.

Steps have been set up for you so that you will see how you are progressing to make this goal. This is your 60-Day Review, and you should be maintaining a production standard of 1,400 items per hour and a maximum error rate of 1.2% or less.

As of this date, _____, which is 60 days after your hire date, you are averaging_____ items per hour with an error rate of _____%.

Currently, this (is/is not) meeting the requirements of a Data Entry Specialist. You will continue to receive training and a weekly evaluation indicating your progress or failure.

This memo serves as a 60-Day Review. On _____ you will receive a second written report of your skills development progress.

_____ _____
Employee Signature Date

_____ _____
Trainer Signature Date

75 Day Review

To:
From: Trainer
Date:
Re: 75-Day Review

It is the policy of the Items Processing Department that all Data Entry Specialists maintain production standards of 1,800 items per hour and a maximum error rate less than 1.2%.

Steps have been set up for you so that you will see how you are progressing to make this goal. As of this date, _____, which is 75 days after hire date, you are averaging _____ items per hour with an error rate of _____%. As of your sixty-first day, your goal was to maintain **minimum production standard of 1,800 items per hour and a maximum error rate of 1.2% or less**

Currently, this (is / is not) meeting the requirements of a Data Entry Specialist. You will continue to receive training and a weekly evaluation indicating progress or failure for the next 15 days.

This is a list of your past training performance reviews:

(
30-Day Review) Average Production / Error Rate %

(60-Day Review) Average Production / Error Rate %

This memo serves as a 75-Day Review that you (are / are not) meeting the requirements of a Data Entry Specialist.

On _____, you will receive another training review. Fifteen (15) days after that will be the end of your 90-day training period.

At that time, if you still do not meet the requirements of a Data Entry Specialist, your employment can be terminated.

_____ _____
Employee Signature Date

_____ _____
Trainer Signature Date

_____ _____
Supervisor Signature Date

_____ _____
Manager Signature Date

90 Day Review

To:
From: Trainer
Date:
Re: 90-Day Review

It is the policy of the Items Processing Department that all Data Entry Specialists maintain production standards of 1,800 items per hour and a maximum error rate less than 1.2%.

As of this date, _____, which is 90 days after your hire date, you are averaging _____ items per hour with an error rate of _____%. Currently, this (is / is not) meeting the requirements of a Data Entry Specialist.

This is a list of all Data Entry Specialist goals that are set while in training:

- 30-Day requirements: Average Production 1,000 / hour + Error Rate 1.2% or less
- 60-Day requirements: Average Production 1,400 / hour + Error Rate 1.2% or less
- 90-Day requirements: Average Production 1,800 / hour + Error Rate 1.2% or less

Here is a list of your past training performance reviews:

- (30-Day Review) Average Production / Error Rate %
- (60-Day Review) Average Production / Error Rate %
- (75-Day Review) Average Production / Error Rate %

This memo serves as a 90-Day Review. You (have / have not) met the requirements for a Data Entry Specialist according to the Items Processing Department Policy. You are released from your probationary hire period, or we will take these appropriate steps as described in the attachment.

_____ _____
Employee Signature Date

_____ _____
Trainer Signature Date

_____ _____
Supervisor Signature Date

_____ _____
Manager Signature Date

Endnote references used in the course.

[i] https://www.bakerhughes.com/cordant/case-study/major-oil-and-gas-producer-improves-maintenance-strategy-efficiency
[ii] http://ask.reference.com/related/Strategic+Planning?qsrc=2892&l=dir&o=10601
[iii] http://terrywireman.com/why_strategic_maintenance_initia.htm
[iv] http://dictionary.reference.com/browse/tribology
[v] http://en.wikipedia.org/wiki/Nondestructive_testing
[vi] http://www.humanresourcesmagazine.com.au/articles/FB/0C0516FB.asp
[vii] http://www.iuoe.org/
[viii] http://www.chiltondiy.com/default.aspx
[ix] http://motortorque.askaprice.com/news/auto-0905/growth-in-diy-repairs-39could-be-dangerous39.asp
[x] https://timesofindia.indiatimes.com/india/11-killed-in-pre-dawn-disaster-as-gas-leaks-at-vizag-plant/articleshow/75612393.cms
[xi] https://timesofindia.indiatimes.com/city/chennai/eight-workers-injured-in-boiler-explosion-at-nlc-india-plant-at-neyveli/articleshow/75616363.cms
[xii] https://www.csb.gov/delaware-city-refining-company/
[xiii] http://www.usmra.com/saxsewell/Upper_Big_Branch.htm
[xiv] http://www.washingtonpost.com/wp-dyn/content/article/2010/06/21/AR2010062103007.html
[xv] http://dictionary.reference.com/browse/negligence