

# **CHALLENGING THE TRADITIONAL APPROACH TO SAFETY MANAGEMENT AND HOW LEADERSHIP BEHAVIOR AFFECTS SAFETY PERFORMANCE**

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## **Abstract**

Traditional safety management focuses on preventative controls and training to help mitigate workplace hazards. Effective execution of this approach can help mitigate workplace incidents but rarely does it reach the goal of creating an incident free workplace. RasGas Venture through its experience with the mega-projects on the LNG expansion work in the State of Qatar is taking a different approach to traditional safety management. The safety performance results from these mega-projects indicate that it is possible to not only mitigate workplace incidents but to achieve levels of incident free work that warrants consideration for re-evaluating the traditional approach to safety management practices.

This paper will look at the role of traditional safety management programs and how they generally have an initial positive effect on workplace safety and how the sustainability of this performance improvement is difficult to maintain. We will look at a safety management model that focuses attention not just on preventative controls but also on leadership and the importance of getting the 'right' work environment established to support a safe workplace.

## **Background**

RasGas Company Limited (RasGas) is jointly owned by Qatar Petroleum and ExxonMobil Qatar Inc. RasGas operates production facilities to treat, liquefy, and export liquefied natural gas (LNG) to countries across Asia, Europe as well as the United States of America. Based in Ras Laffan, Qatar, RasGas currently produces over twenty (20) million metric tonnes of LNG per year (Mta) with five (5) trains in operation.

RasGas expansion projects include the development of two (2) large LNG processing trains – Trains 6 and 7, as well as a separate sales gas facility, namely, Al Khaleej Gas Phase 2 project (AKG-2). When completed each new LNG train will be capable of producing 7.8 Mta of LNG. This increase is over 60% greater than the capacity of the existing RasGas Train 5 (4.7 Mta), which came on stream at the end of 2006.

## **Scope of Work**

RasGas considers the safety and health of its personnel a core value and the protection of the environment of the State of Qatar to be of the utmost importance. The RasGas expansion projects managed by RasGas Venture present a unique set of challenges from both a safety and execution perspective due to the complexity of the construction projects. Specifically, within RasGas expansion projects, construction is defined as an ongoing series of simultaneous activities taking place in relatively close proximity and managed through a risk based approach. In this current expansion phase the construction workforce at RasGas peaked at over 38,000 workers. This workforce size is a three-fold increase in the number of workers that RasGas had for expansion work associated with the previous LNG Trains 3, 4 and 5.

The amount of project work in RasGas is significant by any standard, schedules are aggressive and good planning is critical. Congestion is an issue as space is limited, particularly with the simultaneous construction of LNG Trains 6 and 7 and AKG-2 on the existing RasGas plot at Ras Laffan Industrial City. In addition, many activities occur in a brown field environment where construction is taking place inside operating facilities. The environmental conditions are difficult at best – heat, wind, and dust are particular challenges, especially during lifting operations.

Operating with an internationally diverse workforce means individuals with various languages, cultures and belief systems have to work side by side under challenging conditions. Worker competency is a key concern, labour markets are tight; and unlike the construction of previous LNG trains, there has been a significant increase in the number of inexperienced workers.

To manage this scope of work with a large labour force required that we look at how safety management was being employed and find innovative ways to improve overall performance.

## Introduction

Approaches to safety management have evolved over the past several generations. With each successive stage of development and maturity we have seen an overall step change improvement in safety performance. During each of these step changes we have also witnessed a performance plateau effect, where improvements in safety results have stalled until the next change in techniques are implemented. We believe that RasGas has been able to achieve a much higher level of safety performance as a result of shifting the way we approached safety management in this latest facility expansion phase of RasGas.

Many organizations employ similar safety management programs yet they experience quite differing results when compared to RasGas. In general we are still seeing incidents occurring in workplaces for all companies even those with the most well developed safety management programs. This paper will take a look at the approach being used by RasGas that has taken our organization to a whole new level of safety performance, by focusing on two separate aspects of workplace management; Leadership and Workgroup Behaviors.

*For clarification, when we speak about safety in the context of this paper, we are discussing safety performance from an incident and injury prevention perspective and not considering the other components that are in play such as engineering and construction practices. Improvements in approaches associated with engineering and construction are better discussed using a quality management focused paper. Also, when we refer to RasGas we are discussing the RasGas Venture organization, which is responsible for the design and construction of expansion facilities on behalf of RasGas Company Limited.*

## Evolution of Safety Management

A brief discussion on the evolution of safety is helpful to appreciate the current emphasis in many organizations to focus on human actions and behaviors. Safety has progressed through several stages - Figure 1 provides an overview of the evolution of safety and the resulting injury rate reduction with time.

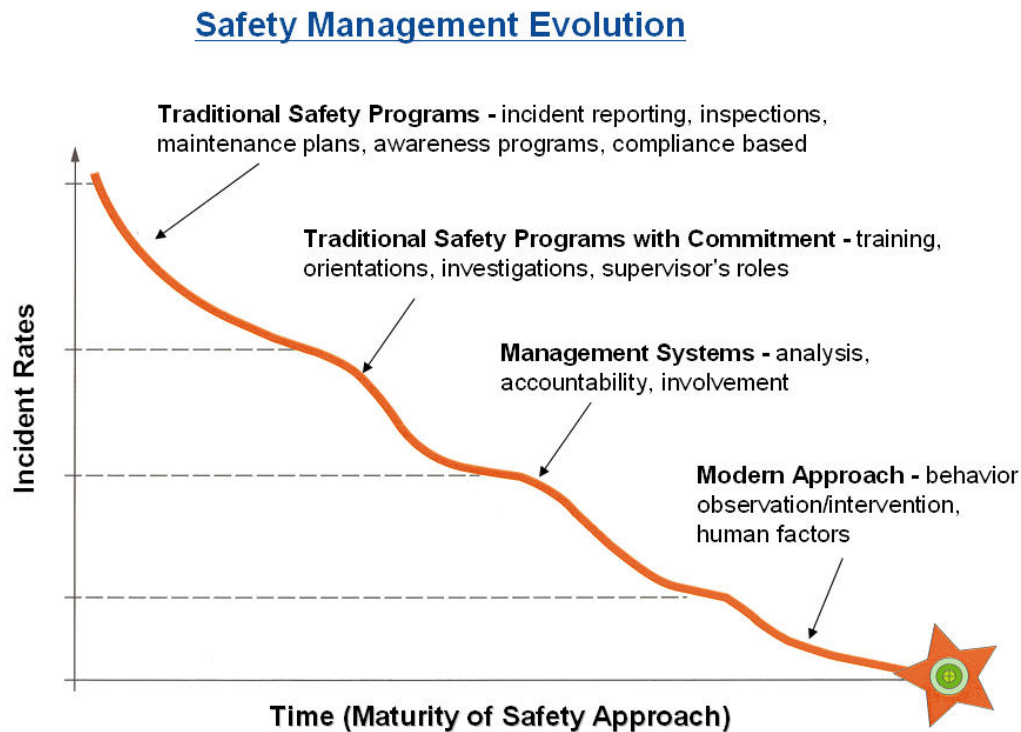


Figure 1

Within the last one hundred years we have seen the evolution of safety management move from safety awareness, to management commitment, to management systems, and now on to behavior based programs. The performance plateau effect shown has traditionally been broken by the introduction of each new

program or approach. These approaches tend to deal with worker/environment interfaces and focus on rules, prevention, mitigations, and behavior. These changes in approach are usually successful but only to a point; they rarely reach the levels of performance expected and over time they often lose their effectiveness if not properly sustained and companies may have to reinvent or modify their programs.

Stage one was the sweat shop era during the early 1900s as the world moved to a manufacturing economy. This period involved the introduction of machinery that did not consider the worker/machine interface. Disabling injuries and fatalities were caused by “faulty” workers. However, pressure mounted from the public, unions, and government to improve workplace conditions and reduce injuries. The management approach to safety was focused on human consequences. The safety practitioner’s “tool kit” consisted of incident reports, inspections and awareness programs. Post industrial revolution we saw a consciousness of worker protection evolve and companies understood the value of capturing incident reports so that they could focus attention on inspection, maintenance, and awareness programs.

Stage two shifted the focus to machinery and management. Equipment was designed with safeguards and fail safe shut down devices to help prevent injuries. Investigations moved towards an evaluation of a series of unsafe acts and/or conditions that resulted in an incident. The safety tool kit expanded to include training, orientations, investigation, and the role of the supervisor. Safety features such as chain guards and interlocks were engineered into complex machinery and protective equipment for workers was introduced. Further developments in safety management included having specialists trained in doing investigations and management took an active role in supporting safety initiatives such as establishing required training programs and developing roles and responsibilities associated with safety in the workplace.

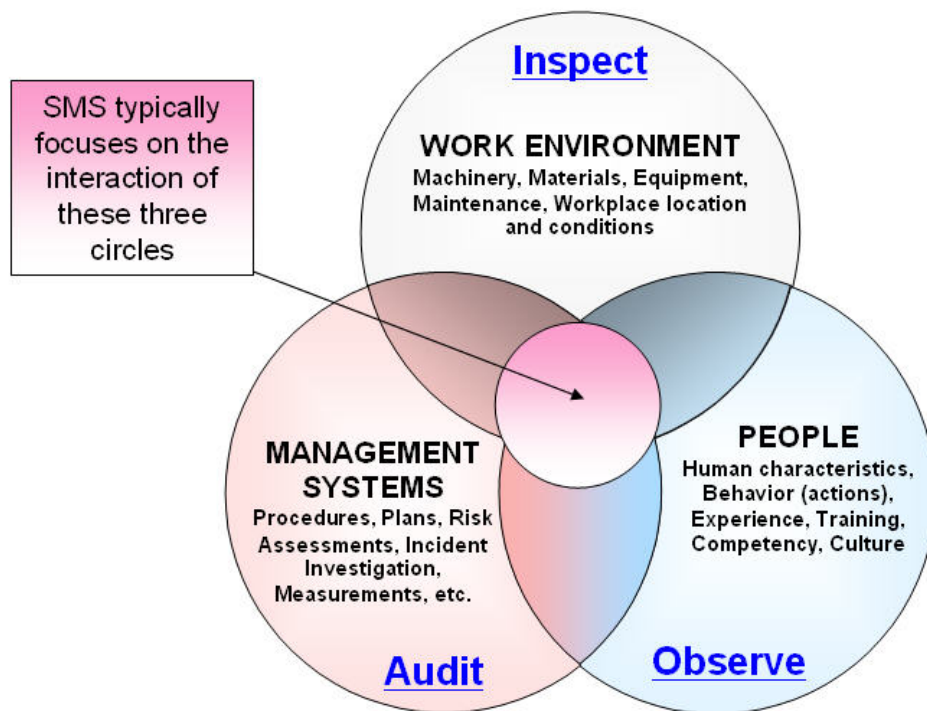
Stage three saw the beginning of a safety management system similar to the approach that was used to manage quality. Under this approach line management is held responsible for implementing a system where programs are established for managing the risks in the workplace. An important element of a management system approach is to measure implementation of the system against user requirements and then use the results to focus on improvement areas. The safety tool kit continued to expand to include analysis, measurement, accountability, and increasing involvement throughout the organization in terms of safety. The role of the safety professional moved away from a compliance officer to more of a resource for advice to support the line activities of the organization. In the late 1980’s and early 1990’s we saw the development of disciplined management systems and the introduction of accountability concepts and continuous improvement.

Stage four is the modern safety management approach, continuing the evolution of the previous three stages, which recognizes the workplace as an interaction between the work environment, people, and the management system (Figure 2). The key point here is that we now agree that there is no single factor or solution that can provide an incident-free workplace. The goal of zero injuries can only be accomplished through a holistic view of safety that incorporates people, processes and their work environment. Today we see most organizations embracing behavior based safety observation/intervention programs and are also considering human factors when creating a workplace environment.

### **Modern (Traditional) Safety Management Model**

Safety incidents usually occur when a worker comes into contact with the work environment in any number of ways and there is a negative consequence. A workplace hazard could come in contact with an unsuspecting individual or a worker can either consciously or unconsciously interact with the work environment in a harmful way. This interaction model is generally well understood and accepted. Modern safety programs are designed to either eliminate or mitigate the worker/environment interface through a number of different processes.

## Traditional Safety Management System Model



**Figure 2**

The general approach to modern safety management can be described by using an interface model which shows the interaction of three primary components.

1. Work Environment - the location where workers are exposed to risk. Considerations need to be made for the geographic location of the workplace, the types of environmental conditions that exist, the various hazards that are present such as moving equipment or high pressure systems. Organizations will typically assess these conditions and put in place cost effective controls to mitigate exposures. Preventing the risk or hazard from being present is typically not an option.
2. People – are either at risk or capable of putting others at risk by their behaviors. Safety management will focus on correct utilization of resources based on skills and competency. Programs will involve education, assessment, verification, and observation. A fundamental component of the safety program is making people aware of what risks exist, getting them to self identify and mitigate the risks. A key challenge in the area of people is being able to understand and manage the relationships between individuals, groups, and supervision. In international arenas there are often multiple cultures engaged in work activities and issues with diversity differences are often neglected in safety management programs.
3. Management Systems – are formalized work practices that outline roles and responsibilities, require accountability to ensure programs are implemented effectively and where continuous improvement is taking place.

The interaction of these three primary components is what a traditional safety management system will typically focus on today.

There is a fundamental assumption that we are only able to identify what needs to be established to prevent, mitigate, and control both the work location and the people. Imposing rules and policies on a workforce is standard practice and absent anything else it can have a positive effect generating some level of safety performance. However, a challenge with relying on this approach too much is that a single act of acceptance of non-compliance with the rules and policies can put the whole program in jeopardy.

## Some SMS Implementation Pitfalls to Consider

Safety Management Systems (SMS) programs may be well developed in isolation before a work location or contractor has been selected. Companies may roll out a new SMS to a workforce which had been following a completely different set of practices previously and then expect immediate and obedient compliance.

The persons engaged in developing safety management systems often create programs without truly understanding the real dynamics of what is actually going on in the workplace.

Assumptions may be made that workers will follow rules and that programs designed to control environmental exposure issues are going to be followed. Organizational resourcing may be established based on these assumptions.

The workforce may be getting exposed to a new work environment or task that it has not seen or worked with before. Risks and hazards identified and mitigation processes developed in the SMS may well be alien to the contractor.

The workforce may not see any real value of what is being proposed by the SMS. It's possible for a program to be totally disconnected between what the SMS is trying to achieve and what the contractor and workers really want or think they need to do.

Behavior Based Safety (BBS) is typically considered to be an observation program focused on watching and recording worker behaviors in the field usually with the intent of providing feedback to ensure compliance. Effectiveness of a BBS program will usually suffer if not properly implemented as people generally do not like being observed or critiqued. A key pitfall of BBS implementation is in failing to take into consideration cultural biases when dealing with a diverse international workforce.

## The RasGas Approach

RasGas has taken a holistic look at the dynamics of the workplace and has developed a safety management model that focuses not just on hazard identification and compliance, but also on the mechanisms that create the workplace "climate". RasGas believes that by creating the right climate first, the traditional safety management programs will have better chance of being effective and are able to generate more sustainable results over the long term.

### Line of Sight Purpose

To understand the RasGas approach to SMS we need to consider the end-point first and then work backwards to what we believe will generate the most desirable outcome (Figure 3).

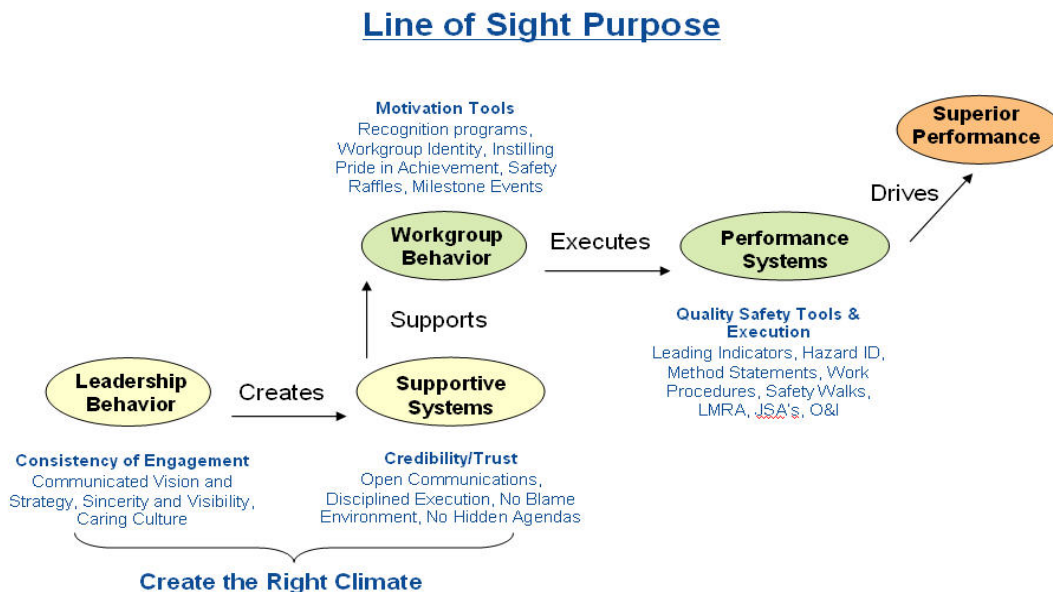
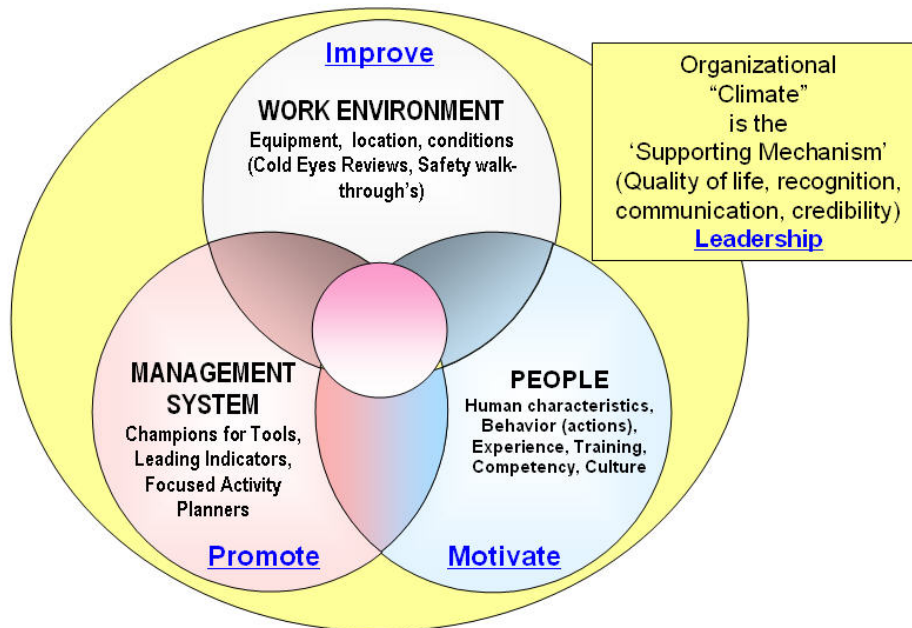


Figure 3

Consider the diagram shown above: reading from right to the left, look at what has to exist before you can reach the end point. What you are ultimately after is an organization that generates superior performance.

To achieve this you need to have effective programs and processes that are executed by people that are both motivated and competent. To get motivated and competent people executing processes effectively requires the leadership of the organization to be truly committed in providing the required support and commitment, which enables the organization to succeed. To get an organization that wants to achieve this requires taking a different approach to creating and implementing a safety management program. Focus must be placed on creating the 'right' climate for safety management to flourish.

### RasGas SMS Model



**Figure 4**

At RasGas we were faced with an enormous challenge of building the largest LNG trains in the world in a very tough market with a very large mix of experienced and inexperienced workers. To undertake this challenge we needed to establish a climate that was conducive to sustaining a high performing workforce under difficult and dynamic conditions. We believe the climate is the mechanism that allows for superior performance to exist. Establishing the correct climate (Figure 4) requires that one focus on the leadership skills of the organization. At RasGas we have managed to create a workplace environment where organizations partner in a no-blame climate, where we focus on leading indicators, address workforce motivation, and employ a disciplined systematic approach to safety management. Safety is a core value and we have succeeded in making it personal.

### **Principles**

Going back to the basics the organization needed to establish a set of principles (Figure 5) by which it will operate with respect to safety. We established a leadership team that was focused on stewarding safety on these mega-projects and one of the first deliverables the team created was a set of principles for how we were going to manage safety.





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## Venture Safety Principles

- Our business is building facilities, our job is building facilities safely
- It is up to each of us to lead safety in the workplace
- An incident free workplace is possible
- Recognizing safe behavior improves performance
- Everyone has the right and responsibility to STOP unsafe acts and conditions

***The objective of any safety program should be to keep people safe, statistics are not an objective, statistics help demonstrate the effectiveness of our commitment to safety.***

Figure 5

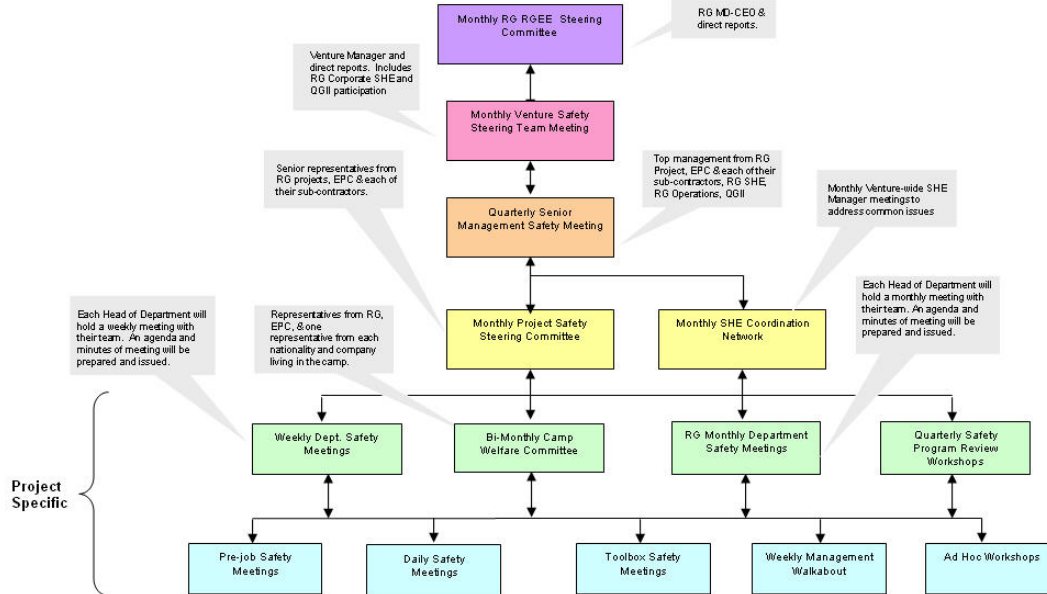
These principles laid the foundation for how we set our expectations with our own organization and then with our contractors. The text in italics is something we push frequently, which is to steer the focus of safety management away from lagging metrics and focus on learning and improving.

*One of the most important things a reader can take away from this paper is to always recognize the behavior you want to continue. Rewards and recognition are frequently used by organizations, but more often than not they are driven by lagging indicators, i.e. LTI Free records or milestones. Focusing on lagging metrics tends to drive the safety management program into being a case management activity and diverts energy away from the real purpose of creating a safer workplace. By switching focus to recognizing good behavior you can subtly drive support for safety management at the top levels of an organization and create that safer workplace.*

### **Oversight**

Establishing an oversight model (Figure 6) is important with respect to getting full leadership alignment and front line supervision engagement. RasGas uses a pyramid shaped oversight model that requires disciplined and systematic engagement throughout all levels of the organization.


## Disciplined Oversight



**Figure 6**

You can see in the figure above that from the Managing Director and CEO level all the way down to individual work teams there are oversight processes in place to ensure that safety is an integrated component of the organizational climate.

A fairly simple way to formalize engagement at the various levels in the organization is to charter each of the meetings. Charters do not need to be complicated (see Figure 7), but they allow a mechanism to exist that generates results through fairly basic measurements and stewardship activities.



**RasGas Company Limited**

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**RasGas Venture Safety Steering Team (SST)**

**CHARTER**

**Objectives**

Our mission is to provide visible safety leadership and support to continuously improve RasGas Venture safety performance. This includes Safety, Health, Environment, and Security activities associated with Surface Venture project execution and construction. Field office safety programs are considered as part of project execution and construction activities. Headquarters office safety programs are not included in the scope.

**Sponsor**

Venture Manager

**Membership**

RGK2, Common Offplots, Barzan Senior Project Managers (Co-chairs)  
 RasGas EPC (m) Project Managers  
 Venture SHE & Q Manager (Facilitator)  
 RasGas SHE Manager  
 QG2 Representative

**Meeting Frequency/Duration**

Monthly / 2 hours

**Skeleton Agenda**

1. Review SHE Calendar (Facilitator)
2. Review Venture SHE Performance (Facilitator)
3. Current EPC (m) safety initiatives / issues / learnings (Project Managers)
4. Review QGII SHE Performance / initiatives (QGII SHE Manager)
5. Review RG SHE Performance / initiatives (RG SHE Manager)
6. Updates on special safety initiatives (Facilitator)
7. Review of status of previous actions (All)
8. Action items flowing from the meeting (Facilitator)

**Minutes**

Within 2 working days of meetings:

- > List attendees
- > Key actions agreed

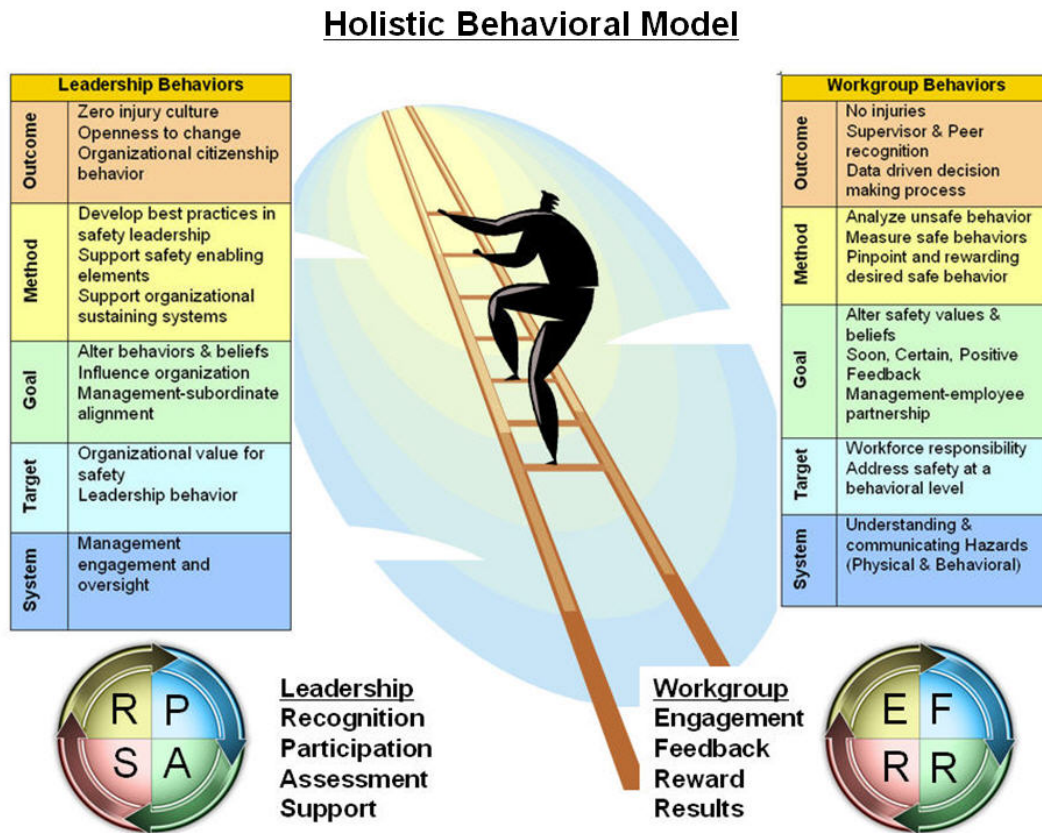
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**Figure 7**



## Holistic Behavioral Model

The RasGas Venture organization utilizes a disciplined approach to safety management that focuses on two discrete aspects of organizational behavior; Leadership and Workgroups. The ladder model (Figure 8) highlights the key fundamental principles of what we are striving to achieve and clearly shows that at the bottom of both sides of the ladder, management system processes are the driver. Each management system affects a different dimension of the workforce with complementary but differing aligned outcomes.



**Figure 8**

A primary step is to focus on understanding both the climate within the organization as well as individual leadership skills and competencies that helps create the climate.

On the right hand side of the ladder we are now tackling workgroup behaviors by implementing a management system that is specific to the workers. The management system employed focuses on getting the workforce engaged, providing feedback in a timely manner, rewarding desired behaviors, and providing proof of results. The key aspect of this management system is an enhanced BBS program that is run by the workforce and gets modified as risks and hazards change over time. The feedback process from the BBS program is designed to provide information to workgroups on those behaviors that we want to see continue and also provides an opportunity for the teams to work on areas where deficiencies are noted. The target audience for the feedback is the workgroups themselves with the intent of modifying behavior and utilizing subtle peer pressure. It is not sufficient just to report back to the workgroups that there are good and bad behaviors. Management has to be committed to providing positive feedback on a continuing basis and they have to develop a credible relationship with the workforce to affect change. The methods used in this step include understanding why unsafe acts or conditions exist, recognizing positive behaviors that create safe acts and conditions, in addition to pinpointing those behaviors that we want to continue. The outcome from this collective effort by management and the workforce using a data driven program, provides for worker and supervisor recognition, which ultimately creates an organization that is striving to achieve an injury free environment.

On the left hand side of the ladder we have a leadership management system that seeks to drive recognition, gain full participation from leadership, ensure program assessment is ongoing, and develops an organization that provides full support to the safety management efforts. Validation that this management system is

generating the correct results is done by measuring self perception against actual perception, in order to understand what leadership changes need to be made to influence the organizations behavior as it relates to safety. This effort is necessary to create the support mechanisms that lead to more effective execution of traditional safety management programs. Without credible leadership organizational safety performance is solely dependent on the front line workers wanting to execute processes which are outside the immediate task at hand.

## Caring

The holistic approach at RasGas goes beyond worksite management. It creates a caring culture that supports the organization to assess the quality of life of its workforce and become engaged in activities outside of the workplace. The attached Worker Wellness Framework (Figure 9) highlights how we looked at the overall well being of our workers. The reactive side of wellbeing is obviously in dealing with health care as it relates to illness and injury. We took health care a step further and included additional disciplined systematic programs on health management such as worker health screening and health education.

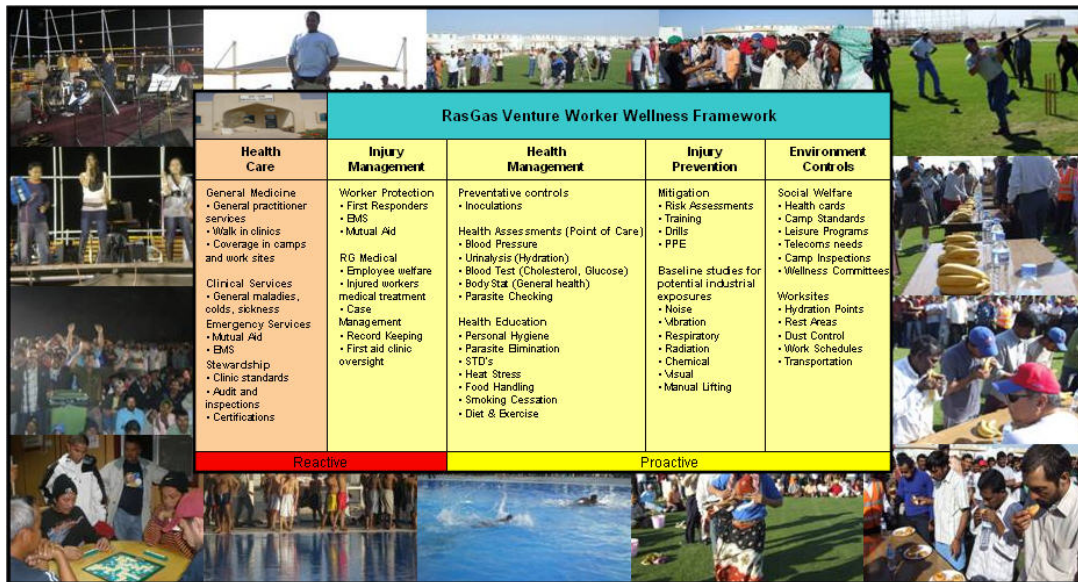


Figure 9

In addition, we placed a large effort on working on the quality of life in the camps including developing Wellness Committees where issues could be raised on a frequent basis to management for intervention. As a result of the wellness committee, we saw improvements in both food quality and quantity. We added sports facilities and championed numerous social events such as concerts and competitions. The camps took on an identity of their own and they changed their name to a 'Global Village'. RasGas developed a camp standard specification that raised the bar for quality of life.

On the worksites we also implemented programs to improve quality of life such as adjusting work schedules during the hot periods, and placing in-field roaming nurses to check on workers in rest stations to make sure their needs are being met.

To fully implement the RasGas Venture Worker Wellness Framework took a committed and dedicated effort by senior management to stay engaged and provide tangible evidence that any worker issue that was raised is addressed and supported. The whole approach to effective safety management became a seven days a week, 24 hours a day commitment.

## Climate

A driving component of the holistic SMS model is ensuring that the correct organizational climate is established. We chose to partner with Behavioral Science Technologies (BST) to aid us in capturing our climate data. BST facilitated the data collection efforts; they analyzed the data, developed the reports, and provided feedback to the organization.

Capturing this climate information requires that one survey a large cross-section of the organization on their perception of the organizations commitment and value for safety. Measuring the climate is something that

can be done relatively easily and there are many consultant organizations willing to conduct the programs on one's behalf. We chose to measure the climate (Figure 10) of several projects and this required some work up front to develop the survey tools in multiple languages. We executed the surveys using workshop style events with door prizes and raffles to get worker engagement and participation. Once the results were compiled we were able to assess differences in climates between the various projects and identify some key areas where we had room for improvement.

One area that scored high on all surveys was in management commitment and credibility. Organizational characteristics such as fairness, credibility, and team work all scored very high indicating that the workers were experiencing a workplace where they believed that management was committed to their well-being. We also were able to identify cultural biases based on the workforce diversity that restricted open communication and basic intervention. Knowing the strengths and weaknesses of our organizational climate we could tailor our safety management programs to reinforce the strengths and tackle the weaknesses.

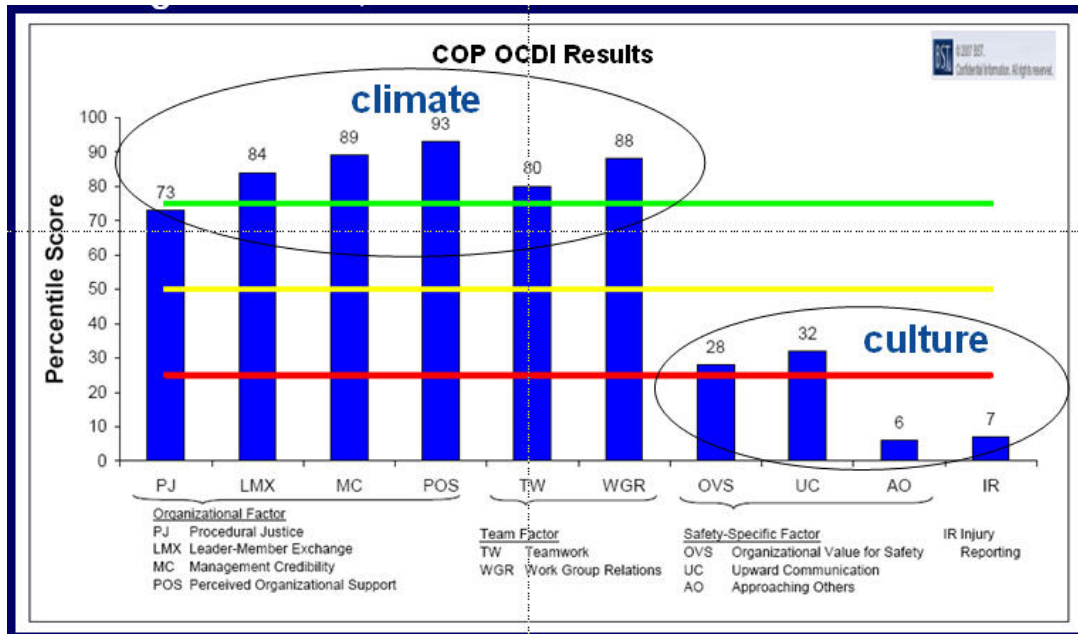
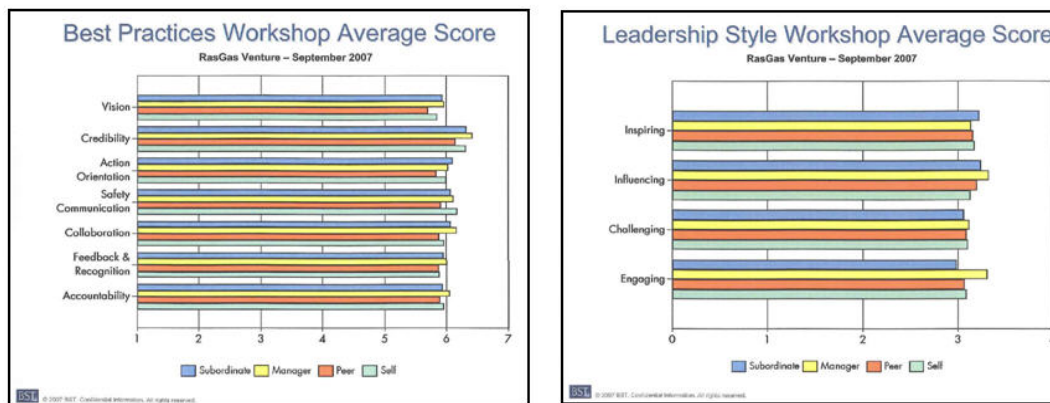


Figure 10

On the leadership side of the holistic model we concentrated on maintaining recognition, visible participation, assessing how well programs were performing, and supporting initiatives. On the workgroup side we sought for worker engagement in SMS, we provided feedback on a routine basis; we rewarded positive behavior and provided evidence of improvement results. We believe these two focused management systems contributed to the enormous success we have realized with workplace safety.

### Leadership Competencies

In addition to looking at climate we also chose to provide individuals with independent feedback on their leadership style (Figure 11). This data was held private for the individuals and collectively we were able to identify certain traits by companies, ethnic groups, and by work disciplines. This data was shared with each organization and then individuals were provided private coaching sessions by an independent consultant in order to further develop their leadership skills.



**Figure 11**

Some of the more progressive consultants in the field of safety management are now talking about the workplace culture and how creative implementation of BBS programs can be used to modify that culture. We believe that “organizational culture” comes from a long term effect based on many different inputs such as environment, belief systems, perceived values, etc. In RasGas we decided to concentrate on the “workplace climate” and look at how we can create the right “climate” conditions for a mature a disciplined safety management system to thrive.

### Summary

Most organizations have a tendency to try and manage safety through the establishment of rules and the use of various safety tools such as job safety analysis (JSAs) or wearing of PPE. Superior safety performance cannot be legislated; governments have been trying for quite a long time to achieve this with limited success. If you look at organizations with superior safety performance you will most likely see an organization that wants better safety execution and is willing to make the effort to achieve the results.

What we all really need to be doing is leading safety through a consistent set of actions and behaviors, supported by a set of safety principles. The embracing of rules and the effective employment of safety management tools will follow when the right climate is present.

### RasGas Key Success Factors

- Establish a climate where engagement is expected and valued
- Management must be fully committed, visible, and a champion of behavioral performance recognition
- Behavioral expectations must be known and continuity of simple SMS programs are kept intact
- We are in this together with common objectives; organizations need to partner with a no blame culture
- A disciplined systematic approach utilizing management systems will provide an assurance of program effectiveness

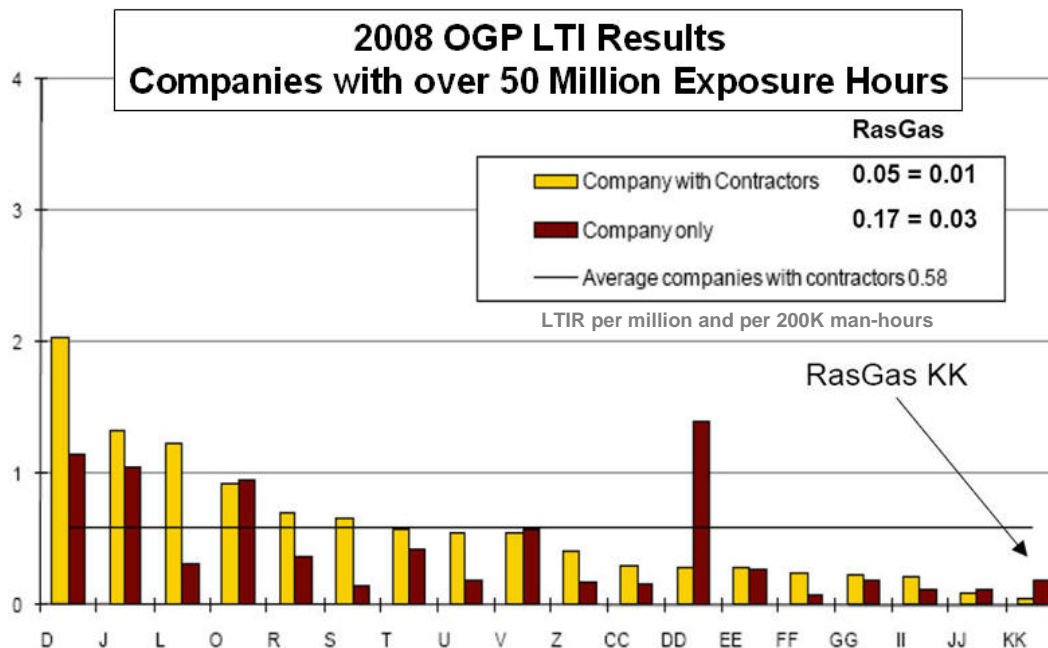
### RasGas Performance Results

The efforts associated with changing our approach to safety management can be demonstrated through our results. The recently released 2008 SHE performance report from the International Association of Oil and Gas Producers (OGP) depicts RasGas construction activities as a worldwide industry leader (see Figure 12) in safety performance.

- RG had the lowest LTIR of all 18 companies surveyed with 50+ million man-hours worked and an LTIR that was 90% lower than the average
- RG had the second lowest LTIR of all 38 companies surveyed, again with an LTIR that was 90% lower than the average



- RG had the fourth lowest TRIR of all 37 companies surveyed and the three companies that had lower TRIR's all had fatalities (RG had none).



**Figure 12**

For reference, a list of the OGP participating companies is:

BG, BHP, BP, Cairn Energy, Chevron, CNOOC, ConocoPhillips, Dolphin Energy, DONG Energy, Eni, ExxonMobil, GDF Suez, Hess Corporation, Hocol, INPEX, Kuwait Oil Company, Mærsk, Marathon, MOL, Nexen Inc, OMV, Perenco, Petrobras, Petro-Canada, Petronas Carigali Sdn Bhd, Premier Oil, PTTEP, Qatar Petroleum, RasGas, Repsol, Saudi Aramco, Shell, StatoilHydro, TNK-BP, Total, Tullow Oil, Wintershall, Woodside, Yemen LNG.

## Conclusion

Without focusing on creating the right sustainment mechanism (climate) implementing effective programs is difficult over the long term. Leadership and management must get engaged (and stay engaged) or your going to have a tough time getting to the next level. Rules based SMS only is a losing proposition.

We have truly arrived at the next level when what we are all trying to create is a safer workplace and not the elimination of injuries through case management. RasGas strongly believes that in order to achieve superior results in safety performance one has to focus on leadership, maintain control through engagement, ensure that the workforce believes in what the organization is trying to achieve, and that good behavior is rewarded versus broadcasting bad behavior, or implementing more rules.

## References

Figure 1: ExxonMobil Production Company "Fundamentals of Safety for Supervisors and Managers" v.4 January 2004. Page 4

Figure 2: ExxonMobil Production Company "Fundamentals of Safety for Supervisors and Managers" v.4 January 2004. Page 5