Closing the Gap Between Engineers and Management

Work-style and communication differences often result in a disconnect between managers and engineers. Bridging this culture gap will allow managers to make better business decisions and bring engineers the understanding and recognition they deserve.

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Engineers are responsible for millions of dollars of revenue, yet few people know about it. Meanwhile, engineering staffs are being reduced, in part because management cannot articulate and promote their value. A gap exists between what engineers are delivering and what management is seeing and understanding.

The work-culture divide between engineers and management can be a source of frustration, career stagnation, and poor business decision-making. This disconnect is not just a gap in communications, but also one of expectations and understanding. The two groups are focused on different results, with different objectives and different measures of success.

A typical engineer is focused on the details of the problems in his or her facility. Engineers find joy in the act of solving problems. They want to dive in to the technical details and develop scientific ways of analyzing and measuring the problem. They are often reluctant to share results until they are certain and have documented proof. In addition, some engineers do not enjoy communicating their results to people who may not have a nuanced appreciation of the problem.

Managers, on the other hand, may not have the time or inclination to delve into the technical details that interest and motivate engineers. Managers often want to get "straight to the bottom line," using a limited set of business metrics: production, cost, quality, reliability, safety, and environment. In fact, managers may become frustrated when engineers cannot describe their results according to these metrics. And, unlike engineers, managers often seek the spotlight, recognizing the value of self-promotion, especially when they have positive results to share.

To help bridge these gaps, engineers can learn techniques to identify business priorities, put those improvements into effect, and communicate the economic value to management using business metrics. Managers can become better collaborators and coaches by learning more about how engineers work, and then teaching them how to think in business terms, how to demonstrate bottom-line value, and how to communicate with a broader audience.

This article presents some useful tips to help engineers deliver the results that managers want to hear about.

Tip 1: Focus on only the right things

Today's engineers face increasing responsibilities and a huge influx of data, e-mail, and other requests. In this environment, the challenge is setting priorities. The engineer must triage his or her daily activities so that the most important items receive primary attention.

Triaging priorities takes discipline. Before agreeing to work on a problem, determine its relative business value — *i.e.*, how it relates to production, cost, quality, reliability, safety, or environmental objectives.

In addition, be aware of the overall business climate in

your company and at your facility, because priorities may shift from month to month. For example, when a plant is sold, production usually becomes the primary focus. When sales drop off, the focus often shifts to cost reduction. By staying on top of such trends, you will be better positioned to deliver results that managers want to see.

Suppose you want to increase production. Begin by reviewing data from the process historian to identify potential bottlenecks, such as control valves that are open for a significant portion of the time. You can then apply your process knowledge to determine which valves or pumps should be upsized to provide maximum benefit.

If quality is the primary concern, start by looking for sources of process variability. Control-loop monitoring tools are an excellent way to quantify process variation because they can sort data by their variances or by specific components of oscillation. Reducing process variability usually yields an immediate improvement in quality.

You may need to make some tough choices, many times with incomplete data. But it is often better to proceed with incomplete data and be correct 80% of the time than to invest the time and energy to collect all possible data and be correct 95% of the time *(1)*.

Tip 2: Calculate value

As mentioned earlier, manufacturing managers typically measure results using one or more of the following metrics:

- production
- cost
- quality
- reliability
- safety
- environmental impact.

The challenge for engineers is to represent technical results in these terms. Sometimes such conversions are direct, but other times they can be more challenging.

In all cases, you need to understand the baseline conditions of these critical variables before beginning the improvement work. Operations and financial personnel can provide useful information in this area. Try to obtain the data in real-time, or as close to real-time as possible. While traditional tracking systems may only provide monthly summaries of these numbers, many plants now track and report this information daily or even in constant, real-time modes.

The opportunity gap. Use the opportunity gap method to demonstrate the value of reduced process variability. With this method, results can usually be translated directly into cost savings or quality improvement metrics.

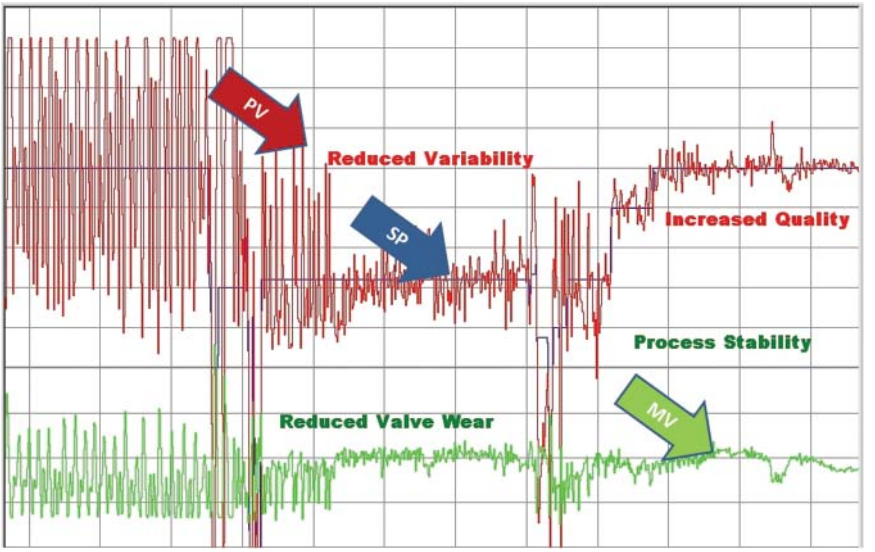
> A challenge for engineers is to learn how to represent technical results using business metrics that align with management's way of thinking and understanding of success.

As illustrated in Figure 1, savings come in two forms:

1. Reduced variability by itself improves quality, reduces risks of excursions, and reduces equipment wear and tear. These savings are real, but somewhat difficult to measure.

2. Shifting the process mean closer to the specification limits usually results in savings that are directly measurable.

For example, in drying operations, the process specification will usually require the final moisture to fall within a specific range, *e.g.*, 12–14% moisture. If the process is subject to high variability, the moisture average will typically be set to 13% to ensure that quality limits are not exceeded. However, if the variability can be reduced, the target can be set higher, *e.g.*, to 13.5% moisture. The extra 0.5% moisture can bring tremendous energy savings that can easily be quantified. A manager is likely to be impressed by the engineer who says "I saved $257,000 per year in energy costs. Do you want to see how?"



▲ **Figure 1.** Deliver results by closing the opportunity gap. To deliver savings through improved process control, the engineer first reduces process variability (PV) through better controller tuning or control strategies, or by resolving valve and instrumentation issues that affect the manipulated variables (MV). The newly stabilized process can then be moved to a more-effective point of operation, usually closer to a product specification limit. Savings result from both the variability reduction and from the change in setpoint (SP).

Tip 3: Communicate

Once you have achieved some significant results, it is absolutely crucial to communicate them, both formally and informally, to a broad audience. The following advice will help you to get your message out.

Keep it short. Your formal communications should be brief and to the point. If you must write a detailed report, begin with a clear summary or cover letter. Keep in mind:

1. The first sentence should state the results, in economic terms if possible. For example: "This study shows that we have saved over $850,000 per year using control loop monitoring."
2. The first paragraph should state what was done, and any requests for further support.
3. The first page should identify:
   a. who was involved
   b. what was done
   c. when it was done
   d. how the results were determined
   e. why the follow-up recommendation is worthwhile.
4. A picture is worth a thousand words. Figure 2 shows a typical results-oriented graphic.

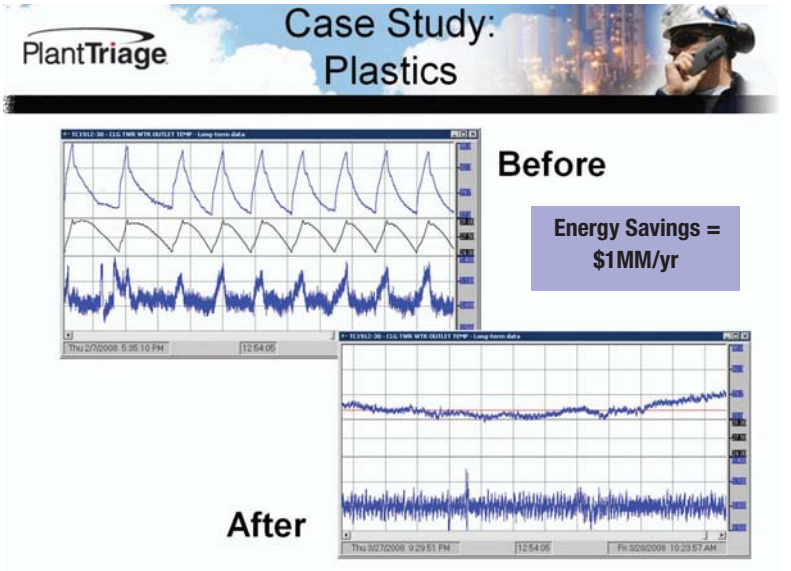
When you write a report, assume that the next level of management will not read past the first page. The level above that may not get past the first paragraph. So, be sure to say what you need to say in the first paragraph.

Reach out. Over-communicate. Of course, you will provide information to your direct management and to people on your team, but go beyond that. Share project updates and results with your coworkers. Most people are happy to be kept informed.

E-mail. We all receive too much e-mail. However, e-mail can be an excellent way to communicate when used appropriately:

1. Treat subject lines like headlines. Many recipients decide whether to open a message based only on the subject. You need to convince him or her that your message deserves to be read.
2. Say upfront what action you need. State whether the e-mail is a request for approval or a request for action, and when you need it. If you don't say, the reader won't know.
3. Make one point per e-mail. Do not run on with a lot of different information and a list of requests.

The elevator speech. The term elevator speech (or elevator pitch) refers to a short speech that you can give at a moment's notice in the time it would take for an elevator ride — about 30–90 seconds. Salespeople may spend hours crafting their elevator speeches, and some even practice in front of a mirror, so they can be sure they are properly conveying their intended message.



▲ **Figure 2.** Use graphics that clearly demonstrate quantitative results.

Prepare an elevator speech to discuss your recent work results. For example, if you meet the company vice president at the grocery store and she asks you how your project is going, will you be ready with an answer that highlights some of your successes? It is important to talk about results, successes, and perhaps ask for support — this is not the time to air the project team's dirty laundry. Also refrain from explaining details as the VP's eyes glaze over. Keep your message short and to the point: "It's going very well. Last week we found a way to cut the equipment costs by $300,000."

Tip 4: Optimize your opportunities

Although the differences between engineering and management styles are inherent in job descriptions and organization structures, it is possible to bridge the gap.

The way you choose to use your discretionary time — whether it be a pet project at your workplace or a recreational activity on the weekend — can present opportunities to develop person-to-person bonds of camaraderie, communication, and understanding that defy the strictures of organizations and hierarchies.

The box on the next page will get you thinking about some of these opportunities.

For example, you might consider lunch to be free time, when you can eat a sandwich at your desk if you wish. But have you noticed that managers are using lunch time to network? They are developing plans, working with their peers, their supervisors, and their employees. Lunch is a good time to communicate business results.

Similarly, look at your pastimes outside of work and see if there are opportunities for networking. If you enjoy golf,

How Do You Spend Your Time?

Your spare time presents opportunities to strengthen communication and collaboration with managers and colleagues. Consider the following situations and how they can help you to make better connections:

- With whom do you normally have lunch?
- What is your "pet" project? Why is it your favorite, and who does it allow you to work with?
- What are your pastimes outside of work? Who else from your employer participates?
- What activities bring out the best in you and give you a feeling of satisfaction? What other people are involved?
- When do you discuss work results? How often? How formally? Who do you include in this communication?

do you play in the company league? Who is on your team?

You don't need to have your mind on the job 24 hours a day, but there is nothing wrong with mixing business and pleasure.

Summing up: Be ready at any moment

If you take away only one lesson from this article, it should be this: *Be prepared*.

Be prepared to choose the most important work every day.

Be prepared to talk about results in business terms.

Be prepared to communicate at every opportunity.

Incorporate these habits into your daily life. It may take some adjustment, but it will be worth the effort. Management will come to see you as someone who is organized, who understands the needs of the business, and who makes their job easier — and they will develop a better understanding and appreciation of the value that you bring to the organization.

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