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Quality- WE Deming

Quality is hard to define in maintenance. Everyone knows when it's missing, but it's hard to tell when it's there. The usual definition in production is quality, which means consistently producing parts with low variation. Maintenance quality usually deals with the consequences of the repair, not the repair itself. The emotional context of the response is also tied up in maintenance quality (a surly, dirty maintenance technician is low quality even if their work is superb).

In some circumstances, maintenance quality might = Reduced downtime
In others, maintenance quality = First Time Fix Rate
Maintenance quality = Low costs
Maintenance quality = Faster start-up
Maintenance quality = Reduced scrap
Maintenance quality = Quicker response
Maintenance quality = No repeat repairs
Maintenance quality = Keep unit in spec
Maintenance quality = No interruptions
Maintenance quality = Satisfied user

Every maintenance operation should define quality to be beneficial to their operating environment. The late W.E. Demming was considered the quality guru for the last generation of Japanese quality experts. In fact, today, the quality award in Japan is the Demming Award. He had much to say about quality in manufacturing. The surprise is that Deming's points also apply to maintenance.

We must see the quality of our plant, site, or division. W.E. Deming's Fourteen Points: First discussed in 1950!

1. Create constancy of purpose toward improving products and services to stay competitive, stay in business, and provide stable employment. Maintenance deterioration usually takes a long time. Any effective maintenance strategy must also have a long horizon. Resources must be allocated for good maintenance practice and not removed with every bump in the quarterly results.

2. Adopt the new philosophy. Awaken to the challenge. Take responsibility for and leadership in change. Our maintenance departments often are the last areas of the organization to realize the need for change. The department is dragged kicking and

screaming into the new corporate culture. Looking toward the future, I see a maintenance department providing leadership for the rest of the organization. Nowhere else is high quality so closely related to safety and high self-esteem? Quality is intertwined with the very history and culture of the crafts.

3. Cease dependence on inspection to achieve quality. Build quality in. Quality comes from skilled and knowledgeable mechanics with good tools, adequate materials, and enough time to do the job. Quality comes from choosing well-designed equipment that doesn't need much maintenance. What maintenance the equipment does need is easy to perform and get to. Quality comes from pride in a job well done. Lead by example with ceaseless training, coaching, and systems analysis. When defects occur, concentrate on the system that delivered the defect rather than being preoccupied with finger-pointing.

4. End the practice of awarding business based on price alone. Instead, minimize total cost. Move toward a single source for each item and have a long-term relationship of loyalty and trust. A revolution in purchasing is at hand. More and more organizations are looking at the total costs of a part or the life cycle cost of a machine. Some economies are false and hurt the overall goals of the organization. A low-cost bearing might be the most expensive bearing you have ever bought.

5. Improve constantly and forever the production and service system to improve quality and productivity, thus continually reducing costs. In today's market, how it used to be done will never be good enough for the future—all improvements and growth flow from dissatisfaction with the status quo. Build measurements into the maintenance information system. Continually strive to improve both the visible and the invisible performance.

6. Institute training on the job. Training should be mandatory for mechanics the way it is for doctors or teachers. Our factories and facilities have today's technology levels, and our maintenance people have the same skill sets as yesterday. To maintain effectiveness, we must train to bridge the gap. Special effort should be given to the people on your staff who deliver the on the job training. These informal trainers need instruction in how to teach adults. They also need backup materials to provide the best possible training.

7. Institute leadership. The aim of supervision should be to help people and machines do a better job. The supervisor should serve their subordinates by removing the impediments from production. The supervisor should ensure that the mechanic, the tools, the parts, and the unit to be serviced converge simultaneously. The supervisor should also be the lightning rod for disruptions from management and production (unless there is an emergency, the mechanic will not be disturbed because interruptions reduce quality and worker satisfaction).

8. Drive out fear so everyone may work effectively for the company. Fear of losing a job interferes with the mechanic's ability to concentrate. Fear gets in the way of a

mechanic's pride in a job well done. A flexible and highly productive department where people can shift from trade to trade, maintenance to construction to production is the safest one.

9. Break down the barriers between departments. Everyone's expertise is needed for constant improvement. With scarce resources, we must include knowledge from other departments and groups to develop the best overall solution for the organization. Maintenance problems can quickly become complex due to financial, marketing, purchasing, quality, and engineering ramifications. The best solution to a problem might not be the best maintenance solution (like running until destruction to fill a vital order). Information for the best solution might come from another department and another expertise.

10. Eliminate slogans, exhortations, and targets for the workforce, asking for zero defects and new production levels. Such exhortations create adversary relationships. Most of the problems related to quality and production belong to the system, not the people. Stable processes create quality. Create stable processes producing quality outputs so people will feel the way the slogan is without coercion and alienation.

11. Eliminate work standards, quotas, and management by objectives (MBO). Work standards and quotas are associated with management styles that treat the maintenance worker as someone needing to be told precisely what to do and how long to take. Standards help schedule and communicate management's expectations. It is difficult not to use them as a production whip. That is a disaster in maintenance situations because we want the mechanics to take the time needed to fix everything they see (within reason!), not just the original job. We must trust the mechanic to look out for our interests, particularly when not there. The problem with MBO is that it focuses on visible, measurable aspects of maintenance. Many of the fundamental issues of maintenance concern aspects of the environment that are hard to measure.

12. Remove the barriers that rob the worker engineer of their right of pride in workmanship. The responsibility of supervisors must be shifted from numbers to quality and improvement. Tradespeople must be allowed to feel pride in their jobs that are well done. Maintenance managers and supervisors must not allow anything to stand in the way of that pride.

13. Institute a vigorous program of education and self-improvement. World-class maintenance departments commit to investing 1-3% of their hours in training all maintenance workers. Technologies are changing, and skills must change, too. A world-class auto manufacturer mandates 96 hours of training per year for everyone. A high-tech manufacturer requires 110 hours.

14. Put everyone in the organization to work to accomplish the transformation. This transformation is everyone's job. This transformation requires the talents of all the employees. It requires all of the talents of each person. When a hotel chain had the housekeepers meet with the architects (for a new hotel), the result was concrete

suggestions to improve the designs, reduce maintenance costs, and improve the rooms for the customers.

Deadly diseases and obstacles to success

1. Lack of purpose to plan products and services that will have a market, keep a company in the business, and provide jobs. Maintenance issues (like the wearing out and failure of a compressor or boiler) take a long term to develop. Only an equally long-term view will be adequate. A moving agenda for the goals of maintenance work against the department.

2. The supposition that solving problems, automation, gadgets, and new machinery will transform the industry. Maintenance problems are people's problems. The systems, attitudes, and approaches are at issue—the paradigm of maintenance as a necessary evil or maintenance workers as grease monkey slobs must be transformed. The transformation starts in the minds and hearts of the maintenance department and then flows to the rest of the organization.

3. Emphasis on short-term profit, short-term thinking fed by fear of unfriendly takeover, and a push from bankers and owners for dividends. Top management will squeeze maintenance to reduce costs below the level necessary to avoid deterioration. The cost reduction is temporary, the asset will deteriorate, and the long-term integrity of the process will be compromised. Maintenance requires long-term planning and commitment.

4. Evaluation of performance, merit rating, or annual review. The question about annual reviews and performance ratings is what practical outcome flows from these procedures. In most cases, the production of a mechanic is more related to how much management gets in their way than their actual qualities. Annual reviews rarely change behavior.

5. Mobility of managers and job hopping. In one beverage bottler, the average tenure of the maintenance manager was 22 months. Some lasted as few as 9 months. Everyone came with bright ideas and wanted to prove themselves. The result was a complete lack of focus on long-term goals and plans. As each manager tried to cut costs, the negative impact fell on the next player. This job hopping in management without a master plan dramatically exacerbates the short-term view.

6. Management is done by using only visible figures, with little or no consideration of unknown or unknowable figures. For example, when you invest in training for your maintenance crew, where does the increased asset show up? After spending $ 100 thousand in a long, expensive trial-and-error development process, a firm finally develops expertise in a new process. This expertise and this new asset are nowhere on the balance sheet. Measuring and realizing that much of what goes on in maintenance is unknowable is essential.

7. Hope for instant pudding. Change of fundamental processes takes time. In the current US culture, it is hard to imagine instituting a process change that could take 5 or 6 years. If you start with a typical reactive maintenance department, it could take 5 years or more to create a proactive TPM-type partnership in maintenance and production.

8. Search for examples. We think that if something worked in another machine shop or foundry, it would work in ours. Since factory maintenance has no strict rules, examples from our industry may not be helpful or even relevant.

9. "Our problems are different." Many people's problems are the same. In the PM area, while no two plants will have the same schedule, the issues will be the same. In our public sessions, maintenance managers in widely different industries, sizes, and sophistication marvel at the similarities in the problems.

10. Poor teaching of statistical methods in industry. The industry is just waking up to the value of statistical methods explaining what happens in the shop. Application of simple statistics to PM or PCR intervals would improve effectiveness. Simple relationships, such as failures to PMs, would show the effectiveness of your chosen frequency. Statistics replaces seat-of-pants reasoning, panic logic, and historical prejudices with testable and verifiable conclusions.

11. "Our trouble lies entirely within the workforce." Your production system is stable enough to produce a certain number of defects. Changes in the workforce are irrelevant to the output. Only changes to the system can have an impact.

12. False starts with inadequate planning, top-level support, and lack of follow-through kill quality improvement transformation in most places. Serious thought and planning are needed before starting. Commitment must begin at the highest levels in the organization. Buy-in at each level must be earned, worked on, and appreciated before proceeding to the next level.

13. "We installed quality control." Quality control is a way of life. It is a daily diet. You don't install it. You become it.

14. The unmanned computer is one of the dangers of wholesale computerization of maintenance. The laptop is a great tool that, like any great tool, is frequently misapplied. Allow people to have their say, and make sure the computer answers to someone (a real person) so that they can overrule the machine.

15. The supposition that it is only necessary to meet specifications. Many of the essential aspects of a component are not included in the specifications. You never know which attributes are required until you try changing vendors and discover that your entire process depends on the qualities of a particular vendor's products that are not covered by the specifications.

16. The fallacy of zero defects. Every system produces defects. Ultra-high quality requires enormous sample universes to establish the defect rate.

17. Inadequate testing of prototypes. By starting manufacturing on inadequately tested prototypes, we strain the system of improvements. There will be so much ground to cover before everything stabilizes that the product will be half-baked for a long time. Extensive testing should be built into this phase to leapfrog this phase.

18. "Anyone who tries to help us must understand our business." The sad truth is that you would probably know what to do if the solution to your problem was commonly known in your industry.

As of this writing, his words were spoken about 75 years ago. Most still apply to the US and the rest of the World factories.

Executive Summary Quality control is difficult to define in maintenance. The customary definition in production is quality, which means consistently producing parts with minimal variation. Maintenance quality generally handles the consequences of the repair, not the repair itself. Maintenance quality might be reduced downtime, reduced scrap, quicker start-up, faster response, no repeat repairs, no interruptions, and satisfied users. Ensure consistent improvement of the product and services to remain competitive; remember that quality comes from a skilled person with good tools, adequate material, and sufficient time to complete the task. A few obstacles might be emphasizing short-term profit, thinking only about the near future, etc.

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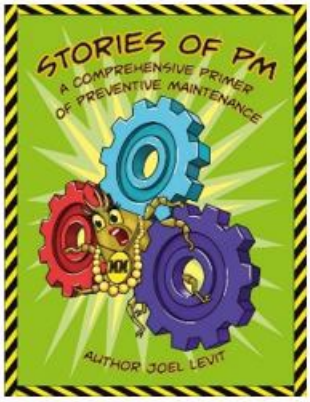

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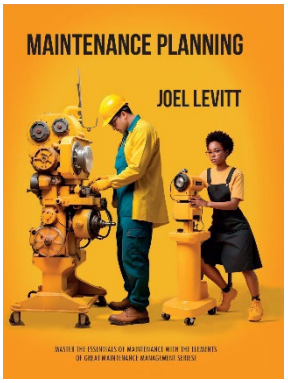

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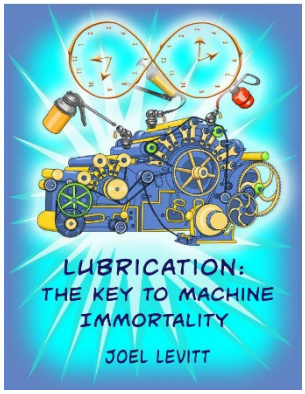

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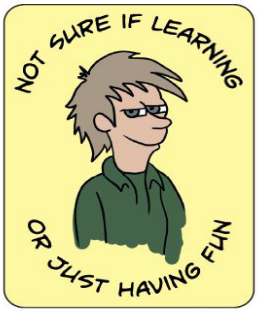

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