

Five practical steps toward gaining a consensus for aggressively pursuing a plant-wide reliability initiative.

Whether your firm bleaches pulp for paper, refines petroleum, or manufactures, your company executives are expected to watch the bottom line. They want equipment up and running at full capacity so they can meet their output goals—even if it means pushing the equipment well beyond its original design capacity. And they want it done with an ever-shrinking maintenance budget.

These are the realities facing North American maintenance managers. So it is your job to keep the equipment running smoothly—even under these impossible conditions.

You know a reliability-based maintenance management approach can provide the solution. You have read books that explain the latest theory behind equipment failure patterns and the benefits of early detection. You have even been to technical conferences and read industry publications to learn the current reliability “best practices.”

But how do you turn your organization around? You know you will need active cooperation from everyone. But how do you get technicians, supervisors, engineers, production managers, and others to buy in—particularly when they have 20-plus years of experience in a different paradigm? And more important, how do you get executive approval to move forward with reliability initiatives?

Here are five practical steps toward gaining a consensus among your entire team for aggressively pursuing a plant-wide equipment reliability initiative.

### **Step 1: Educate from top to bottom**

Maintenance and reliability leaders have to be much more than just cheerleaders. They have to help others understand, believe in, and follow a new maintenance approach—one that often contradicts traditional wisdom and experience. There are no quick fixes here. Traditional maintenance knowledge and beliefs have been internalized through repeated exposure and experience over many years. New concepts and practices have to be acquired the same

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way—with repeated exposure over spaced intervals of time. Here are some practical tips for spreading the “reliability gospel” in your organization:

- Shatter the old myths. For example, as reliability leaders, we know that overhauling or replacing motors on scheduled time intervals actually lowers reliability because the rebuilt or new ones are more likely to fail early in their life (infant mortality). But others in the organization may still base their understanding of maintenance on older concepts. Resistance to change will persist until they understand the limitations of traditional approaches.
- Present a better way. New concepts and methods will not take root without a clear understanding of both how and why they are better. Explain, for example, how accurate data on heat exchanger efficiency establishes what is “normal” and why timely inspections are needed to detect degradation early enough to plan and schedule corrective maintenance.
- Use multiple formats. Delivering your message via creative and varied means will dramatically reduce the number of exposures it will take for people to “get it.” Quick learning points in regular meetings, water cooler conversations, and distributing short articles can be as effective as formal training.
- Show them “what’s in it for me.” Just because people “get it” does not mean they will “do it.” So help them understand how reliable equipment benefits them personally: The production manager meets his output goal, the maintenance supervisor does not get calls in the middle of the night, and the technician gets out of firefighting mode.

Planting lots of small seeds in different places will eventually cultivate a broad understanding of reliability concepts and an appreciation for the benefits that are gained. This exposure will lay the foundation for future acceptance—not to mention approval—of real change later.

### Step 2: Benchmark where you are

Obviously it takes more than education to get a plant-wide reliability initiative off the ground. Achieving marked improvements in equipment reliability requires changing how you make maintenance decisions, how you invest limited plant resources, and what people do on a daily basis. Gaining approval for this level of change requires a comprehensive plan and a strong business case. The first effort should be to assess objectively where you are now.

Benchmarking can be a humbling experience for plants that are entrenched in traditional maintenance methodologies. They are shocked to find out how far behind they are. But a good dose of reality can provide a tremendous “attitude adjustment.” It is a bit like the doctor telling you that you are 25 lb overweight, your cholesterol and blood pressure are too high, and your life expectancy is 20 years shorter than it should be. Suddenly the latest fads of eating right and exercising have a whole new meaning.

So what do you use as a measuring stick for maintenance and reliability? Unfortunately there are no industry standard metrics like we have for safety. For safety, OSHA has defined how to calculate lost time incident rate (LTIR) and recordable incident rate (RIR). Companies have been tracking them for years, so we know that an RIR of 0.5 and LTIR of 0.05 are top notch.

Benchmarking maintenance and reliability can be a bit more involved. Experts simply disagree on what to measure and how to measure it. And few industries publish their outcomes. For many plants the best answer is to enlist a professional to assess the organization. But do not spend 6 months and a ton of money. For a mid-sized maintenance organization (50-200 technicians) \$30,000-\$50,000 and a few weeks should get you a decent scorecard and a best practices review. The unbiased opinion is well worth the time and cost; after all, one unplanned failure of a critical pump can cost you a lot more than \$50,000 in lost production and repair costs.

For those who want to implement an internal benchmarking process, a core list of maintenance and reliability metrics is provided in the accompanying “[Basic List of Maintenance and Reliability Performance Metrics](#),” adapted from benchmarks used by the management consulting firm ATKearney. Precise definitions of these metrics vary and the “top notch” score will vary with the type of operation.

Once you know how your outcomes stack up, the next step is to assess how you are doing maintenance—a best practices review. In other words, determine what techniques or methods you are using and to what extent. Examples of top notch practices include operator-driven maintenance, designing out failures, condition-based maintenance, and use of an enterprise reliability information system. If you do all the right things and do them well, you should achieve good results. So make sure there is good correlation between your best practices “score” and the performance outcomes “score.”

Communicating the results of a benchmarking effort to the organization can be risky business, particularly when the gap between perception and reality is great. But an early wake-up call can energize the organization and possibly save a plant from being closed.

### **Step 3: Establish a long-term vision**

Once you have established where you are, your next challenge is to define where you want to be. The key to establishing a vision is to begin with the end in mind. Use the metrics from the benchmark to set specific, measurable targets for your performance outcomes 3-5 years in the future. Use the best practices from the benchmark to paint a vision of what maintenance and reliability will look and feel like when you get there.

Make sure you include the key stakeholders in the goal-setting process. Maintenance supervisors, engineers, reliability specialists, and production managers will all have to cooperate to achieve the goals. An offsite planning meeting can be a very effective forum to gain commitment, motivate your team, and establish momentum for your reliability program. And an outside resource can be helpful as a neutral facilitator of the process.

During the visioning process avoid getting mired in discussions of the details and difficulties of how you will achieve the results. When you plan a vacation you first decide where you want to go, then you sort out the logistics of how to get there and what to do along the way.

### **Step 4: Build a business case**

Now that you know where you are going, what is it worth to get there? The business case answers the question “why do we want to have a reliability program?” It is not because we want to be top notch or be recognized at the next reliability conference. We want to make more money; that is why we are in business.

Fortunately there are very few endeavors that have a more compelling financial business case than a reliability-based maintenance management approach. And the homework you have done in Steps 2 and 3 make the calculation relatively simple. Consider the following examples:

- A 5 percent increase in Availability = a 5 percent increase in revenue for a continuous process plant that can sell all that it makes. A plant that produces \$200 million per year generates another \$10 million in revenue.

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Reducing Overtime from 20 percent to 10 percent moves 10 percent of your labor from overtime rates to straight time rates. If your overtime multiplier is 1.5 and you have a \$15 million labor budget you move \$500,000 to the bottom line.

- Increasing your Planned Work from 50 percent to 80 percent moves 30 percent of your corrective work from unplanned to planned. Since a planned job costs 2/3 less, you save 20 percent overall. So for a corrective maintenance budget of \$10 million you move \$2 million to the bottom line.

Now when you are presenting your plans to the VPs from corporate and they ask “why do we need to do this reliability thing?” you can answer “because it will add \$10 million to top line revenue and \$2.5 million to bottom line profits.” Now you have their interest.

Building a compelling business case is often overlooked and underemphasized by technical experts in the reliability field. But executives are not persuaded by cool technology, world-class best practices, and the latest buzzwords. Even if they understand it and find it interesting, they will not act on it. So the function of the business case is to first educate the executives about the business value of reliability and then to explain the details of how you will roll out the program and how much it will cost. It is also very helpful to get your accounting folks involved in crunching the numbers to avoid credibility issues. [Fig. 1](#) illustrates a typical business case for a small to mid-sized plant (\$10 million-\$20 million annual maintenance budget).

### Step 5: Conduct a pilot program

Now you have gotten buy-in (or at least interest) at all levels of the organization, so where do you begin? The answer is to conduct some kind of pilot program. The pilot serves the following critical functions:

- Reduce initial investment. The pilot may cost only 10 percent of the full program, so you are far more likely to gain budget approval. And a mini-business case for a good pilot can easily show good returns in a short time period.

- Prove the business case. Even the best business case, completed with blessing from the

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accounting department, will have assumptions. The pilot serves to validate the assumptions and demonstrate the financial benefits.

- Test lab. You are attempting something new. So you want to be able to tweak things and figure out what works and does not work without the pressure and scrutiny of a huge project.
- Solidify buy-in. No matter how much preaching and planning you have done, many in the organization are going to be from Missouri. They need the “show me” of a pilot to get onboard for full rollout.

Selecting your pilot project is critical. Ideally, you want to identify a small but operationally significant portion of the plant and apply all of the new practices in that area. Make sure the project is small enough to initiate in 1-3 months and show significant results in 3-6 months.

Establish a method of tracking impact from day one. Document little successes and convert them to dollars using an accepted method like a balanced scorecard. Compile these into a success story and get accounting to bless the financial calculations.

Now you have got the buy-in, the confidence, and know-how to move forward with a plant-wide reliability program. And, more importantly, you have the proof you need to gain executive level funding approval.

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### **BASIC LIST OF MAINTENANCE AND RELIABILITY PERFORMANCE METRICS**

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<b>Metric</b>
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<b>Top Notch Value</b>
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<b>Availability:</b>	the portion of time that	a plant or major system is available for producing output
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95-99 percent
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<b>Percent Failure Analysis:</b>	the portion of equipment	downtime events that undergo a thorough analysis of
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85-100 percent
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<b>Percent Planned Work:</b>	the portion of corrective	maintenance work hours that are planned and scheduled
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85-95 percent
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<b>Percent Overtime:</b>	the portion of maintenance	work hours that are performed at an overtime rate
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5-8 percent
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<b>Relative Maintenance Cost:</b>	maintenance spending	as a percentage of asset replacement value of the plant
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1.5-2.5 percent

**Technician Productivity:** the percent of work hours spent on productive activities vs nonproductive (rework)

70-85 percent

**Percent Rework:** the portion of maintenance work that has to be redone due to poor installation, s

2-5 percent

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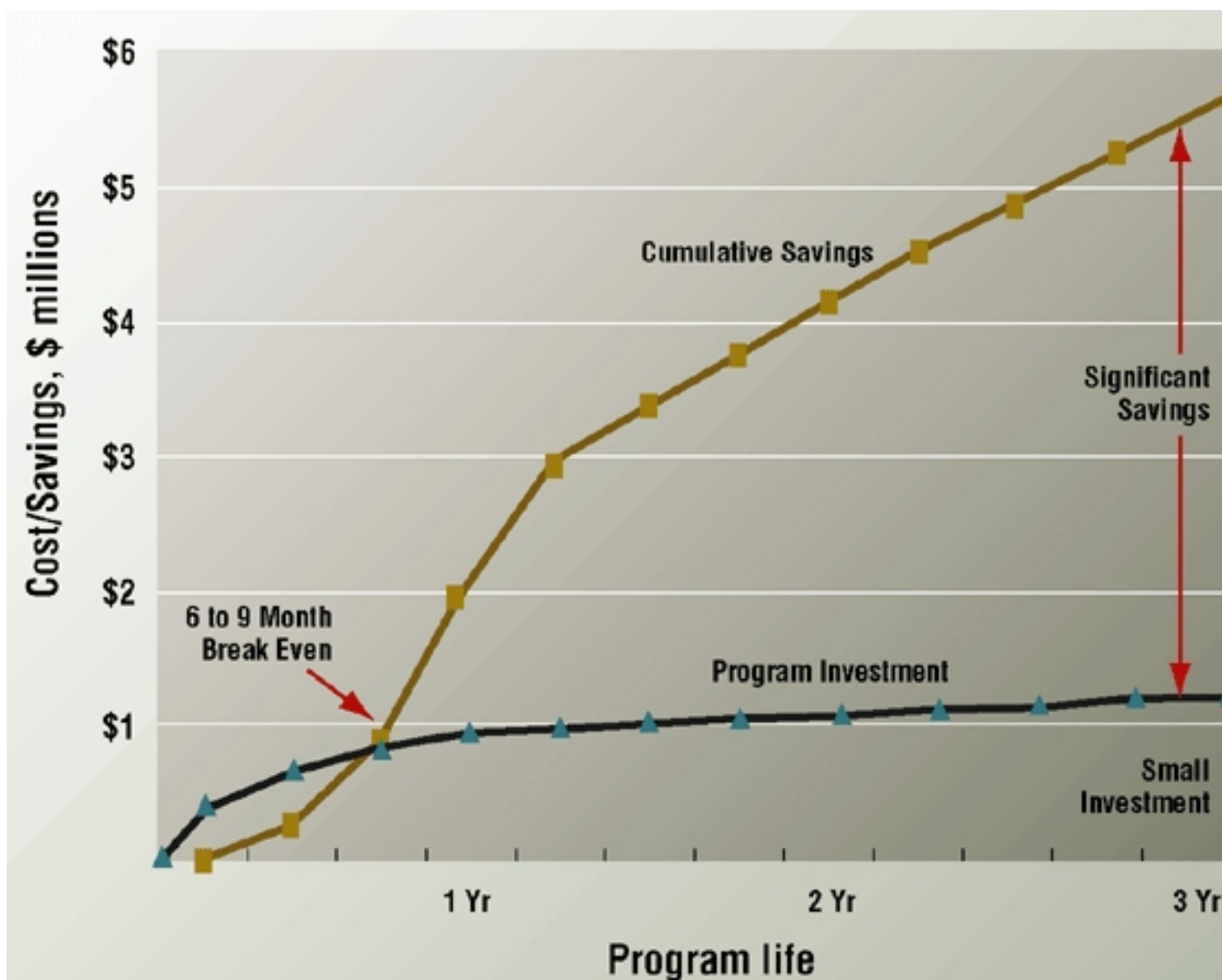


Figure 1: Typical business case for a small to mid-sized plant (\$10 million-\$20 million)