

UNLOCKING SAFETY CULTURE EXCELLENCE: OUR BEHAVIOUR IS THE KEY

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INTRODUCTION

THE INDIVIDUAL'S ROLE IN DEVELOPING A STRONG SAFETY CULTURE

This paper describes the development and deployment of methods to promote the behaviours which support a strong and sustainable safety culture. Most organizations in hazardous industries have embraced the need for a strong safety culture, and recognize that excellent safety leadership, effective supervision, and high levels of workforce involvement are essential safety culture ingredients (Flin, R et al, 2000; HSE, 1999; HSE, 2001). To support the development of a strong safety culture, both site and topic-based approaches have been adopted. This project used an alternative approach.

SITE-BASED APPROACHES

Site-based approaches typically involve some form of safety culture diagnosis, and a plan to address areas for improvement. The unit of analysis is the site or organization. The improvement plan typically includes a need for change in behaviours and practices at different levels of the organization.

TOPIC-BASED APPROACHES

Topic-based approaches involve interventions to address specific aspects of safety culture – for example supervisor or safety leadership development programmes, practices designed to encourage and promote workforce involvement such as appointing workforce safety representatives, or implementing a behavioural safety programme.

AN ALTERNATIVE APPROACH

Whilst the site or topic-based approaches are appropriate in some circumstances, they do not describe all the individual behaviours required to develop and support a strong safety culture, or specify how these behaviours relate to each other and are mutually supportive across different levels of the organization. Furthermore, site or topic-based approaches do not always lend themselves to integration into the organisation's existing safety management system or human resources systems.

GLAXOSMITHKLINE'S (GSK) IRVINE SITE, AND THE BACKGROUND TO THIS PROJECT

The site was established in 1973, covers 135 acres, and is located on the West coast of Scotland, approximately 30 miles from Glasgow. Irvine is one of GSK's largest primary manufacturing sites, with 650 staff involved in the production of both penicillin-based antibiotics and active pharmaceutical intermediates.

The approach to improving the safety culture at GSK Irvine, and the specific project described here are milestones on a journey for the site that commenced back in 2005. During that year the Factory Safety Committee had been discussing safety culture at several meetings, and ultimately agreed to make the first step in the journey by attempting to measure the existing culture. In October 2005 as part of the European Health and Safety Week, a site survey was launched using the existing HSE "Climate Survey Tool" (HSE, 1997). Over 400 employees (60% of the workforce) completed the 72-question survey. In early 2006 the Factory Safety Committee then analysed the survey, with the aim of identifying some key interventions and developing supporting action plans.

In March 2006, just after celebrating success at reaching 1 million hours Lost Time Injury-Free for the first time in the site's 33-year history, a process safety incident occurred when a 4500 litre reactor vessel exploded, badly injuring 2 operators. The site's top priority ever since has been an effective response to prevent any similar incident recurring, This project has been fundamental to achieving that goal.

After the explosion, the subsequent GSK internal investigation focused largely on the technical aspects of the root cause analysis of what happened within the reactor vessel. The investigation also examined some of the EHS behavioural issues concerning staff at all levels involved directly or indirectly with the incident. This led to a clear recommendation to review the behavioural findings from the incident in conjunction with the recently-completed site safety survey. To lead this project, the company appointed an experienced EHS manager (the first author).

At this stage it was decided to bring in some independent, external expertise and the second author was engaged to assist with the analysis of both the 2005 HSE climate survey and the behavioural aspects of the March 2006 incident investigation. The second author has been involved in the subsequent stages of the design and development of the EHS Behaviour Standard and associated interventions, whilst GSK staff have presented all training and communication sessions.

It was decided to develop a competency model which described (a) the specific managerial, supervisory and workforce behaviours which supported excellent EHS performance and (b) those which detracted from excellent performance.

DEVELOPING THE COMPETENCY MODEL

Five main sources of data were used to develop this competency model:-

1. Existing academic research, which identifyed leadership behaviours which support workplace safety outcomes (HSE, 2003)

2. Existing industry research conducted by the UK offshore sector's cross-industry Step-Change in Safety group, who developed a set of safety behaviours following a review of 11 offshore fatalities (Step-Change in Safety, 2004)
3. Previous work (Hayes et al, 2007) generously shared with GSK by Wood Group Engineering North Sea Ltd
4. Key EHS behaviours relevant to becoming a high-reliability organization (Weick, 1999) were integrated into the model
5. In-company research, to identify specific positive and negative HSE behaviours which had particular relevance to recent explosion, and the findings of the incident investigation.

It was decided to base the competency model on the behaviours which differentiate those who are more effective at managing health and safety, from those who are less effective.

There is an important distinction between the technical competences necessary to do a job (i.e. the ability to drive a fork-lift truck), and the personal competencies which differentiate between those who are more or less effective in a job. Although a group of fork-lift drivers may all possess the same technical competence, individual differences will exist in how effective they are in achieving their overall job objectives (e.g. safety, housekeeping, efficiency). Table 1 below summarizes the differences between behavioural competencies and technical competences, and how to analyse jobs to derive the behavioural competencies which support superior job performance.

In this project, the first job analysis method used was critical incident interviewing, (Flanagan, 1954) which asks interviewees to identify "critical incidents" they have personal knowledge of, which led to a good or poor result. In this case the result referred to HSE performance. Incident does not mean accident or loss, it could simply be someone's behaviour in a meeting which supported or undermined health and safety.

The second method was repertory grid technique (Kelly, 1955) which elicits the constructs or attributes which experienced people use to differentiate between good and

Table 1. Differences between behavioural competencies and technical competences

	Behavioural competencies	Technical competences
Focus	People who do the job	Jobs or tasks which people do
Level of Performance	Superior performance	Minimum standard
Outputs	Behaviours which contribute to superior performance	Key roles and tasks. Minimum knowledge, skills and abilities required
Appropriate job analysis methods	• Critical incident technique • Repertory grids • Studying documentation • Structured job analysis questionnaire • Observation	• Studying documentation Observation • Functional job analysis

poor job performers. The technique asked experienced people to think about managers, supervisors or others they know well, and who are (a) effective in managing health and safety or (b) less effective or ineffective. By comparing those in groups (a) and (b), it is possible to define the behaviour(s) which differentiate the effective and less effective performers.

These two job analysis techniques were used to extract the specific positive and negative EHS behaviours from interviews and focus groups held with managers, supervisors and technicians.

The next steps in model development were to examine the critical incident and repertory grid data, sort the positive and negative behaviours into related groups, and differentiate whether they were behaviours required of everyone on the workforce, only supervisors, or only managers. The wording of behaviours was refined, to aid clarity.

Four sets of positive and negative behaviours were identified for each level in the organization: everyone, supervisors and managers. Each set of behaviours was given a short descriptive label. The resulting overall scheme is shown in Figure 1 below. The total number of behaviours generated across all four sets and three levels totaled 100.

Figure 1 illustrates how it is only when the appropriate behaviours are displayed by ***all*** people in the organization that an excellent EHS result can be achieved. This approach

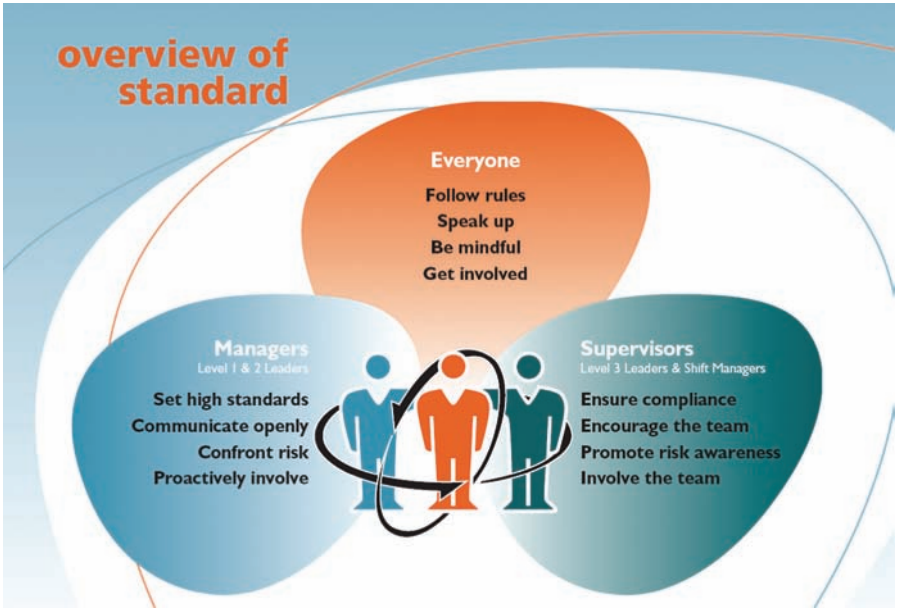

Figure 1. Overall scheme of EHS Behaviour Standard

can be contrasted with many "behavioural safety" programmes, which focus largely on ***workforce*** behaviours.

The 12 sets of behaviours were further examined, and it became apparent that four common themes ran through the sets of behaviours: standards; communication; risk management and involvement. These themes emerged from the data gathered, and were not pre-determined. Figure 2 illustrates how the sets of behaviours relate to the four themes.

By reading across these themes, it is possible to see the mutually-supportive inter-relationships between the sets of behaviours for each group. Similarly, it is possible to identify how a lack of the correct behaviours at any level can undermine the overall result. For example, management efforts to set standards, and workforce efforts to comply can be undermined by the wrong supervisor behaviours.

Figure 3 below is an example of the content of one of the twelve sets of behaviours, and shows the positive and negative behavioural indicators which were derived from the job analysis.

The resulting competency model, known in this company as the EHS Behaviour Standard, has the following important features:

– research-based
– simple to understand

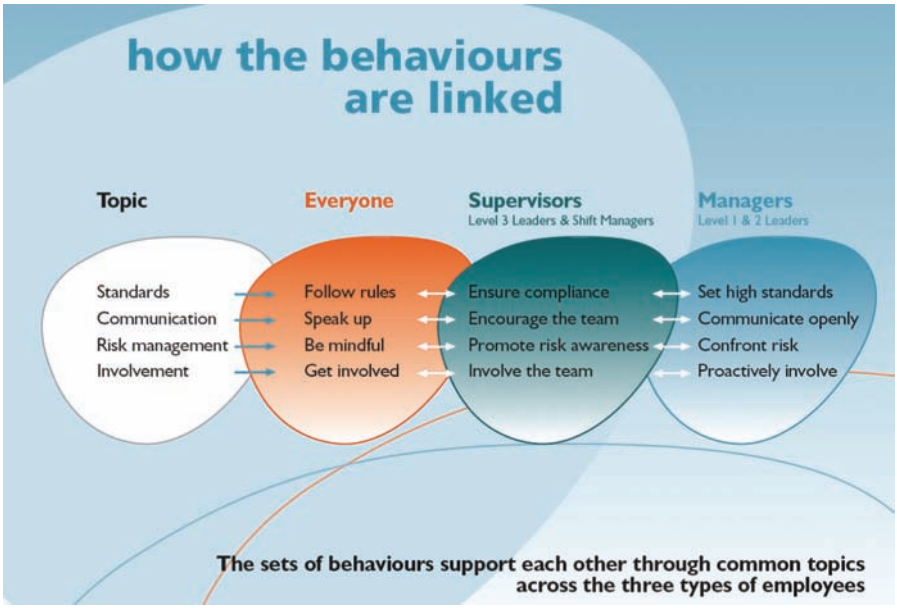

Figure 2. How EHS Behaviours relate to topics

Figure 3. Manager's "Set High Standards" behaviours, with positive and negative indicators

- defines the positive and negative behaviours which contribute to excellent and poor EHS performance
- shows the inter-relationship between behaviours of managers, supervisors and everyone in the workforce
- includes language and examples which are company and site-specific
- can be used by individuals and teams to understand their role in developing a strong safety culture
- format can be readily integrated into the organisation's safety management and human resource systems, e.g. induction, selection, training & development, and appraisal

DEPLOYMENT

DEVELOPING SUPPORTING MATERIALS FOR THE EHS BEHAVIOUR STANDARD

Materials were prepared for the communications cascade using local graphic designers and printers. There were 3 key publications:-

1. **A 24-page A5 sized booklet**. This booklet provided an introduction from the Site Director, an overview of the approach to the standards and then sections on each of the 4 sets of behaviours for each of the 3 groupings of staff. The booklet also

included 2 pages at the back providing a process, with worked examples, as to how to assess oneself against the behaviour standard and to create an individual improvement plan.

2. **A small pocket-sized folding Zip-Card** containing summary information on the approach. This publication still however contained all 100 behaviours
3. **Postcards** The intention of the postcard was to encourage staff to indicate one strength and one area for improvement from the EHS Behaviours. These were recorded on the postcard at the communication sessions and "posted" to the Site Director. This enabled some analysis to be carried out on common themes and, more importantly, provided some follow-up as the postcards were passed back to the individuals directly via their team leaders 3 months after the training session they attended.

IMPLEMENTING THE EHS BEHAVIOUR STANDARD: RE-INDUCTION

The design of the implementation was informed by (a) the principles of ABC analysis, a behavioural change technique which emphasises the important of providing consequences to change behaviour (see HSE, 2002 for details), and (b) the knowledge that it was managers' and supervisors' behaviour which had to change first, followed by the workforce. It was decided to "re-induct" the entire workforce about the EHS Behaviour Standard.

For such a significant re-induction programme to be successful, securing management and supervisory ownership and involvement was critical. To that end, the first EHS Behaviour Standard re-induction sessions were carried out with that target audience. In addition, because of the subject matter and due to the site being unionised with two unions at shop-floor level, union Safety Representatives were also invited to the initial sessions. Two half-day re-induction sessions were delivered on consecutive days in January 2007 with a total attendance of 83 staff. The content was the same as used for subsequent workforce re-induction sessions' with some additional emphasis on the key responsibilities that management, supervisors and safety reps held with respect to safety performance and safety culture. Furthermore, the following individual objectives were communicated to this group of staff:-

Managers objectives

- Personally set an excellent example of the EHS behaviours at all times
- Ensure all team members participate in the EHS behaviours "re-induction"
- Active monitoring and sponsorship of team action plans arising from "re-induction"
- Ensure during Q3 2007 all managers, supervisors and safety reps complete 360-degree feedback on EHS behaviours, and that any identified development needs are built into their own PDP

Supervisors objectives

- Personally set an excellent example of the EHS behaviours at all times
- Take an active role in delivering the EHS behaviours "re-induction"

- Develop and support a team action plan on improving EHS behaviours arising from "re-induction"
- During Q3 2007 personally obtain 360 degree feedback on EHS behaviours, identify any development needs and build into personal PDP

To further support this group of key staff a set of Questions and Answers were prepared in advance by the project team and these were handed out at the end of the re-induction sessions.

Thereafter half-day re-induction sessions for the whole workforce then commenced some two weeks later. A series of ten sessions were set up over an intensive two-week period. Total attendance was excellent, with 657 attendees covering more than 95% of site staff. One key target set by the Site Director was to complete the re-induction programme before the first anniversary of the explosion – this was successfully completed with the last of the ten sessions held on the 28 February 2007.

Each re-induction session covered the following content, most of which was delivered as team-based activities, led by local managers and supervisors

- An introduction to the subject matter of "safety culture"
- An emphasis on the need for improvement at GSK, Irvine. This involved some commentary on the two injured operators from 2006 including their support for the approach to the EHS Behaviour Standard. Also the Site Director or a deputy recalled his personal account of the incident from 2nd March 2006. These personal messages were very powerful in what became an emotionally-charged atmosphere.
- An overview of the CAPA (Corrective And Preventative Action) Plans that were being progressed following the incident
- A simple worked based scenario to get staff thinking about their EHS behaviours
- An explanation of how the team created the Irvine EHS Behaviour Standard. This included reminding staff of their input via the 2005 climate survey
- An overview of the EHS Behaviour Standard and a walk-through the booklet
- The creation of Team Action Plans using a template supplied
- Discussions about follow-up supporting activities
- Individual commitments recorded using the booklet and the postcards.

These re-induction sessions worked extremely well because the team leaders were primed to facilitate discussion, and also because attendees were grouped into work teams to create their own team action plan. Furthermore, at the end of each session, time was allowed for staff to review their own levels of performance against the appropriate set of behaviours and commit to an individual area for improvement. These were captured in the booklets that they took away with them and on postcards which were sent to the Site Director.

FOLLOW-UP ACTIVITIES TO ENSURE SUSTAINED BEHAVIOUR CHANGE

Several follow-up activities were announced at the re-induction sessions to emphasise that the plan was to ensure this new approach to improving our management of safety was not going to be a one-off event. The commitment was there from the leadership team to ensure

this became fully embedded in ways of working i.e. strengthening our safety culture. Follow-up activities included:-

- **Individual Commitment** – captured on postcards at the re-induction sessions, individually reviewed by Site Manager, who added a personal message, and returned 3 months later to the individuals via their Team Leader with a discussion about how they are progressing.
- **Team Action Plans** – developed during the workforce re-induction sessions, collated site-wide to check for consistency, and monitored for progress via departmental and personal objective tracking systems.
- **Manager and Team Leader Objectives** – as described above each manager and team leader has a set of specific objectives in relation to the EHS Behaviour Standards included in their 2007 PDP forms.
- **Checking understanding and soliciting feedback** from the workforce re-induction sessions. This was managed via a web-based survey form that was e-mailed to all attendees within 2 weeks of their training session. The questionnaire asked for responses to 7 questions to check understanding, 2 questions to assess their level of support for the programme and then optional extras to provide general feedback comments and to submit an idea for consideration. 575 staff had responded with 223 ideas submitted and 149 comments provided. A high level of understanding of the roll-out sessions, and support for the site's EHS Behaviour Standard was verified via the survey.
- **Winning prize for the best idea** helped encourage submissions and embed and sustain the programme.
- **Induction Programme** – a 30 minute interactive introduction to the EHS Behaviour Standard has been introduced into the site induction programme to ensure all new employees are covered as soon as they join.
- **Contractors** – it was always the intention to ensure that all contractors based on site were treated in the same way as GSK staff. All contractors (over 300) attended similar re-induction sessions in Spring 2007.
- **Publicity** – a number of banners and posters carrying the overview of the Behaviour Standards have been created and are on prominent display across the site.
- **Recognition** – use of the company reward programme has been encouraged to recognise any particular excellent examples of the correct display of EHS Behaviours. A number of these have already been awarded on site since the roll-out programme commenced.
- **360 Degree Feedback** – this programme for all managers and supervisors commenced with the site leadership team. Each person selects several colleagues/peers and several subordinates who together with their line manager assess the individual against each of the EHS Behaviour Standard "Manager" behaviours, using a web-based survey tool. Supporting consultants then analyse the returns and create a report that is fed back directly to the individual who is then assisted or coached into creating a more detailed individual improvement plan. The target is that all Managers, Supervisors and Safety Reps will complete this process in 2007.

- **Human Factors Training** – As a COMAH site there is an expectation by the regulator that systems are in place to manage human factors in relation to our major accident hazard installations. To date two "Human Factors Awareness" courses have been held on site for a cross section of staff from the Factory Safety Committee. Also a more detailed two day "Human Factors Analysis Tools" course (Lardner and Scaife, 2006) was run on site to enable experienced incident investigators to (a) better understand why people involved in incidents behaved as they did, and (b) write better behavioural recommendations which will influence behaviour of those immediately involved, and others, in the future.

RESULTS TO DATE

There is supporting evidence of benefits starting to be realised on a number of EHS KPIs. At the end of September 2007 the following highlights were noted as the best levels of EHS performance in the site's 33 year history:-

- Lowest ever recorded 12-month rolling LTIIR at 0.08.
- Highest-ever recorded number of hours worked since the last lost time accident – 1.45 million.
- Passing 1 million hours LTI free for only second time ever and in successive years (2006 and 2007).
- Lowest ever cumulative "Spill Index" – a key environmental measure.

A cross-section of experienced managers, supervisors, EHS professionals and safety representatives used the Safety Culture Maturity[1] Model (Keil Centre, 2007) to assess whether and how the site's existing safety culture had changed since the explosion in 2006. In their opinion, the site had improved by one level, and this was aided by the development and deployment of the EHS Behaviour Standard.

At an early stage in the project, the site HR Director expressed significant reservations about the ability of the site, aided by the second author, to achieve a cultural change. In July 2007 he commented "I was sceptical about the possibility of "culture change" – I thought it was expensive consultant mumbo-jumbo but I was wrong – I take my hat off to you – there has been a real change for the better over the past few months".

This project has been recognized internally, as it won the GSK Chief Executive Officer's EHS Award for 2007 in the "EHS Initiative" category. A total of 86 projects from GSK sites across 30 countries were submitted and reviewed by a panel of external judges.

The GSK Vice-President and Corporate Head of EHS commented:

> *"The efforts represented by this award application are not only critical to EHS performance at Irvine, but I believe that Irvine has set the mark for other sites to follow. It is a great effort and I'm very pleased that the external panel judged it so highly. Congratulations and well done to everyone at Irvine.*

[1]Safety Culture Maturity is a registered trademark of The Keil Centre Ltd.

The approach described is now being adopted for use by GSK globally, as its preferred method of assessing and enhancing safety culture.

DISCUSSION AND CONCLUSIONS

The question has been asked – "If the EHS Behaviour Standard and methodology had been in place a year earlier, is it likely this would have prevented the reactor explosion?". Following the explosion, the incident investigation concluded that a holistic response was required, involving improvements to engineering, the safety management system and the existing safety culture. Using Reason's Swiss Cheese analogy, there were holes in multiple layers of system defences. The site identified 11 improvement areas from technical issues (Emergency Vent Design, Mechanical Integrity) to management systems (Permit to Work, Change Management) and safety culture and behaviours. Since then the approach has been to close all gaps in these system defences (or layers of cheese). In the opinion of the site management, without the focus on safety culture and behaviours, the chances of sustaining the benefits across the other improvement areas would be limited. It is impossible to say with any certainty whether the EHS Behaviour Standard and methodology would have prevented the explosion, without the engineering and safety management system improvements. The likelihood would certainly have been reduced, via management behaviours which place safety before production, supervisory behaviours which encourage wariness amongst their team members, and everyone being more involved in EHS, and speaking up about any concerns. An additional issue addressed very effectively by the EHS Behaviour Standard and methodology was the belief amongst some site employees that the deficiencies leading to the explosion were only relevant to the building where the explosion occurred. During development of the EHS Behaviour Standard it became apparent this was not the case, and this misconception was firmly rebutted during the workforce briefings.

This novel project helped a site develop and implement a safety culture improvement project, in the aftermath of a serious explosion. The methods used proved flexible, and acceptable to the target audience. A comprehensive implementation plan was developed and executed, with a strong emphasis on shaping manager and supervisor behaviours, as they in turn can strongly influence the wider workforce.

The flexible nature of the EHS Behaviour standard allowed to be built into the safety management system, so that its influence can endure

It is likely that this approach will be of interest to other organisations looking for practical methods to develop and embed the safety culture they desire.

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