The Effect of Training on the Bottom Line

by D. Glen Miller, EdD, and Bonnie F. Mattick, CPT, MAEd

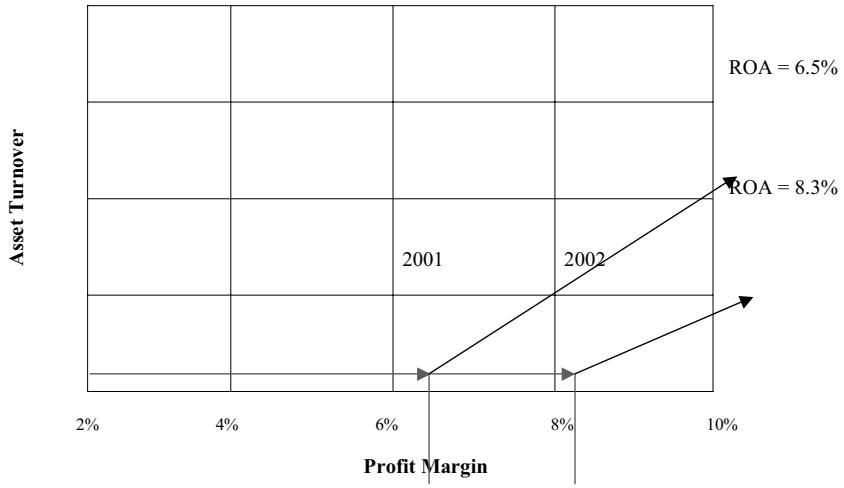
Trainers, human resource generalists, and process improvement consultants all face the same challenge of showing how their efforts contribute to the bottom line. We explored what type of evaluation best links human performance variables to the profitability of a corporation. The evaluation choice for discussion and application is Dr. Kirkpatrick's four-stage framework (Kirkpatrick, 1998). In a *Performance Improvement* issue (2003), Jie Li and Greg Wan cite J. Gordon's reference to Kirkpatrick's model as a "sensible approach" that provides a systematic frame of reference (Li & Wang, 2003). Although human performance technology (HPT) or business consultants consider level four evaluations most relevant to the bottom line, our clients are often skeptical that an HPT intervention will affect behavior and business goal outcomes. In short, our clients want positive level four outcomes. They want an improvement in the workplace. To gain their sponsorship, we need to demonstrate we can evaluate level four outcomes.

In an article for *Learning and Training Innovations,* Kaliym Islam (2004) said e-learning guru Kevin Kurse recommends a fifth level of evaluation, focusing on the financial return of a training program investment.

Key Issues in Measuring Effects

In measuring the effect of any HPT intervention on business goals, there are several factors to investigate, consider, design, and measure. Looking at both levels four and five, we considered some key questions:

- *What business goals do HPT interventions intend to affect?* Some business goals that we looked at were return on assets with reduced product rework, improved safety performance through training and coaching, and reduced maintenance costs through teamwork. A client may want a decrease in rework activities. The client may want more efficient maintenance or safer work hours. After the HPT intervention, often there is an expectation for more productivity. How much more? Too often, this determination is not considered early in the design stage. Without a clear expectation, data collection usually lacks useful quantification, which makes measurement of success or failure subjective.
- *What business baselines need to change?* To baseline or benchmark data, we recommend that the consultant or practitioner review production, maintenance, or service data for at least the last three months. In this case example, it was determined that the prior quarter's work would be an indicator for the volume of rework in the factory. To have a realistic baseline with which to examine the expected decrease in rework, we then gathered previous rework data. Specifically, we examined records for what the previous rework in the manufacturing facility had been and reviewed the desired expectations with senior management.



Note:
Return on Assets is a key metric. Chart A shows the relationship between the Profit & Loss Statement and the Balance sheet. The improvement in ROA was influenced by reduction in product rework.

$$\text{Return on Assets (ROA)} = \frac{\text{Revenue} - \text{Costs}}{\text{Assets}} = \frac{\text{Earnings}}{\text{Asset}}$$

Figure 1. Impact of Rework on Company "A" Return on Assets.

If the goal is to improve safety, then the number of safety incidents per month, or X hours worked without an incident, can be determined for the baseline. If the information for establishing a baseline is unavailable, make an educated estimate based upon subject matter expertise, experience, and input or interviews.

- *What factors most significantly influence the goals?* Capture as many factors as are available from the strategic plan that could affect the human performance intervention. Productivity measurement, for example, includes many factors that could override the influence of an intervention. The practitioner must be aware of and establish control for these factors. Factor identification helps flesh out the context and business environment. Be prepared to control additional factors within the boundaries of your HPT performance measure.
- *What measurement design will best drive the business toward accomplishing goals?* A common business adage is, *what gets measured gets done*. Lately, the structure of the balance scorecard encourages using a variety of stakeholders to establish key performance indicators for measuring nonfinancial as well as financial goals (Hughes, Caldwell, Gjerde, & Rouse, 2005). In this article, we advocate measuring both. The successful HPT consultant or practitioner should design measures that concurrently or interactively measure business goals and human factors.

Let us first look at business goals that would gain the most benefit from human performance improvement. It is a long way from traditional HPT intervention to the bottom line. That is not to say that HPT does not directly affect the bottom line. It is to say that often the field application does not make a strong case for, nor does the evaluation clearly indicate the influence of, the HPT. For practical purposes, the authors use roll-up goals that contribute to the bottom line. Roll-up goals are line-level measures such as less scrap, better customer service, fewer returns, less rework, shorter run times, safe work, shorter maintenance time, and increased production. These measures should roll up into a performance measure that demonstrates money earned or saved. The accountants use this money factor in their financial reports.

As consultants and practitioners, we used performance measures with business goals and human factors to help illustrate the power of combining these factors. We have experienced various situations at companies and have illustrated a variety of successful measurements in the following discussion. Let us look at a common business goal that clearly affects the bottom line and has a significant human factor.

Using Performance Measures with Business Goals

Example One: A Major Manufacturing Facility

A company in the electronics manufacturing industry was concerned about the amount of rework and inventory held in *work in progress*. Managers wanted employees to gain a perspective on how different manufacturing activities within the company interact. We used a board-game simulation that closely resembled the company's manufacturing process. Participants learned how a decision in one part of the plant affected other areas, which in turn affected the financial report. A true measurement of our efforts was the comparison of current product rework to the level of rework prior to the intervention. The results were significant. Our followup with the company revealed a noticeable increase in productivity, coupled with a decrease in product rework. These factors had a definite impact on the company's bottom line.

Before training, the employees had little understanding of how work in progress inventory affected the profitability of the company. In Figure 1, the impact of rework and the return on assets (ROA) metric show the relationship between the profit and loss statement and the balance sheet. It simply shows the return the company is obtaining from its assets. As we know, earnings divided by revenues equal profit margin percent, and revenues divided by assets equal asset turnover. ROA is calculated by multiplying the profit margin percent by the asset turnover.

Month	Near Miss coaching	Accidents	OSHA Incident Rate, avg. 8 per 200,000 hrs worke	XYZ Inc. incidents
January	0	3	1.00	4
February	0	1	1.00	4
March	11	0	1.00	2
April	8	0	1.00	0
May	8	0	1.00	1
June	7	1	1.00	1
July	6	0	1.00	1
August	5	0	1.00	2
September	4	0	1.00	1
October	4	0	1.00	0
November	3	0	1.00	1
December	3	0	1.00	0

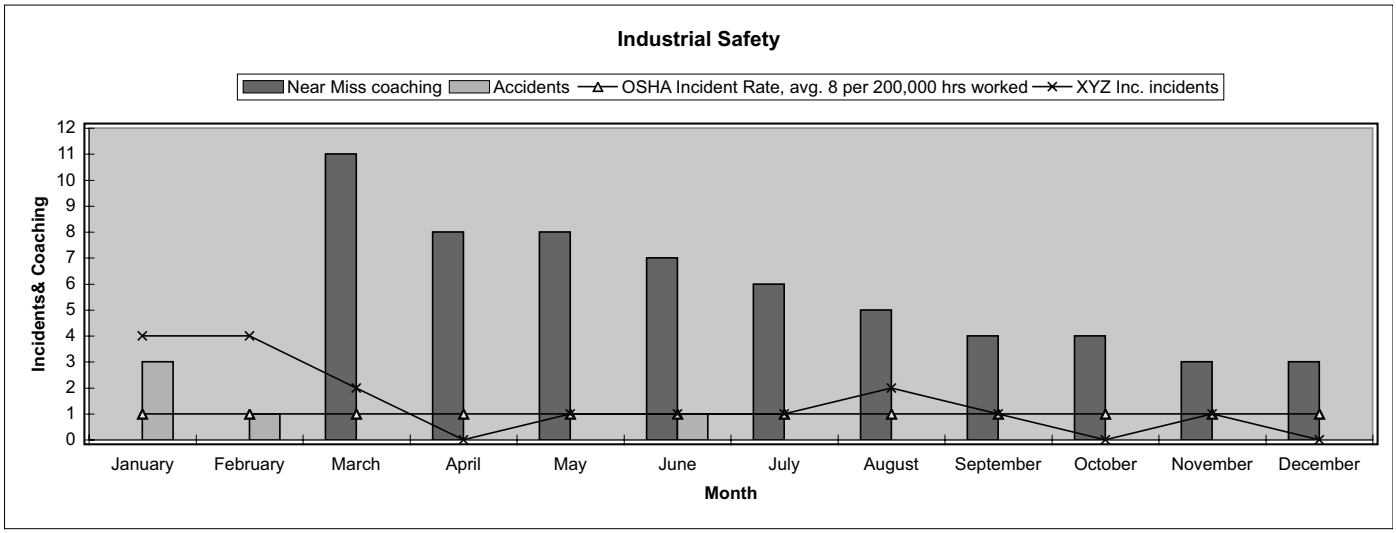


Figure 2. Industrial Safety at XYZ, Inc.

Example Two: Industrial Safety

We recently worked with ground beef processors, a fast-paced, low-margin business where accidents significantly take away from the bottom line. The company wanted its supervisors to learn coaching skills so that the supervisors could teach production workers how to work effectively, efficiently, and safely.

We used level one evaluations, commonly called smile sheets, to determine the supervisor's impression of the pilot course. We used these evaluations to improve the delivery of the workshop. However, we also pushed for clarification on future supervisory behaviors. Performance-based questions asked were the following:

- What would the supervisor do after the workshop?
- What is management's role in supporting the supervisor?
- How will we determine if safety is improving?

The practitioner's role is to design measurement into the project, starting at the baseline of the business at the onset of the HPT implementation. The practitioners in this project followed up with observation of the supervisors' coaching behaviors, as a level three behavior measure, and the behaviors effect on production, or level four results, after the first month, again at six months, and at the end of a year. The practitioners used a check sheet. When did the supervisor stop or delay production to coach individuals on safe practices? Did the supervisor demonstrate correct behavior? Where did the coaching action take place? What was the safety issue?

The practitioners collected the data and discussed it with the supervisors. Trends were communicated to upper management to maintain sponsorship of the intervention. Areas of concern, such as industrial safety in the frozen meat grinding section, became apparent. Upper management encouraged more coaching in this area. Over the year, safety incidents decreased, at least in part because of the coaching and awareness levels, according to subject matter experts.

The industrial safety chart (Figure 2) combines the human factor of coaching with the production factor of safety. This is shown to be a robust performance measure. It not only motivates the supervisors to continue encouraging the production workers to see the importance of safety, but it also emphasizes that coaching every day on the shop floor can reduce near misses.

A financial roll-up metric (Figure 3) shows the company owners and board of directors how training has heightened

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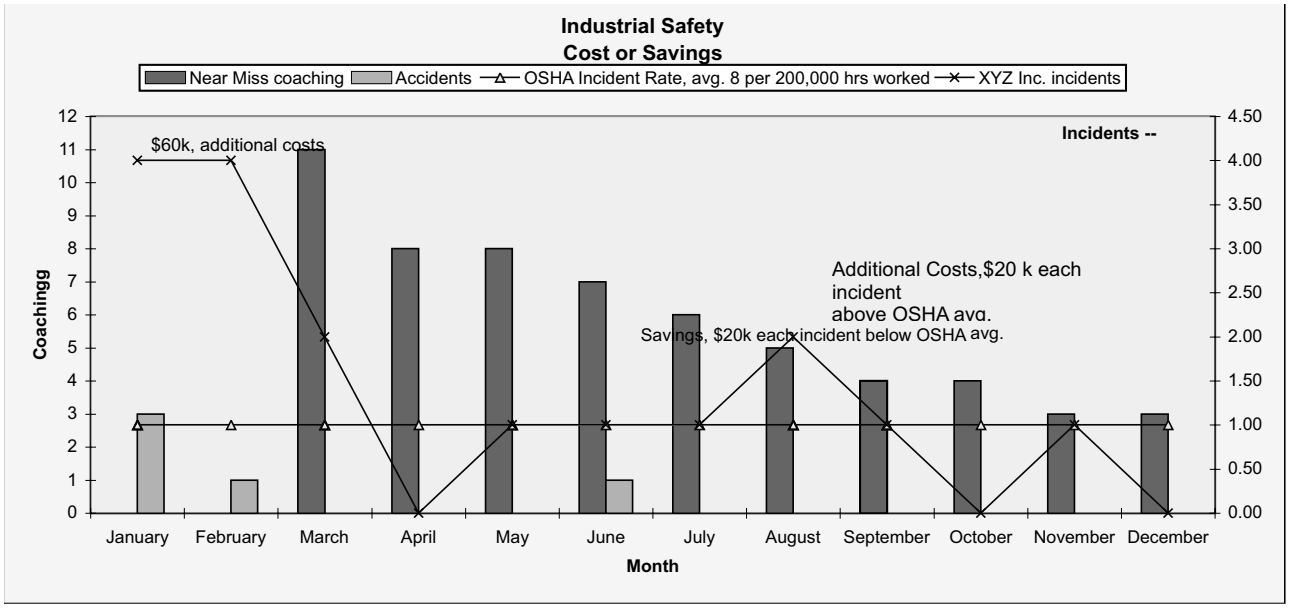


Figure 3. Industrial Safety at XYZ, Inc., Cost or Savings.

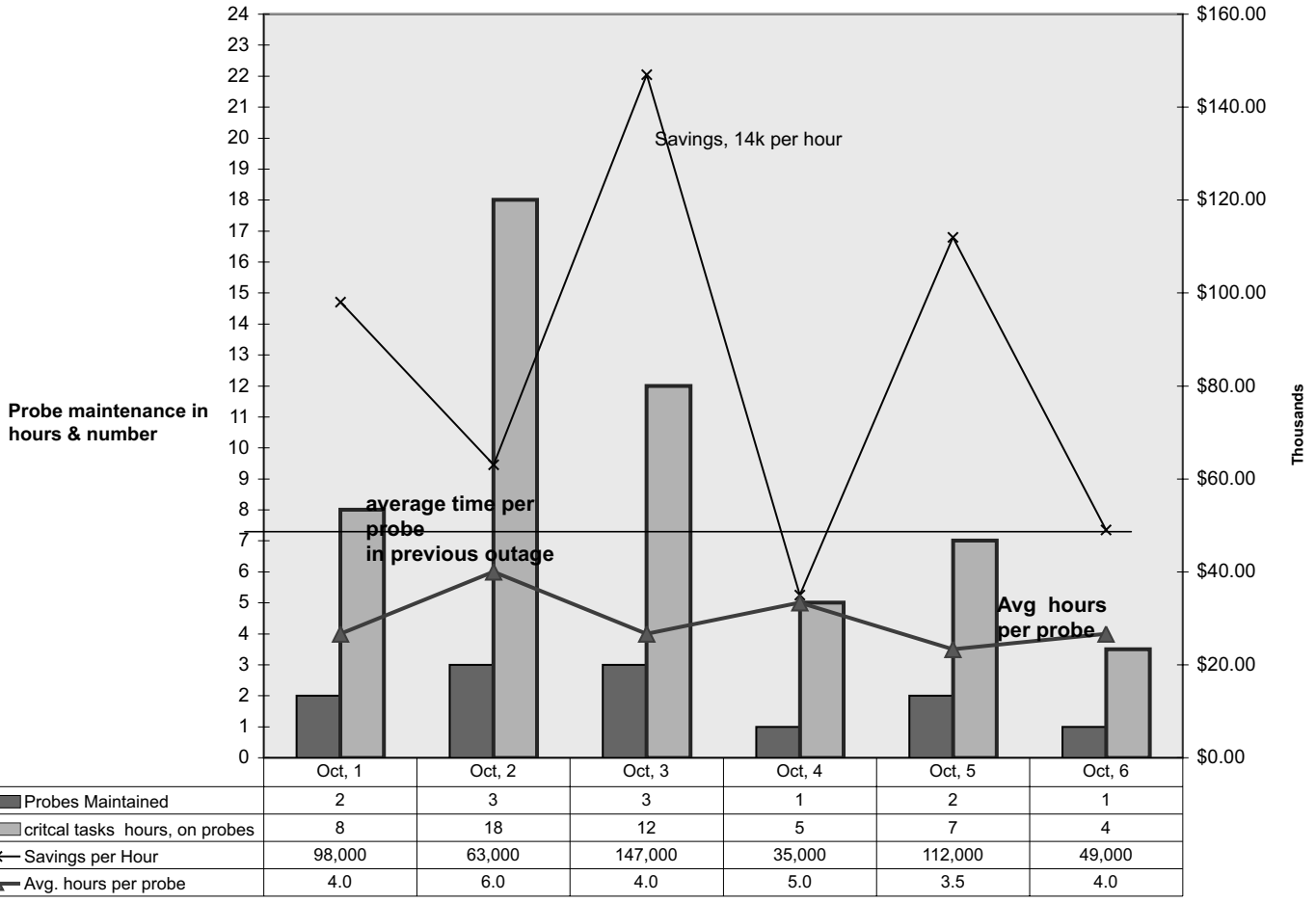
industrial safety, how it has diminished incidents and minor injuries, and how the direct cost of money spent on incidents has decreased. There were other changes in the workplace in addition to encouraging the supervisors to be more assertive with their coaching. Other measures, designed to quantify expenses for replacement workers and downtime production costs, were also included. Moreover, the company predicts that costly lost time accidents will decrease with diminished incident rates.

When worker or employee skill development is technical, design steps should follow the examples already presented. To measure skill improvement, the HPT designer could provide technical training without obtaining business goals or baseline data that may influence the bottom line. However, to promote benefits of HPT to senior management and the board of directors, in determining the business goals served, the baseline performance and other influencing factors are very important. Ascertain these points and then proceed to design a roll-up metric illustrating the time and money saved.

Case Three: Nuclear Power Industry

Our experience in the nuclear power industry provides an example of level four results gained from implementing technical skill evaluations. Senior management assigned several performance improvement projects to help decrease time spent on reactor maintenance during outages. When the reactor was shut down for refueling or fixing plant systems, the electric utility lost a million dollars a day. Our goal was to design teamwork training that significantly reduced the time it took to remove and repair probes under the reactor vessel.

The facility had a mock-up for probe repair where we installed some unique training devices. The team learned to loosen, remove, and inspect the probes in a cramped space. Some work was done on a narrow platform, while probes were inspected in another area. When a probe was improperly inserted or improperly removed, water leaked onto the students. We designed performance improvement discussions scheduled throughout the training period. We insisted that teams that trained together would work together. One factor in this situation was that the mainte-



	Oct, 1	Oct, 2	Oct, 3	Oct, 4	Oct, 5	Oct, 6
Probes Maintained	2	3	3	1	2	1
critcal tasks hours, on probes	8	18	12	5	7	4
Savings per Hour	98,000	63,000	147,000	35,000	112,000	49,000
Avg. hours per probe	4.0	6.0	4.0	5.0	3.5	4.0

Figure 4. Probe Outage Maintenance and Cost Savings.

nance manager often swapped out personnel at the last minute. In a fast-paced industry, it is important to be aware of factors that can affect the outcome of the intervention. In this case, we had to ensure that the team trained was the same team scheduled to do the maintenance work and apply the training.

The inspection and repair had averaged 7.5 hours a probe, with 8–12 probes scheduled during an outage. We hoped to cut that time in half. The plant scheduled maintenance on approximately 12 probes during the outage. The outcome is illustrated in Figure 4.

This example of team technical training points out the importance of the practitioner's responsibility to gain clarity in all areas that could influence the outcome of HPT interventions. Training was the main intervention. All other work practices were by procedure. The main control problem was that the trained team actually did the work. The metric is especially valuable, as it best measures the effect of team training while illustrating a benefit at the bottom line through significant cost savings.

The authors found other cases, citing customer satisfaction and financial improvement as bottom line, business benefits from performance improvement programs. Some of the articles and books the authors reviewed were Harold D. Stolovitch's article (2005) citing success criteria and metrics; Donald J. Ford's reference to using evaluation checkpoints through each step of the HPT process (2004); and Jack Phillips' book *Return on Investment in Training and Performance Improvement Programs* (1997), which states that the key to a good evaluation is based upon the linkage of initiatives to specific, measurable business objectives and outcomes.

The real value is established when the HPT practitioner provides measurable goals and assumes accountability for saving costs or increasing profits. Demonstrating the business value or even return on investment of HPT impact is good professional practice. Moreover, we found that funding is most often provided for HPT interventions when they clearly improve the bottom line.

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