GREAT SAFETY PERFORMANCE

An Improvement Process using Leading Indicators

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June 2004

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In the United States, 1.5 million injuries and illness resulted in workers missing time from work in 2001 (Bureau of Labour Statistics, 2001). In Canada, three workers die from an occupational injury or disease every working day, and more than 3,000 workers are injured; in essence, one occupational injury occurs approximately every nineteen seconds worked (CANOSH, 2002). Unsafe work practices have severe consequences for individuals and organizations:

- Personal grief and hardship for the affected workers and their families (Dyck, 2002; NIDMAR, 2003);
- Financial liabilities for workers, corporations and government agencies (NIDMAR, 1994); and
- Potential criminal prosecution for persons who direct work and demonstrate wanton disregard of worker or public safety, along with senior management and directors (Federal Government of Canada, Criminal Code Amendment, November, 2003).

These facts indicate the need for a more proactive approach to the management of workplace safety - an approach that enables organization leaders to monitor all the relevant risks and take corrective action before accidents happen.

The Great Safety Performance Model is an improvement process that describes how companies can improve their safety outcomes by maximizing the conditions for safety within their workplaces. In contrast to more traditional approaches, the Great Safety Performance Model places greater emphasis on the "antecedents" of behaviour as a way of identifying, monitoring and managing the leading indicators of safe work performance. The Great Safety Performance Model also enables companies to demonstrate their level of compliance with the applicable Occupational Health and Safety (OH&S) legislation.

Corporate OH&S Duty

In Canada, OH&S Duty means that "every one who undertakes, or has the authority to direct how another person does work or performs a task, is under a legal duty to take reasonable steps to prevent bodily harm to that person, or any other person, arising from that work and task" (Federal Government of Canada, 2004). Organizations, corporations and individuals that direct others to perform work, or have the authority to do so, must take reasonable and practicable steps to provide a safe and healthy workplace, and to protect workers and the public from potential harm as a result of the work. They must also be able to provide evidence of their actions (Keith, 2004).

Lapses in corporate OH&S duty can have severe consequences for organizations and their leaders. In addition to the risk of sizable financial penalties and social embarrassment, front-line supervisors, managers, executives, and directors of corporations – any individual who directs work and workers - can be held legally accountable for preventable workplace injuries and death.
Leading-edge companies know that the “ideal defense” is a “sound offence.” By establishing a robust OH&S Management System, corporations can “bullet-proof” themselves (Keith, 2004). The key elements of an OH&S Management system are:

- Management Leadership and Commitment,
- Hazard Identification and Management,
- Worker Training,
- OH&S Communication,
- Incident Investigation, and
- Program Evaluation and Continuous Improvement.

Safety professionals and researchers not only agree that this is the ideal OH&S management structure (Germain, Arnold, Rowan & Roane, 1998), but recognize that 85% of the safety failures in the workplace stem from system problems that only management can address (Bird & Germain, 1996).

Leading-edge companies tend to deal with system problems by addressing the "leading indicators" of safety performance to maximize the effectiveness of their OH&S Management Systems. This means identifying and continuously improving all the system conditions that are necessary to enable workers to work safely. It translates into leaders creating a workplace culture that supports a high degree of commitment to workplace safety; having a process for measuring, monitoring and managing the leading indicators of safety performance; and demonstrating the effectiveness of the established OH&S Management System. This is the type of evidence required of company leaders to prove that they are upholding their OH&S Duty.

**Sustainable High Performance Workplace Cultures**

The Great Safety Performance project is particularly relevant to the leadership, communication, measurement, and continuous improvement elements of an OH&S Management System. Leadership is addressed by providing management with data, a focus, and an agenda for safety improvement and culture change efforts. Communication is focused on creating dialog between front-line workers and management, and involving front-line personnel in improvement planning. As for measurement, a specific set of leading indicators are defined, measured, and monitored to demonstrate the predictors of safe work in a specific job function. In terms of continuous improvement, a process to identify system performance gaps, implement improvements, monitor progress, and manage cultural shift is implemented.

Strengthening these elements of an OH&S Management System is accomplished by using a model of organization performance systems to enable and support worker performance in a variety of ways. *The Performance Maximizer®* (Figure 1) illustrates the nature of human performance in the workplace by describing all the factors that exist when successful human performance pertaining to any function occurs in the workplace. The model asserts that leaders and workers need to jointly create conditions whereby everyone will *know what to do*, be *able to do it*, be *equipped to do it*, want *to do it*, and experience *interactions* that support great performance in their job.
duties. These factors are referred to as the "Conditions for Great Performance." Interactions refer to the quality and effectiveness of interpersonal interactions\(^1\). The absence of these conditions constitutes obstacles and barriers to successful worker performance.

**FIGURE 1: The Performance Maximizer\(^{®}\)** Copyright © 1998-2004 Performance! ...by design\(^{®}\). The Performance Maximizer\(^{®}\) (words and illustration) is a registered trademark: 82 The Terraces, 5810 Patina Drive, SW, Calgary, AB T3H 2Y6 Canada

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**Applying The Performance Maximizer\(^{®}\) to Safety**

The premise implicit in *The Performance Maximizer\(^{®}\)* is that great human performance is enabled by using a performance system approach to create the right overall work environment - the *Conditions for Great Performance*. With that premise in mind, a Canadian electrical utility embarked on the design of a Great Safety Performance Model

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\(^1\) The category of Interactions was added to *The Performance Maximizer\(^{®}\)* after the work reported in this article was begun and is therefore not included in the results. However, in our current work, interactions are proving to be a critical part of the “performance system”. 

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in April 2000. The company was determined to be “best in class” in regard to safe work and safe workplaces. The corporate OH&S Team identified the desired OH&S and business outcomes, hypothesized that the Conditions for Great Performance are the “leading indicators” of safety, and formulated a set of goals for the proposed Great Safety Performance initiative. Throughout the project, Performance! …by design® an external performance consulting firm, provided guidance to the OH&S team. The project goals were:

1. Shift the focus of safety management from lagging to leading indicators of safety performance;
2. Demonstrate a predictive relationship between leading and lagging indicators of safety performance;
3. Using the leading indicators provide data to monitor system risks and to drive injury/illness prevention;
4. Provide leaders in the company with a focus and an agenda for their safety improvement and culture change efforts; and
5. “Raise the bar” on safety performance by significantly improving the company’s safety results.

**Methodology**

To guide the project, a continuous improvement process was incorporated into the Great Safety Performance Model. This process is a six-step cycle designed to systematically maximize the Conditions for Great Performance and create a high performance culture that can sustain effective (in this case, safe) work practices. This process provides the structure for the following description of the methodology used in the pilot project.
Figure 2: Performance Improvement Process ~ Six steps to a High Performance Culture for Safety

1. Explore the Situation
   - Scope opportunity. Agree on Assessment

2. Define the Need
   - Design and develop or purchase solutions

3. Develop Responses
   - Identify root causes for gap
   - Assess Safety Performance. Agree on Actions

4. Implement Actions
   - Measure quarterly. Correct course

5. Measure and follow-through
   - Engage stakeholders. Maintain support.

6. Future State
   - Help manage implementation to completion

GAP

Current State
   - Measure Current Performance. Establish baseline

Great Safety Performance
   - Know What to do
   - Able to do it
   - Equipped to do it
   - Want to do it

Safety performance opportunities or problems

Great Safety Performance Model
   - Help manage implementation to completion

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Copyright © 1998-2004 Performance! ...by design®. All rights reserved.
1. Explore the Situation
The Great Safety Performance Project began in April 2000. This initiation stage included an exploration of high performance workplaces, defining the scope of the work to be done, and developing the goals provided above.

2. Partner with Clients & Manage Change
At various stages of the project, the partnering and change management activities included:
- Working with management to set goals and make decisions about their participation, resource commitments and improvement actions;
- Working with front-line workers and leaders to tailor the Great Safety Performance Model to meet the group needs;
- Educating stakeholders about the benefits of adopting the Great Safety Performance Model to them; and
- Working with front-line workers and leaders to validate and understand data, recommend improvements and implement actions.

In general, these involvement activities served to ensure that management were active leaders in the process, and that all the stakeholders felt ownership of the initiative.

3. Performance Assessment
3a. Future State: Developing the Great Safety Performance Model
The OH&S Team began defining all the required elements of the Great Safety Performance Model by addressing two questions:
1. What does great safety performance look like?; and
2. What are all the specific factors that would make up the enabling Conditions for Great Safety Performance in the workplace?

The Great Safety Performance Model indicates that great safety performance consists of Safe Work Actions that lead to Safe Work Outcomes that produce positive Safety Results and Individual Outcomes, which in turn, improve the impact on Company Business (Figure 3).

The OH&S team identified ten practices for the Safe Work Actions and twenty-six specific factors necessary to enable those Safe Work Actions. These factors are the Conditions for Great Safety Performance which specify what is required to:
- Know What to do to work safely (5 factors);
- Be Able to work safely (5 factors);
- Be Equipped to work safely (10 factors);
- Want to work safely (6 factors).

The OH&S Team also proposed that the Safe Work Actions and the four (4) Conditions for Great Safety Performance are the Leading Indicators of Safety. In the
model, the Safe Work Outcomes and Safety Results elements are the Lagging Indicators of Safety (Figure 3).

FIGURE 3: Great Safety Performance: An Illustration of the Leading and Lagging Indicators of Safety

The OH&S Team operated on the premise that a predictive relationship exists between the leading and lagging indicators of safety performance. That is, given the right supportive environment (Conditions for Great of Safety Performance), workers would be enabled to perform Safe Work Actions, and then, would produce the desired Safe Work Outcomes and Safety Results (Lagging Indicators of Safety). It was believed that by monitoring both the leading and lagging indicators of safety performance, the company would have the information needed to continuously improve its safety performance.

To help explain and market this novel concept, a communication metaphor using the dashboard of a car was developed (Figure 4). The traditional focus on predominantly Safety Results (lost-time injury frequency and severity) can be thought of as the view in the rear view mirror. The landscape seen in the mirror is a view of the past. Similarly, an accident has to have occurred to be counted (it’s in the “rear view mirror”). Prevention opportunities are limited to future actions.

The instruments on the automobile’s dashboard monitor its performance in real-time and allow the driver to take appropriate corrective action before problems occur. Similarly, the Great Safety Performance Model and methodology monitors a
"dashboard" of leading indicators of safety performance and provides real-time data to guide leaders in proactively maximizing the performance environment for safety.

FIGURE 4: Great Safety Performance Model: Measurement of Leading Indicators

3b. Current State: Baseline Measurement of Safety Performance

The OH&S Team determined that the model elements could be measured using a combination of "hard" and "soft" (perception) data for leading and lagging indicators of safety performance. For lagging indicators, the typical safety results were available: incident and injury records, frequency and severity rates, as well as business data. In terms of the leading indicators of safety performance, the company already tracked a variety of "hard" data such as worker training records, worksite inspection reports, equipment inspection and maintenance logs, vehicle inspection logs, and safety audit results. However, significant factors in the Conditions for Great Safety Performance are rooted in the actual workplace experience of workers themselves and for these there were no practical "hard" data possible. The OH&S team decided to measure these factors using a worker perception tool.

The Workplace Safety Survey, a 36-item survey instrument, was developed to measure all the leading indicators of safety performance as well as to collect the needed perception data. Using a 6-point frequency scale ranging from "0" (almost never) to "5" (almost always), workers were asked to rate:
• How frequently they engage in the Safe Work Actions— a measure of their own performance (10 items).

Then using a 6-point agreement scale ranging from “0” (strongly disagree) to “5” (strongly agree), workers were asked to rate:
• The degree to which they actually experience a variety of factors required to support their Safe Work Actions (i.e., the Conditions for Great Safety Performance) – a measure of how well the performance system supports them (26 items).

All the survey items were then rated again on how important the workers felt it is to:
• Perform the listed Safe Work Actions to ensure their safety, and
• Have the Conditions for Great Safety Performance in place to enable them to perform the identified Safe Work Actions.

Importance was rated on a 6-point importance scale from "0" (Very Unimportant) to "5" (Very Important).

There were several research goals associated with the implementation of the survey. Namely to:
• Establish the reliability of the survey tool;
• Determine if a predictive relationship between Safe Work Actions and the Conditions for Great Safety Performance could be established;
• Determine if a predictive relationship between the leading and lagging indicators of safety performance could be established; and
• Determine the overall impact of the Great Safety Performance Model on improving workplace safety.

The research group was comprised of sixty-five meter readers that were new to the company. Their safety results (lost-time injury frequency and severity rates) were five times higher than that of the rest of company and they believed that workplace injuries were an inherent part of meter reading.

Meter readers are utility workers who travel about the city reading residential, commercial, and industrial utility meters located at customer sites. While driving to and walking about their assigned routes, they encounter numerous hazards such as traffic, slippery sidewalks, decks or stairs, agitated dogs, insect nests, poorly lit stairwells, violent people, cluttered walkways, temperature extremes, and the like. Although the company appeals to its customers to keep access to the meters clear and safe, many hazards remain.

Prior to implementing the pilot project, the utility meter readers were educated on the Great Safety Performance Model, the planned measurement techniques, and how the appropriate remedial actions would be determined. They were also advised that
their individual responses would be kept confidential as all the results would be reported in aggregate form. They were then invited to participate in the pilot project.

Before any intervention took place, the meter readers completed a baseline Workplace Safety Survey which was tailored to the meter reading situation (December 2001). The purpose of administering the surveys with Meter Readers specifically was to:

- Establish a level of current safety performance;
- Identify performance gaps and their causes;
- Develop recommendations for improving safety performance;
- Track changes in worker perceptions and safety performance over time (quarterly during the first year).

The survey data were processed, analyzed, and interpreted by Performance! …by design in collaboration with the Department of Psychology, University of Calgary, Alberta. The survey data were analyzed using special statistical software (SPSS statistical software, version10) ideally suited for this type of data. The reliability and validity of the Workplace Safety Survey tool were also analyzed.

Means were calculated for all items and a constant value of 20 was used as a multiplier for each. This was done to facilitate both the interpretation of the results and their presentation as “gauge scores” in the Great Safety Performance “dashboard” display. The highest possible mean score (or gauge score) for each leading indicator was 100 (as opposed to 5, the highest rating on the survey scale).

3c. Gap Analysis:

The analysis of baseline results indicated a variety of relatively lower mean scores in both Safe Work Actions and the Conditions for Great Safety Performance. Based on the researchers’ hypothesis, low mean scores in the Conditions for Great Safety Performance are linked to low mean scores in Safe Work Actions. To understand and validate the data, the results of the Workplace Safety Survey were compared against the “hard” safety data as well as other available measures such as results of the company Employee Relationship Survey (soft data). Likewise, discussions were held with meter readers and their management to gain insight into the data.

4. Develop Responses

The OH&S Team worked with management and employee groups to identify appropriate improvement actions.

5. Implement Actions

Working together, company management, the meter readers and the OH&S Team initiated a variety of improvements actions in order to reduce or eliminate the identified barriers and obstacles to improved safety performance.
Table 2 in the Results and Findings section provides a sampling of weaknesses in the Conditions for Great Performance, actions that were taken, and results achieved.

6. Measurement and Follow-through
Quarterly Workplace Safety Surveys were administered between December 2001 and December 2002. One more was done, July 2003, at the end of the eighteen month pilot period.

In July 2002, the meter readers were asked to record the number of occurrences they personally had in each of five injury/incident categories: First Aid, Medical Aid, Lost-time Injury, Motor Vehicle Accident, and Property Damage. These data would be used to determine if a predictive relationship between the leading and lagging indicators of safety performance could be established.

Data for all surveys were again processed, analyzed, and results communicated to management and the meter readers as described above. With this information on progress, management and the OH&S Team were able to make decisions about the success of their improvement efforts and take further corrective action as needed.

Project Results and Findings

1. Reliability of the Workplace Safety Survey:

The Workplace Survey proved to be an impressively reliable measurement tool for the leading indicators of safety performance. Method 2 (Covariance Matrix) was used for this analysis and the results are reported in the Reliability Analysis Table in the Appendix.

2. Conditions for Great Safety Performance:

a. Actual performance of the system for enabling Safe Work Actions

The degree to which Meter Readers actually experienced the four Conditions for Great Safety Performance during the 18-month pilot period is shown graphically in Figure 5 and numerically in Table 1. The July 2003 results indicate that since December 2001 (baseline), there has been a modest improvement in the workplace system to enable workers to Know What to do (7.5%) and be Able to do it (10.3%). Stronger improvement took place in the Equipped to do it (15.2%) gauge score. The Want to do it gauge score measures feedback, recognition, management’s responsiveness to unsafe conditions and practices, and motivation to perform well. It is in the Want to do it category that the most dramatic improvement occurred (42.9%).
<table>
<thead>
<tr>
<th>Table 1: Great Safety Performance &quot;Dashboard&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Leading Indicators</strong></td>
</tr>
<tr>
<td>Know What to do</td>
</tr>
<tr>
<td>Able to do it</td>
</tr>
<tr>
<td>Equipped to do it</td>
</tr>
<tr>
<td>Want to do it</td>
</tr>
<tr>
<td>Safe Work Actions</td>
</tr>
<tr>
<td>Frequency of Injuries</td>
</tr>
<tr>
<td>Severity of Injuries</td>
</tr>
</tbody>
</table>
Improvement in a variety of factors in the *Conditions for Great Safety Performance* drove these results. See Table 2 for a sampling of specific improvements.

<table>
<thead>
<tr>
<th>Issues identified</th>
<th>Actions implemented</th>
<th>Survey score increase after 18 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Some lack of awareness regarding expectations and standards as well as priorities and direction</td>
<td>Clarify and strengthen the communication of expectations, management’s commitment to safety, and the importance of both Safe Work Actions and the Conditions for Great Safety Performance</td>
<td>13%</td>
</tr>
<tr>
<td>Meter readers were unclear about how their safety performance is measured and received little information in that regard.</td>
<td>More information provided at monthly safety meetings; quarterly progress updates using Great Safety Performance Survey data</td>
<td>14%</td>
</tr>
<tr>
<td>There were serious issues with hazards at customers’ meter reading sites; insufficient signage, guards and barriers.</td>
<td>Gain customers’ cooperation in controlling or eliminating hazards at meter sites.</td>
<td>40%</td>
</tr>
<tr>
<td>Some deficiency in properly designed tools/equipment</td>
<td>Improve some tools; meter readers select own footwear.</td>
<td>14%</td>
</tr>
<tr>
<td>Quick access to assistance or guidance was not readily available enough when needed.</td>
<td>Provide cell phones to maintain contact while on route</td>
<td>14%</td>
</tr>
</tbody>
</table>

| Meter readers received infrequent (meaningful) recognition for doing their jobs safely. | Enhance front-line leadership practices to increase the quantity and quality of performance feedback and recognition | 56%                                  |
| Meter readers received insufficient specific feedback when they did their jobs safely. |                                                                                                               | 56%                                  |
| Meter readers had insufficient helpful corrective feedback when doing their jobs in an unsafe manner. |                                                                                                               | 23%                                  |
| Management was not perceived to be quick and decisive in responding to unsafe conditions and practices. | Improve management’s responsiveness to safety issues and communication of actions and results. | 23%                                  |
| It was not absolutely clear to meter readers that they could refuse to enter hazardous sites. | Clarify authority to make individual decisions regarding safety at work                                          | 17%                                  |
FIGURE 5: Mean Scores for the Conditions for Great Safety Performance

Actual = the degree to which Meter Readers reported that these Conditions were in place to support their safety
Importance = the degree to which Meter Readers reported that these Conditions are important for their safety
b. Importance of the Conditions for Great Performance

For each of the individual items in the Conditions for Great Safety Performance, the meter readers were asked to indicate how important each item is for them to work safely every day. The meter readers steadfastly reported the individual items as being “important” or “very important” for them to work safely (Figure 5). Overall, the Importance Ratings for the Conditions for Great Safety Performance have increased approximately 9% from baseline.

3. Safe Work Actions

a. Actual Performance of Safe Work Actions

The mean scores for the ten Safe Work Actions measured by the Workplace Safety Survey are presented graphically in Figure 6. The degree to which the meter readers reported that they engage in Safe Work Actions improved 7.5% overall from baseline (Table 1). This indicates that the meter readers perceive their performance of the Safe Work Actions to be higher than “very frequently” and approaching the “almost always” level. (A score of 80 equates to “very frequently” and 100 to “almost always” on the survey instrument.) This finding aligns with the dramatic decrease in the group’s actual safety results (injury frequency and severity rates) over the 18 month pilot period (Table 1).

b. Importance of Safe Work Actions

For each of the individual items in Safe Work Actions, Meter Readers were asked, “To work safely everyday, how important it is to engage in each of the ten individual Safe Work Actions?” The average ratings of importance increased approximately 5% over the 18 month period (Figure 6). By July 2003, the meter readers were rating the individual items as “important” to “very important” for working safely on the job.

The correlation analysis done on all the surveys conducted in 2002 and July 2003 indicates that all the Actual Frequency and Importance Rating scores strongly correlate. For the ten Safe Work Actions the analysis produced Pearson Correlations ranging form .601 to .778 with Significance (1-tailed) at .000 for all ten. The more important the meter readers rated a Safe Work Action, the more likely they were to engage in that Safe Work Action. This means that increasing Meter Reader perceptions about the importance of Safe Work Actions would be a very strong influence on the Safe Work Actions being performed with more frequency. This significant finding should encourage management and industry trainers to accelerate and make more effective their efforts to help workers appreciate, value and commit to acting on corporate safety standards and practices.
Actual = how frequently meter readers perform the Safe Work Actions
Importance = how important meter readers believe it is to perform the Safe Work Actions for their own safety
4. Predictive Relationship

This project sought to establish a predictive relationship between the *Conditions for Great Safety Performance* and *Safe Work Actions*, and subsequently, between *Safe Work Actions* and *Safe Work Outcomes*. Experience, logic, and data from other areas tell us that this relationship is intrinsic to worker safety performance.

**a. Extent to which the Conditions for Great Safety Performance are Predictive of Safe Work Actions:**

Bivariate Correlation Analysis (Pearson; 1-tailed) was done on the data for each round of surveys administered during the 18 month period. The data support a strong predictive relationship from the *Conditions for Great Safety Performance* to *Safe Work Actions*. Correlation Analysis (Independent variables = *Conditions for Great Safety Performance*; dependent variable = *Safe Work Actions*) yields Pearson Correlations of .447 to .726 with significance at \( \geq .001 \) (see Correlation Analysis Table in the Appendix).

It is also very important to note that the *Conditions for Great Safety Performance* are highly correlated with each other (see Correlation Analysis Table in the Appendix). This finding supports the researchers’ assertion that *The Performance Maximizer* illustrates a “performance system” and that the *Conditions for Great Safety Performance* are a set of performance enablers that are characterized by high degree of interdependence. The important implication for how leaders manage safety performance is addressed in the discussion that follows.

**b. Extent to which the Safe Work Actions are predictive of Safe Work Outcomes:**

Once the methodology for identifying and measuring the leading indicators of safety performance proved reliable and predictive (valid), the OH&S Team sought to correlate the leading indicators of safety performance (*Conditions for Great Safety Performance* and *Safe Work Actions*) with the actual lagging indicators of safety performance (*Safe Work Outcomes*; *Safety Results* – workplace injury frequency and severity rates). Both logic and experience tell us that *Safe Work Outcomes* almost always follow consistent performance of *Safe Work Actions*. By establishing a predictive relationship to *Safe Work Outcomes*, we hoped to understand the degree to which some, or all, of the *Conditions for Great Safety Performance* needed to improve in order to achieve better *Safe Work Outcomes* and *Safety Results*.

In July 2002, we began tracking the predictive relationship between *Safe Work Actions* and *Safe Work Outcomes*. The data collected indicated that *Safe Work Actions* negatively correlated to the occurrence of First Aid and Medical Aid injury incidents (Pearson Correlations and Significance respectively: -.370, .022; -.374, .021). That is, the higher the *Safe Work Actions* score, the less likely it is for First Aids and Medical Aids to occur. Since then, statistical testing of the predictive relationship between *Safe Work Actions* and *Safe Work Outcomes* could not be achieved due to a relatively small target population and a dramatic reduction in the number of workplace injury incidents (see Table 1). Correlations cannot be established when the injury/incident numbers
are at, or close to, "0." This idea was abandoned in favour of finding a larger population with potentially more workplace incidents.

**CONCLUSION**

The Great Safety Performance Model combines a model of organization performance systems with a continuous improvement process. It requires the integration of perceptual ("soft") data and objective ("hard") data for the Conditions for Great Safety Performance. The available "hard data" supported the trend noted in the relevant perception data.

The results achieved through the application of the Great Safety Performance Model with the pilot group (Meter Readers) support several significant conclusions:

1. The data collection and performance measurement methods proved to be impressively reliable. The four Conditions for Great Safety Performance were statistically significant predictors of on-the-job safety performance.

2. By strengthening the Conditions for Great Safety Performance, obstacles and barriers to the performance of the Safe Work Actions were reduced or removed.

3. Managing and improving the Conditions for Great Safety Performance lead to improvements in Safety Results.

4. Workers' beliefs about the importance of Safe Work Actions strongly influence their performance of those practices.

5. The Conditions for Great Safety Performance are an interdependent set of variables that must be managed as a system.

**DISCUSSION**

The Great Safety Performance Model is intuitively sound, and easy to understand and use. The Workplace Safety Survey tool, which was found to be valid and reliable, allows an organization to measure the degree to which workers practice Safe Work Actions and the degree to which they are enabled to do so by the workplace performance environment. By doing repeated surveys, safe work practices, and their enabling conditions, can be tracked and intervention efforts evaluated. This is one way in which a company can demonstrate its commitment to workplace safety and provide evidence of its “OH&S duty of care” for workers.

Knowing that there is a predictive relationship between the four Conditions for Great Safety Performance and the Safe Work Actions, company leaders who want to improve safety outcomes, can focus on the leading indicators of safety performance as opposed to dwelling on the lagging ones. Using this approach, there is an opportunity to change the safety outcomes, as opposed to merely observing and reporting on them. As Charles E. Gilmore asked the National Safety Congress, “What is the sense of measuring, if the loss must occur, before you can act? That is reaction, not control (Bird & Germain, 1996).”
It is very valuable to know that as worker perceptions about the importance of *Safe Work Actions* increase, the frequency with which the desired *Safe Work Actions* are performed, increase as well. Instead of dictating to workers that certain behaviours must be practiced, management, and trainers can be more effective if they explain the benefits of the desired *Safe Work Actions* to workers and their families. In essence, focus on “what is in it” for each player to practice the proposed *Safe Work Actions*. This approach is consistent with current research on effective occupational safety training techniques (Colligan & Cohen, 2004).

Although the predictive relationship between *Safe Work Actions* and *Safe Work Outcomes* could not be conclusively proven in this pilot project, there is a strong indication that there is a direct relationship. Once the Great Safety Performance Model and its elements were initiated, the target group began to demonstrate a dramatic reduction in workplace Safety Results. The injury frequency rate$^2$ for the group (Table 1) dropped from 33 (December 2001) to 0 (July 2003) and the injury severity rate$^3$ decreased from 289 (December 2001) to 0 (July 2003).

More importantly, a significant cultural change occurred. Line management and the meter readers moved from a state of “learned helplessness” to one of “being empowered.” For example, when they joined the company in December 2000, they voiced the belief that workplace injuries were "just part of meter reading." By July 2003, the group realized that they could work safely without experiencing any workplace injuries. In essence, their experience changed their beliefs.

Two additional, important findings emerged. First, the research confirmed that the *Conditions for Great Safety Performance* are highly interdependent. This is a crucial message to leaders and OH&S professionals. They must recognize that in managing safety, they are dealing with an interconnected system. Investigations, analyses and remedies that have a singular focus may be oblivious to other factors in the safety “performance system” which are influencing safety practices and results. This means that safety performance can only be maximized when all the enabling conditions are considered, planned for, measured and managed as interdependent elements.

Second, the Great Safety Performance Model can serve as a vehicle to quantify, document and demonstrate the efforts a company invests to create a safe workplace with safe work practices. Such information is valuable evidence which can attest to the company’s due diligence in promoting and providing a safe workplace as well as it’s compliance in meeting its OH&S duty.

Lastly, using the Great Safety Performance Model, organizations can design and implement a variety of high-leverage improvement initiatives specific to their business situations. These include:

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$^2$ *Injury Frequency rate* is the number of lost-time injury incidents per 200,000 work hours.

$^3$ *Injury Severity rate* is the number of lost-time workdays due to a work injury per 200,000 work hours.
• Identifying the leading indicators for safety performance;
• Assessing the gaps between ideal and actual safety performance;
• Developing workable solutions to strengthen the *Conditions for Great Safety Performance* and deliver the desired safety results;
• Establishing a monitoring mechanism to measure the effectiveness of the implemented initiatives and interventions; and
• Creating a system that demonstrates organizational/corporate commitment to workplace safety.

The only question that remains is…

"Are you ready to raise the bar on your approach to safety management within your company?"

**Summary:**

- The Great Safety Performance Model uses “leading indicators” to drive prevention and provides a process to improve a company’s safety outcomes by maximizing the conditions for safety within its workplaces.

- The model asserts that leaders and workers need to jointly create conditions whereby everyone will know what to do, be able to do it, be equipped to do it, want to do it, and experience interactions that support safe performance in their job duties. These factors are referred to as the "Conditions for Great Performance."

- The Great Safety Performance Model can serve as a vehicle to quantify, document and demonstrate the efforts a company invests to create a safe workplace with safe work practices. Such information can be valuable evidence to attest to the company’s due diligence in promoting and providing a safe workplace as well as it’s compliance in meeting its OH&S duty.

- Using the Great Safety Performance Model, organizations can design and implement a variety of high-leverage improvement initiatives specific to their business situations.
APPENDIX: Reliability and Correlation Tables

Reliability Coefficients - Standardized item alpha (/> .7 = Very Good)

<table>
<thead>
<tr>
<th>Leading Indicators</th>
<th># of Items</th>
<th>April 2002</th>
<th>July 2002</th>
<th>October 2002</th>
<th>December 2002</th>
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<td>.81</td>
<td>.85</td>
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<tr>
<td>▪ Able to do it</td>
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<td>.82</td>
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<td>.85</td>
<td>.76</td>
<td>.81</td>
</tr>
<tr>
<td>▪ Equipped to do it</td>
<td>10</td>
<td>.81</td>
<td>.80</td>
<td>.82</td>
<td>.86</td>
<td>.85</td>
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<tr>
<td>▪ Want to do it</td>
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<td>.93</td>
<td>.85</td>
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<tr>
<td>▪ Safe Work Actions</td>
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Method 2 (Covariance Matrix) was used for this analysis

Bivariate Correlation Analysis: July 2003 – Meter Readers (total population = 65)

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<tr>
<th>Know What to do</th>
<th>Pearson Correlation</th>
<th>Know What to do</th>
<th>Able to do it</th>
<th>Equipped to do it</th>
<th>Want to do it</th>
</tr>
</thead>
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<tr>
<td></td>
<td></td>
<td>Know What to do</td>
<td>Able to do it</td>
<td>Equipped to do it</td>
<td>Want to do it</td>
</tr>
<tr>
<td>Know What to do</td>
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<td>.697(**</td>
<td>.644(**</td>
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<td>.726(**</td>
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REFERENCES

Aon. (2000). *Canada @ work*. Toronto: Author.


**The Authors:**

Tony Roithmayr operates *Performance! ...by design*, a consulting practice dedicated to helping leaders turn their strategic intent into Great Performance. As a performance consultant, Tony has for over 20 years been helping organizations align human performance with the results required by their businesses. His experience includes projects to improve employee and leader performance in a variety of operational situations (e.g., workplace safety), implement performance management systems and implement performance-based approaches to learning and coaching in the workplace.

He has held human resource management positions as well as internal and external consulting roles in financial services, consumer-packaged goods, health services and the high-tech and energy sectors. Organizations he has served include ManuLife Financial, Nabisco Brands, Apple Canada, Molson, Royal Trust, Petro-Canada, ENMAX, Enbridge, the City of Calgary and the Veterans Hospital Administration (U.S.).

By 1998 Tony had developed *The Performance Maximizer*® and began formulating processes and service offerings that are branded *Performance! ...by design*. This brand is dedicated to the proposition that great performance - performance that is valued by both employees and their organizations - can be designed, developed and sustained.

*The Performance Maximizer*® is protected by copyright and a registered trademark. For inquiries: tony@performance-bydesign.com

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