

# Integral Safety Needs Analysis towards Optimizing Safety Performance in Malaysian-Based Multinational Pipe-Coating Industry

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**Abstract**—In examining the literature on occupational safety and health management systems (OSHMS), this paper asserts that there is a need to consider the human interface when attempting to deal with a step change in safety at the workplace. The general absence of study in the integration of systems and subjective side of occupational safety has prompted this conceptual development, empirical study and theoretical reflection. The survey population was made up of on-line survey and paper questionnaire among 282 respondents. The demographics of the sample were representative of the typical mid-sized pipe-coating industry with 12% management respondent, 16% supervisory respondent, 70% shop floor respondents and the remaining 2% subcontractor respondents. There were also follow-up one-on-one interviews with 25 organization members. It can be concluded from this sample that in excess of 60% of the survey respondents expressed desire to build on the reacting, conforming and achieving stages towards achieving an integral performance level when given an option to do so. These preliminary results of initial perception survey forms the foundation for the scope of study in the form of intervention and gap closure to be addressed in future researches for further promoting the integration of psychology, sociology, industrial relations and management studies to supplement existing system approaches in OSHMS.

**Index terms:** Integral safety, human interface in OSHMS, adaptive leadership

## I. INTRODUCTION

A Malaysian-based multinational pipe-coating organization (which has elected to remain anonymous) has allowed the researcher to work in partnership towards building and sustaining an incident-free workplace. Understanding the current perceptions and attitudes of the organization towards safety is a critical starting point in discovering what will be required to shape a future that delivers on what may seem impossible to many, which is the elimination of all worker injury. The integral safety assessment is a tool which reveals organization members perceptions about key drivers of safety performance. Central to the researcher's approach and to this assessment is the perspective that the ultimate source of behavior and safety results is how people perceive their world. Through the use of surveys and interviews the researcher has taken a broad and deep sounding of how the organization sees itself now, and where it wants to be in the future with regards to operating as an incident-free organization.

Lutchman et.al [1] stressed that the current focus on safety is on cooperation, collaboration and generating and sharing new knowledge to enhance workplace safety. The concept of “*you do not know what you do not know*” rings true when the evolution of safety is reviewed and the roles, responsibilities and accountabilities of leaders and safety practitioners are attempted to be defined. Leadership in safety cannot be treated any differently than leadership in any other areas of business. A key challenge for business leaders today is the ability to manage cost, production (quality) and safety in tandem. This is mainly because the stakeholders (in various forms) are often overly focused on short-term gains or cost efficiency.

Geller [2] postulates that the human dynamics enable profound understanding of the psychology of safety. It is no longer adequate to merely have a solid safety and health management system in place and hope for, or expect the best outcome in term of safety performance. Supporting evidence to this statement would be the major disasters in recent years- Texas City Refinery explosion, Deepwater Horizon and Longford gas plant explosion to cite a few high –profile incidents.

The distinction between a leader and a manager was made clear by Tom Krause at the ASSE conference [3] was that leaders are people who “inspire others to want to do something” as opposed to managers who “hold people accountable for doing something”. Getting people to take personal accountability and responsibility for safety is the real leadership challenge here. The evolution of safety management and the maturity or progression of the current workforce requires an alternative leadership and engagement approach to achieve breakthrough results.

Wilber proposed an Integral Approach model that was later adapted by MJM Associates for application in the workplace [4]. In this model, the workplace is described as being in a state of a four-quadrant domain, where there is division between the group as a collective unit and the individual operating as a person. Wilber’s Integral Approach model appears to be consistent with Krause’s, view in his book *Leading With Safety*[5] where the subjective side of safety is discussed at length under Safety Leadership model. Personality, values, emotional commitment are discussed in relation to a leader’s ability to impact the Big Five dimensions that contribute to safety leadership. The Big Five cited by Krause being Emotional Resilience, Extroversion, Learning Orientation, Collegiality and Conscientiousness. A significant distinction between Wilber’s and Krause’s work is that Krause focus is targeted at an audience with interest in safety at the workplace while Wilber’s work forms the foundation for philosophy in general.

The main purpose of this integral safety assessment needs analysis is to provide the organization’s leadership team with the awareness, insights and planning opportunities needed in support of developing an incident-free organization. The groundwork that the team is able to put in place during these foundational stages would be critical in shaping future results.

## II. MATERIALS AND METHODS

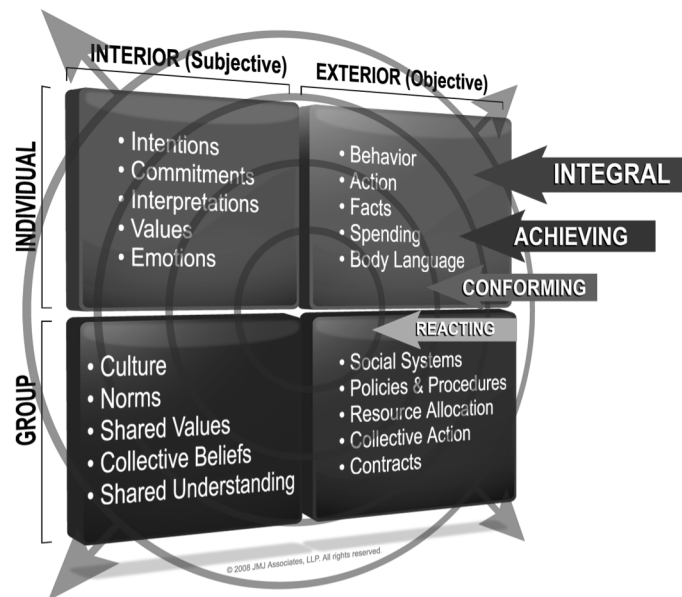
Data collection for this pilot study was carried out via structured online and paper based anonymous questionnaire, through one-on-one and group interviews. A total of 282 respondents participated in the online web-based survey with an additional 25 respondents participated in the one-on-one interviews. Inquisition Survey Tool was used for the web-based data collection and data compilation prior results tabulation. The survey data are organized consistent with this Quadrant Model (Figure 1) which is widely used by MJM Associates in their safety consulting practice, giving four views of factors relating to the organization’s current and desired safety performance; i) individual subjective or personal view, ii) collective subjective or cultural view, iii) individual objective or behavioral view, and iv) collective objective or organizational view.

**Individual subjective or personal view** includes questions relating to an individual’s subjective personal view of those factors affecting safety performance (i.e. individual commitments, beliefs, intentions, values and experiences). For example, “I am committed to keeping not only myself safe but those around me as the well.”

**Collective subjective or cultural view** includes questions relating the way the organization as a whole views the world (i.e. shared understandings, beliefs, commitments). For example, “We really value people showing care and concern for one another.”

**Individual objective or behavioral view** includes questions relating to individual behaviors or actions from the outside (i.e. everything that is objectively observable about an individual). For example, “I saw my supervisor remind Ahmad to wear his safety glasses.”

**Collective objective or organizational view** includes questions relating to how the organization works as a social system and questions relating to sub-systems within the whole (i.e. staffing patterns, JSA procedures, rewards and recognition programs). For example, “In the office we are required to do ergonomic reviews of each other’s work space regularly.”



**Figure 1 Four perspectives on safety performance based on Ken Wilber's four quadrants model**

In addition, the survey also allowed the researcher to assess the organization's current level of development, as well as its desired level of development utilizing a four-level scale (described below). Each level has something to contribute to being injury-free, and each preceding level is foundational to the next, but it's only at the Integral Level that a team has full access to the positive aspects of all the levels. As an organization develops, each succeeding level represents a style of operating with greater degrees of flexibility and resilience and an increased capacity to deal with complexity. The safety performance levels depicted by the outwardly expanding concentric circles in Figure 1 can be very briefly described as follows:

**i. Reacting**

Action takes place in response to safety issues only after they occur; safety is not a high priority unless it has to be. Basically, the expectation is for the people who work here to take care of themselves. If there is a mistake then there is a drive to find someone to blame.

**ii. Conforming**

Safety policies and procedures are instituted and followed so that people will not make mistakes that lead to injuries; the emphasis is to have rules and make sure everyone follows the rules for their particular role. There is believe in the system and reliance on it to keep people safe; those who break the rules are punished.

**iii. Achieving**

The processes for reducing the number of injuries and incidents that occur have been instituted, and people are held individually responsible for their own safety. There are constant reviews and revisions looking to improve the safety management systems so that safety performance steadily improves. The focus is all about driving for quality and results, whatever it takes to get to zero.

**iv. Integral**

The organization is constantly on the lookout for how to have the whole system and each person in it functions safely and at their best. There is an understanding that personal and process safety are intimately related and can use Reacting, Conforming and Achieving styles as the situation demands. What motivates the individual in the organization is genuine care and concern for the people with whom they work with.

### III. RESULT AND DISCUSSION

#### A. Personal Perspective on the Organization.

From this perspective, the researcher seek to discover people’s intentions, commitments, values and beliefs, and other key subjective variables that influence individual choices for more safe, less safe or unsafe actions. Some key areas of interest about people’s personal relationship to safety that the researcher explored using the survey and interview process include:

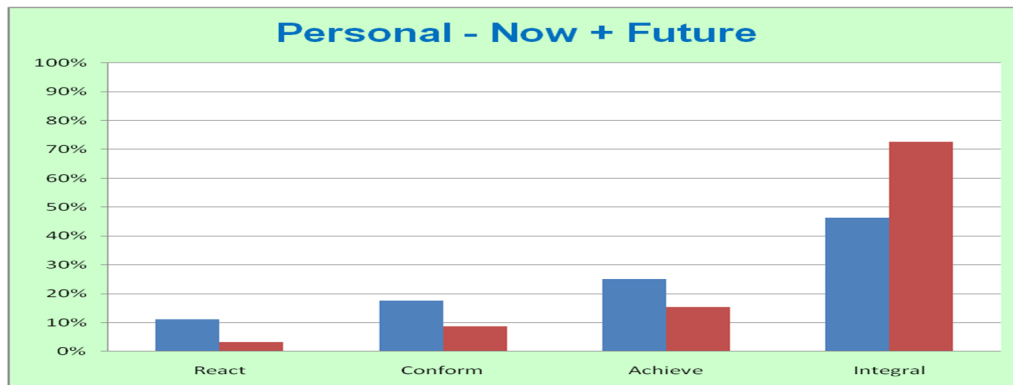
- Level of personal responsibility for overall safety
- Mood at work
- Level of trust and connection to others
- Personal value for safety and attitude toward risk
- Relationship with supervisor
- Willingness to speak up for safety
- Awareness of relationship between current work and future safety of others
- Relationship to the idea of an incident- work environment

Table 1 shows the personal perspective on the organization among respondents of the survey. Almost half of respondents feel that they are currently being pushed hard to improve their jobs. More would be motivated by being engaged in truly gratifying work.

**Table 1 Personal perspective on the organization**

Personal Perspectives	Reacting	Conforming	Achievin	Integra
	Present (%)			
Feeling at work	17	14	46	23
Attitude toward risk at work	9	36	15	39
Attention to safety	8	19	9	65
Experience safety professionals	24	11	23	42
Response to safety	4	19	7	70

More than a third surveyed feel that if they simply follow the rules and procedures then they will be safe. The environment most desired however, is one where safety is more than just following the rules. It is about self-awareness of the risks and people looking out for each other; caring about one another. There is a range of different relationships towards the safety professionals on-site. This correlates to the data from the interviews as well. There is also a clear desire to have the relationship be more about partnership than is currently experienced. Strength to build on is the willingness for people to speak up when they see something unsafe. The survey data does indicate that almost 25% of those responding continue to be reluctant to take the initiative to do so. This is consistent with the feedback from the one-on-one interviews as well. The average score of all responses on the four-point scale of safety performance viewed from the perspective of people’s personal relationship to organization safety perspective is as shown in Figure 2.



**Figure 2 Personal relationship between present safety and future safety**

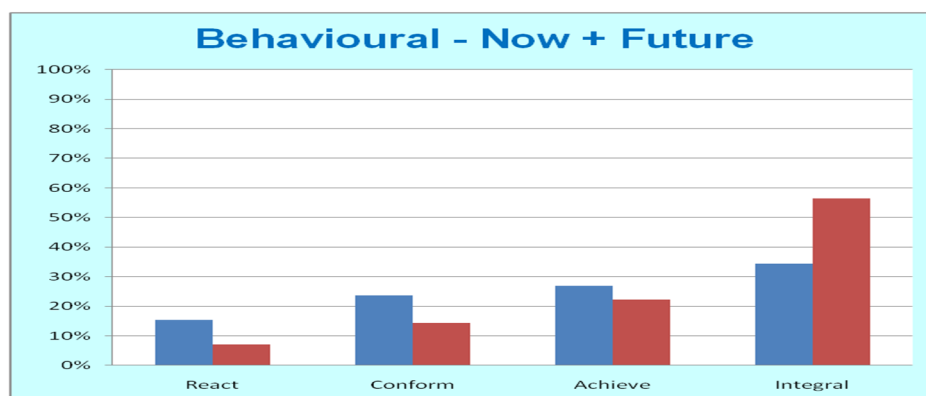
### B. Behavioral Perspective

This perspective is focused on the observable actions of individuals. The researcher asked questions to discover the people's perceptions about their own actions and those of their supervisor. In the survey and interview process the researcher explored questions that touched on topics such as the following:

- Leadership behavior for safety in the organization.
- Perceived standards for current safety behavior.
- Behavior regarding suggestions for safety improvement.
- Perceived fairness in applying safety rules.
- The way safety issues are closed out when raised.
- How information that may be difficult to hear is handled.
- Supervisor's way of getting others into action.
- Supervisor's way of giving acknowledgement and appreciation.

As depicted in Table 2, an extremely high percentage of respondents would like to experience greater compassion and understanding from their supervisor. This fundamental is to create culture of care, concern, dignity and respect which are categorizes of high performing organizations with extraordinary safety performance.

Many respondent feel when supervisor was not around, there were still a dominant directive style being employed. People are saying that they do not expect an invitation to work but having someone make a request of them and following up on their assignments would be preferred. The average score of all responses on our four –point scale of safety performance viewed from the Behavioral perspective on Organization Safety as shown in Figure 3.



**Figure 3 Behavioral relationship between present safety and future safety**

**Table 2 Behavioral perspective on the organization**

Cultural Perspectives	Reacting	Conforming	Achieving	Integral
	Present (%)			
Willingness to involve	21	27	18	34
Perception toward management's care and concern	14	19	54	12
Commitment to safety	15	45	25	15
Respected manners	9	40	42	9

### C. Cultural Perspective

This is the perspective of norms, shared views, commitments and values. Some key areas of interest about people's personal relationship to safety that the researcher explored using the survey and interview process include:

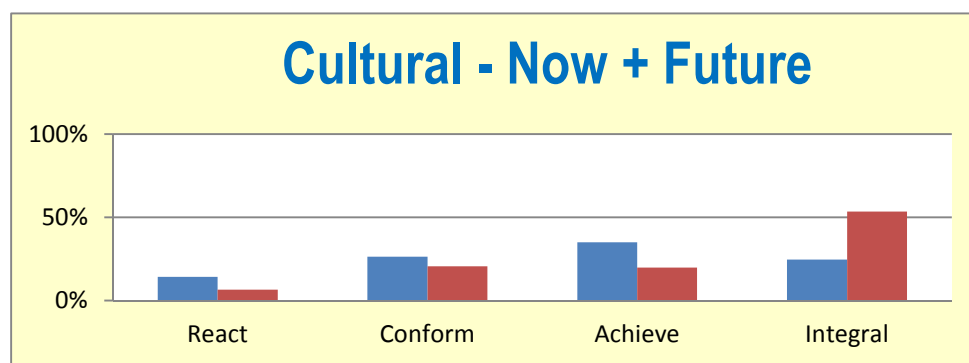
- the level of trust, teamwork and alignment
- the emerging "heroes" of the organization
- what morale is like in this organization
- how people informally talk about this organization
- perceived level of management's care and concern for employees
- perceived safety goals of managers
- how suggestions for changes are received
- attitudes about giving feedback to others

Table 3 shows many individuals describe an environment where they will only do something if it fits their job or not doing so would get them in trouble. However, this is very different to where they would like to see themselves.

People really want to feel that management cares for them as human beings with intrinsic worth but most of them feel that the management is more focused on getting the job done. This striking difference is a fantastic area of opportunity. A culture of following the rules versus having safety as a real core value matches the interview data and previous responses. All data point to a strong reliance on rules and procedures. Knowing the rules and doing whatever it takes to get the job done is what 80% of respondents felt gets respected and celebrated at this organization. Even when given the choice of having the desired state be "taking care of people" versus "knowing the rules" the people surveyed felt that they were of equal importance. This further validates that leadership places a very high priority on knowing the rules. There is no inference to this situation being wrong, but rather it surfaces the challenge for leadership in finding ways to celebrate behaviors consistent with a culture of caring and showing concern. The average score of all responses on our four-point scale of safety performance viewed from the Cultural perspective on organization safety perspective is shown in Figure 4.

**Table 3 Cultural perspective on the organization**

Cultural Perspectives	Reacting	Conforming	Achieving	Integral
	Present (%)			
Willingness to involve	21	27	18	34
Perception toward management's care and concern	14	19	54	12
Commitment to safety	15	45	25	15
Respected manners	9	40	42	9



**Figure 4 Cultural relationship between present safety and future safety**

#### **D. Organizational Perspective**

From this perspective into reality the researcher looked at the organization as a social system and at reviewed the other systems that influence behavior (i.e. compensation, staffing, safety protocols, polices and rules).Some key areas of interest about people's personal relationship to safety that was explored using the survey and interview process include:

- Actions that indicate management's value for safety.
- How the contracts and contracting practices, at every level, support or don't support the organization's capacity to operate incident-free.
- The activities, meetings, communications, etc. that support or inhibit people's capacity to work well together across and within job functions.
- The expertise of the fabricators, constructors and installers being captured in the design.
- How readily people share information.
- Activities and role of safety professionals.
- Staffing plan and its implications for safety.
- Design choices.
- Treatment of vocal safety proponents.
- Decision-making process.
- Dealing with schedule pressure
- How safety in design conflicts between the owner and the design team are handled.

In addition to the Management site visits which are already being recorded, majority of people expressed that there is an opportunity (and a desire) to develop leading indicators for safety performance as well as shown in Table 4. An extremely high proportion of the people feel that contractor's safety management should be further improved over and above the routine monitoring that is currently taking place. This is an enormous chance for creating partnership between the organization and its business partners.

Concern about the number of qualified staff in the organization and subcontractors were repeatedly highlighted in the interviews and the survey. Safety training is viewed as adequate in teaching "how" to work safe, but falls short of building real commitment to having everyone go home safe every day.

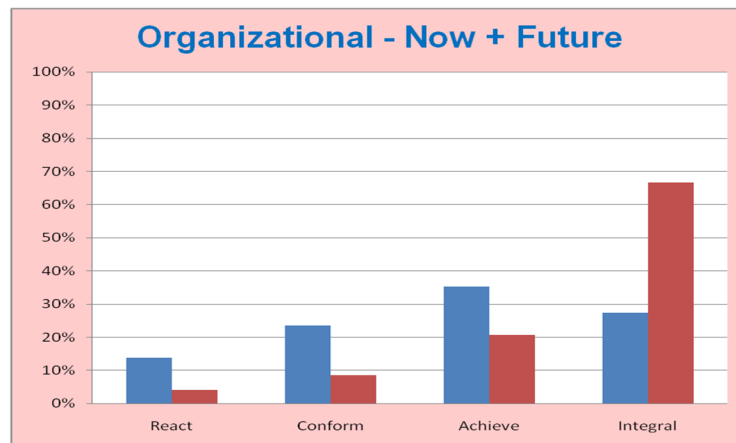
Process safety appears to be a strong feature in the organization. All respondent felt safety measures are in place and operational. There are comments from the interviews that suggest this rigor may have been exaggerated - to the extent that incidents investigations are considered to be too time consuming and a somewhat painful exercise.

The average score of all responses on our four-point scale of safety performance viewed from the Organizational perspective on organization safety perspective is shown in Figure 5.

**Table 4 Organizational perspective on the organization**

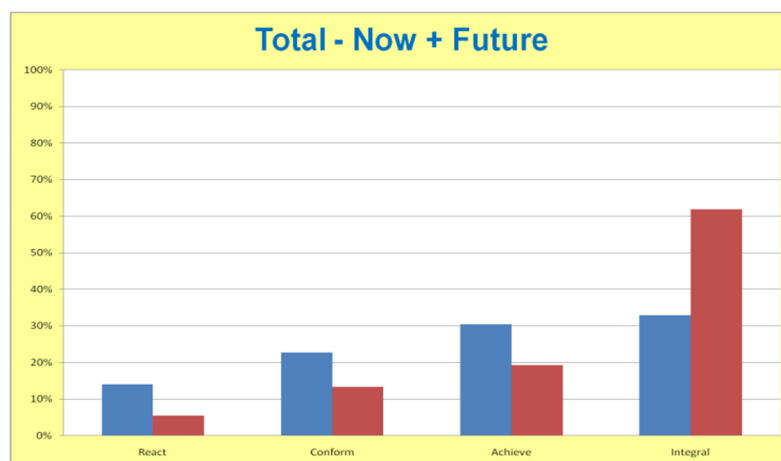
Organizational Perspectives	Reacting	Conforming	Achieving	Integral
	Present (%)			
Manager's concern on safety	26	21	20	33
Contractor's safety performance	13	15	53	19
Qualified workers	19	20	46	15
Relevant safety training for new hires	5	22	58	15





**Figure 5 Organizational relationship between present safety and future safety**

An overall accumulation of the combined four point scale of Personal, Behavioral, Culture and Organizational & System quadrant as expressed by the organization population is depicted in Figure 6.



**Figure 6 Personal, behavioral, cultural and organizational relationship between present safety and future**

In the diagnostic process, the researcher considered five dimensions – Leadership, Values and Alignment, Safety Management Systems, Learning Capacity and Safety Culture. These dimensions represent the particular areas of focus that previous experiences with an Integral Approach to safety have demonstrated how successful an organization will be in generating an incident-free environment. Each of these dimensions can be looked at from both a quadrants and levels perspectives. It is strength in all five areas that produce maximum results. Grote (2012) partially discussed these dimensions in with his paper on safety management in high risk domains. The researcher has organized representative quotes from the interviews inside these categories, highlighting also areas of strength and areas of concern/opportunity.

### I. Leadership Strengths

- Site leadership is seen as being approachable and not dictatorial in administering daily activities. People are also comfortable with the growing number of local management personnel.

- Several site leaders are seen as examples of committed safety leader. Some names were mentioned repeatedly more than others when speaking about safety.
- The safety message being a top priority has been sent out clearly and heard by the workforce. Most people felt that incident-free operations can materialize in the organization as long as leadership rallies people together towards a common goal.

***Concerns Voiced and/or Opportunities to Address***

- Safety programs in this organization have a very short life-span.
- Some departmental managers are seen as not “walking the talk” when it comes to safety. These managers are perceived to take actions that are contradictory to the safety message.
- Management is actively involved in safety only when there is a client pushing for it or after an incident has occurred.
- Avoid double standards.

**II. Values and Alignment Strengths**

- This organization is seen as a preferred employer by most people for various reasons. Some reasons cited are: pleasant work environment, personal development opportunities, workers facilities, safety standards and fringe benefits.
- The recent action of leaders coming out to site and interacting with the workforce is very well received. The request is for this to continue.

***Concerns Voiced and/or Opportunities to Address***

- Cynicism regarding the “true” motivation behind the current focuses on safety.
- Beliefs that it is about reducing claims and cutting costs rather than a genuine care and concern.
- The organization is being influenced by external pressures.
- Getting the job done is the priority.
- Ultimately “what is important”.

**III. Safety Culture Strengths**

- Close knit bonding between the workers. People are open and understanding with one another.
- If a job is stopped for a valid safety reason, it will be supported.
- Indication of a beginning of trust between management and the workforce.

***Concerns and/or Opportunities to Address***

- Subcontractors are considered as second class citizens.
- The local culture of respecting elders and superiors can make it difficult to speak up.
- Taking shortcuts & bending safety rules.
- Making the safety message real, simple and personal.

**IV. Safety Management System Strengths**

- Safety compliance and practices have improved a lot compared to when the organization was based at the former site.
- Safety professionals’ traditional “policeman / enforcer” image is shifting.
- Robust safety management system is helping people work safely.

***Concerns and/or Opportunities to Address***

- Overwhelmed with too many programs and initiatives. Some examples given are: Proactive Intervention Culture, Advance Safety Audit, Safety Observation Report, Finding Better Way Every Day and 12 Lifesaving Rules.
- High subcontractor labor turnover.

- Real safety versus paper safety.

#### IV. Learning Capacity Strengths

- Safety systems have helped improve safety performance.
- Many acknowledged that the enhanced manufacturing process and the safety features at the new site far exceeded their experience than at the previous site.
- Experienced workforce & well respected people in the community to influence the new-hires.
- Communicating with the workforce and getting them involved: Although strides have been made, more can be done.

#### *Concerns and/or Opportunities to Address*

- There are shortcuts being taken out in the yard, daily.
- Are there rules that are not practical?
- Current issues that are a concern to the workforce.
- Listen to what the workforce is saying.

### CONCLUSION

There are some common themes that run through the survey which send clear messages to the leadership of the organization. Most notably, the substantial differences between the present and desired state in some areas shows how much people want things to be different. This desire for change could be thought of as an immense source of potential energy. Overcoming the cynicism that “this too will fade away” will be a challenge that can only be met through actions that leave no doubt that management is uncompromising in their desire that people go home each and every day uninjured. Although exceptional safety performance offers many commercial advantages, the motivation for creating an incident-free work environment must be sourced from a true concern for the health and welfare employees and their families. The clearest strengths to build on are shown within individual attitudes and behaviors. The survey reveals an interesting paradox with the relationship of people to systems, rules and procedures. On one hand there is a strong reliance on following the rules to keep safe, both in terms of personal risk and equipment safety. On the other hand there is also a feeling that individuals are held back by rules and procedures. There are aspects of the culture highlighted by the survey which are important to consider. In particular the perception that it is against the norm to speak openly to address issues or resolve conflict, which is clearly a potential barrier to change. The question facing management now is how to have systems and culture support and enable individuals being effective rather than constraining them. Shifting the culture at the organization is a leadership challenge that is shared across all the different organizations represented. Towards creating an incident-free environment, the organizations leadership must start with a shared commitment to eliminating all injuries and take actions that are consistent with this commitment. Every leader must be committed to the same vision. To make it sustainable will require integrating incident-free principles fully into the systems and structures. Safety is high on everyone’s agenda; they know it is important, they just do not necessarily know what they need to do to make an incident-free environment happen. Clear and simple messages are needed. Individuals need to experience that management cares for them, as human beings with intrinsic values and worth and not just as an output generator.

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