

Successfully Implementing a B-SAFE behavioural safety process and measuring the success in terms of a pro-active safety culture

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The views expressed in this paper are those of the authors.

Introduction

Olefines 6 (the cracker) is a single stream, high hazard, petrochemical installation of some 30 acres. The plant processes some 3m tonnes of hydrocarbon, mainly naphtha and propane and produces Olefines – Ethylene, Propylene and Butadiene as principal intermediate products. These are used in the manufacture of a wide range of everyday household applications in use by us all.

Because of the historical development of the Olefines business, storage and distribution of the cracker products is carried out on 2 additional locations on the Wilton site, with a further riverside jetty for the handling of ships.

The plant is operated continuously, with 5 to 6 years between major overhauls. It is manned by a team of 20 people per shift on a continuous shift pattern. There are a further 11 per shift in the storage and distribution areas.

Safety is a paramount requirement, in view of the hazards of the materials we use.

We have had a pretty good safety record, over a large number of years. However individuals were getting hurt and we needed to find techniques to motivate the operations team into further improvements in safety performance. We started down the track of behavioural safety in 1997, on the cracker, on the back of 8 years without a reportable injury (as defined in RIDDOR). We later have spread this throughout the business, including offices and major contractors. We selected B-Safe[®], as developed by Dominic Cooper (BSMS), as our vehicle for implementing this in 1997.

This paper describes the implementation of B-Safe[®] within Olefines and some of the lessons learned in the process.

Appendix 1, attached, is a copy of a Business awards entry, written by Paul Rayson. It describes implementation and achieved results.

Lessons Learned

1. Working in Partnership

Within ICI we recognise trade unions. Historically we have had a fairly 'traditional' management / union relationship, that had held us back over a lot of years. Since entering into a zero overtime, multiskilling agreement in 1994, relationships have greatly improved.

Having identified the opportunity of using behavioural safety to improve on our safety performance, it was clear to me that it could only work if the shopfloor bought into the process. I, as a manager could not successfully impose behavioural safety and I made it clear to all that it was their decision, not mine.

The choice was largely down to the use of two checklisted processes and the shopfloor made this decision - not me, fully supported by the union representatives.

2. Getting the First Line Managers on Board

The shopfloor team having chosen B-Safe[®], what I then found I had failed to do was get my shift management team on board. This became obvious when an overheard remark was reported to me from one shift manager to an observer – " Right go out and spy on your mates then".

In spending my time and effort in getting the shopfloor to say yes, I had forgotten about the group in the middle, who, not surprisingly, were not onboard with the process and in some respects saw this as reducing their authority.

To rectify the situation, I developed a presentation to them, leading into a good discussion on the issues. This did much to rectify the problem.

3. Launch Night

To further give B-Safe[®] some significance and start to spread the cracker implementation into other areas of the business, we put together launch nights (2 events to allow all shifts to attend). This was open attendance to all in the business at Middlesbrough Football Club's new stadium, with transport laid on, tour of the ground, meal, drinks and quiz. With the only penalty being a 30-minute lecture on what B-Safe[®] was all about.

4. Other Business Safety Processes

In ICI we have been strong on managing safety for many years. We have lots of procedures, lots of safe systems of work and many layers of audits. What we have not been so good at is converting procedures, into people's behaviour.

Wearing of Personal Protective Equipment (PPE) is an excellent example. After many years of experiencing numerous minor eye injuries, in 1990 we mandated the wearing of Light Eye Protection. (LEP) It took us about 4 years of catching people out to get a reasonable level of compliance.

The key message here is that as managers, that unless you take a really hard disciplinary line, you have to convince your staff of the reasons for following your procedures. With a shift organisation it is very difficult to take a consistent coercive approach since normal office hours account for only 20% of operating hours.

B-Safe[®] now allows the workgroup to define and agree amongst them – with an appropriate level of assistance, what the most important safe behaviours are that need to be worked upon. It begins to make it a virtue to behave safely, whereas previously it tended to be macho to behave unsafely.

Without doubt B-Safe[®] has complemented our systems and procedures. By taking the accountability for safety to the workgroup, they are now coming back and finding where some of our systems have holes in. There are numerous examples of these which are listed in Appendix 2 :- "What has B-Safe[®] ever done for us ?"

Also B-Safe[®] observers have been identifying shortcomings with the plant. For example - poor access to equipment that requires proper access or paths. In the past this had led to arguments between the technicians and management about whether problem 1 is more of a risk than problem 2. As a day manager I am not likely to be the one that gets hurt or knows most about the job, therefore I don't want to get involved in these arguments. With B-Safe[®] I have the perfect decision making vehicle. I have given Paul a £100,000 p.a. budget for this type of improvement.

So overall the message is simple; B-Safe[®] complements and enhances our existing systems for managing safety.

5. B-GREEN

During Phase 1 we had a couple of minor environmental incidents with elements of behavioural cause. For phase 2 we incorporated the learning into an environmental section of the checklist. This has clearly and demonstrably put good environmental behaviour into our teams and has been commended by the inspectorate.

6. Avoid Major Events

3 months after starting B-Safe[®] on the cracker we went into our major overhaul. These are big events. This overhaul lasted over 50 days (550,000 man hours). Preparing the plant and restarting it are the most hazardous aspects of operating this type of plant. They cause major disruption to all. I could not have chosen a worse time to get B-Safe[®] running, but having got the go ahead I was not going to postpone in case it floundered for other reasons. Interestingly we also applied B-Safe[®] to the main overhaul in a modified fashion to very good effect, with up to 3000 contractors on the plant at peak.

7. Selection of Coordinator

Good selection of the Coordinator is vital in the process. He takes on a de-facto role as coach and mentor for the observers. He has to be able to hold his ground with a number of different managers. He needs to have respect and trust from his peers and managers and at times have great tenacity in the face of adversity. Now we have established B-SAFE I have now taken

the view that the workgroup (at least those that endorse B-SAFE), should select the Coordinator. I also believe that the Coordinator should not take on the role indefinitely, as after a time he will be seen by the workgroup as not being one of them.

Gaining Shopfloor Buy-In

- It takes time to gain buy-in

The biggest step in this process was gaining acceptance that technicians would observe other technicians performing work. This was an alien concept. However, without a credible alternative to improve their safety, they were prepared to listen. From proposing that Olefines look at implementing a behavioural safety process to starting the first phase of B-Safe[®] took around 18 months.

My own interest in behavioural safety started when the site management at Wilton, decided they wanted to impose Safe Unsafe Acts Auditing (SUSA) on all the businesses. I saw SUSA very much as another auditing process. This prompted me to go to a BST seminar in 1995, where I first learned about behavioural safety. Having sold me the concept I brought BST in to sell it to our Safety Committee. This they did and the next step was to sell it to the shopfloor. As I needed general shopfloor buy in I then asked BST to repeat this sort of presentation to all the shift technicians. BST proposed they do this as part of a formal safety climate survey which they later carried out for us in late 1995. However in carrying out this survey BST did not convince the shopfloor of the benefits of behavioural safety.

I was then left looking for other means of moving forward, which was when I found B-Safe[®]. Dominic Cooper took a different approach in trying to sell B-Safe[®] to the shift team. Instead of embarking on a formal process, assisted by the union/safety representatives he spent time visiting the shift team and talking to them informally. This moved things forward fairly quickly into the cracker teams being persuaded to run with B-Safe[®]. I cannot pretend that, apart from a minority of enthusiasts, most of the team were only convinced enough to be prepared to try it. The representatives had to pull in a number of favours to get the first observers to volunteer.

Dominic Cooper did have the benefit of BST preparing the ground. But fundamentally both from a management and shopfloor standpoint there were a number of good reasons for us to prefer the B-Safe[®] process. These included lower training requirements – from both a cost and attendance time viewpoint (in a no overtime organisation especially), more flexibility in observation disciplines, full training material included in package and overall lower costs.

Maintaining Shopfloor Buy-In

- Results are the biggest incentive

The cracker is notionally divided into two operating areas – Hot & Cold. (Cracking process operates at 850C & separation down to –180C). We decided that each area would have one observer per shift. Since we have 6 crews to man our shift pattern, we therefore needed 12 observers for each phase (out of a team of 120, including shift management and labs).

The first 12 came from enthusiasts and converts. This left the remaining 90% of the workgroup outside of B-Safe[®] as targets to later recruit as observers. Their opinions were split between "Happy to take their turn" to " B-Safe[®] is a lot of -----". As we have completed phases largely the subsequent observers have come forward because they have seen B-Safe[®] work. They have seen housekeeping standards improve. They have seen past observers really buy in to the process. Although we had a very bad phase 1 from an accident standpoint, they did see the improvement in measured performance and they are now seeing accident performance get to world class standards. They saw real success with the shutdown behavioural and accident performance. (Although there was a big dip in score when Middlesbrough lost their cup match that year).

These results were not a matter of chance. They were because once observers highlighted issues, Paul sorted them. Paul has been relentless in chasing down issues that concern him. And the second thing he did was to highlight them by starting a B-Safe[®] bulletin listing the successes under the banner of "What has B-Safe[®] ever done for us". See Appendix 2 for excerpts.

We still have a number within the workgroup to convince. There are now few left who will seriously criticise B-Safe[®], but there are certainly a number who still state they will never be observers. We take great care not to criticise their views and push them in to repeating this type of statement and try to get them into discussion as to why they do not wish to observe. I was very pleased when I was carrying out the Phase 4 training when one of my mature, respected lead technicians said – " I was one of those people – but I now realise how B-Safe[®] is getting the results". You will also see in Appendix 1, 2 testimonials from technicians who have been observers, which make the point more strongly than any words I can use.

We still have not changed everyone's behaviour and at times we are using B-Safe[®] to identify and target problem areas. But now as we get our contractors converted to B-Safe[®], hopefully we will begin to see much less need to clear up afterwards and get people to working safely in the first place.

Other than results we also have undertaken an element of recognition of observers contribution through having a meal out as a group as every phase starts. We also hand out a few promotional items such as B-Safe[®] tee-shirts, sweatshirts, engraved tankards, ties (when relevant) and pens. These support the process but are not real motivators.

Assessing the Success of Your Process

Measures

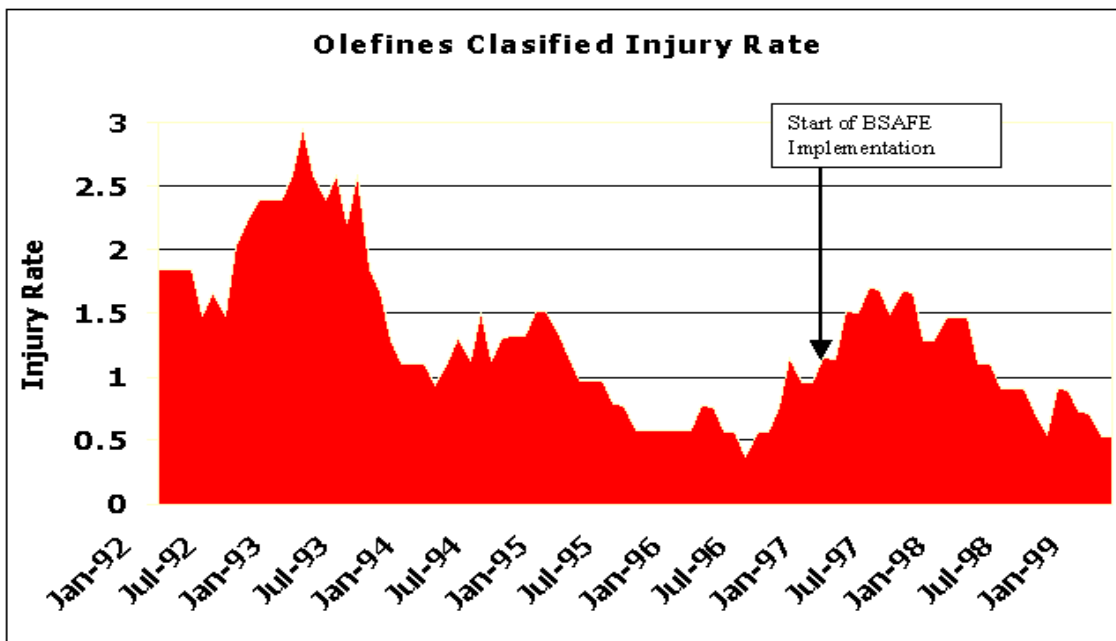
As B-Safe[®] is a measurement based process, we clearly gain our most direct assessment out of the behavioural scoring. Within the business we have now completed 3 phases on the cracker and one shutdown. We have completed one phase in our storage and distribution area and one phase in our day maintenance team.

With the exception of phase 3 on the cracker, everytime the target has been achieved. It is in fact uncanny how the target is reached and then the results plateau, as every psychologist would predict for you.

Why did Phase 3 fail. There are probably a number of contributory factors. In the first place we bit off some big improvement areas on unlagged hot surfaces and unblanked ends. We did not limit the unsafe score in these categories and they dominated the results. This contrasted the approach we took in phase 1. Since we did not want B-Safe[®] to become a housekeeping audit, we graded housekeeping scores, allowing a maximum negative score of 5 for very poor. The second impact was that we had a number of management consultants around through the year, which did inhibit some of the day management team from resolving some of the procedural issues. Thirdly, we appointed a new coordinator for Phase 3.

Phase 3 apart, the process is giving a measurable improvement in safe behaviour. But of course the most important measure is the long term impact on accident rate. We define three levels of injury. Minor – which can be anything and frequently will not be reported, Classified – where a medical judgement on consistent grounds is taken, and Reportable – as defined under RIDDOR. Due to the inconsistency in reporting of minors we do not worry about minor injury rate and concern ourselves with classified and reportable as being more statistically significant.

Unfortunately this year we have had a shift manager suffer a broken rib, when he slipped, bringing our reportable free run to an end, after a 6 years, 3m hours. (He in fact lost no time at work.). This was a pure behavioural issue, with the injured person rushing in heroically to isolate a leaking filter (after the end of his shift) and slipping on the spilled material. (Meanwhile the filter had in fact already been isolated remotely). The injured person to his credit had already signed up to be an observer and is now observing on phase 4. Even taking this into account our classified (or worse) injury rate continues to fall dramatically. What our current injury rate would have been, without B-Safe[®] is of course impossible to predict.



This graph shows the historic classified injury performance within Olefines over a 7 year period. Injury rate is a 12 month moving average (per 100,000 hours).

A few comments on this graph:-

- The long term trend in injury performance is of improvement.
- There is an apparent cyclical nature to our injury performance. It has been suggested that this is typical where safety is managed with initiatives being put in place as a reaction to events.
- With the implementation of multi-skilling there has been a background of increasing workload on all individuals since 1994 which could be assumed to increase probability of injury.
- We started the implementation of B-Safe[®] at a time when there appears to have been a significant rate of rise in injury rate.
- The proof of success will be if we eliminate the cyclical rise and maintain a steadily improving performance.

Observations

The frequency we have chosen for observations is that each observer carries out an observation every time they attend work. Examining the data, the variation in the measurement would suggest that we are carrying out more observations that are needed to satisfy statistical significance. Also this frequency means that any individual observer is spending more time on observation than the minimum needed to effect a change in his personal safety behaviour – the primary intent of the process. This would suggest that we could improve the efficiency of the process by carrying out fewer observations.

We do not intend to do this because the observation has to become a routine habit.

Alternatively we could use fewer observers, each covering a larger area. This would have a very negative impact on the process because it would take longer to cycle through the workgroup and change the behaviour of all. As it is with 2 observers per phase and two phases per year, it will still take 5 years for all to be observers.

Safety Climate Survey

The safety climate survey undertaken for us by BST did uncover some interesting issues. The most significant of these was around the views expressed on Safety before Production. The management group clearly saw Safety as being more important, but this message appeared to not have been adequately communicated to the technician level. Other than highlighting this as an issue, the survey did not fundamentally alter anything that we were doing or planned to do.

Speed of Results

The principle aim of the process is to change your employee's behaviour by recruiting them to observe for long enough periods. The process attempts to get buy in from other members of the process by involving them at all stages, but at a simple level you should not expect a step change in injury rate, but a steady tail off as more and more of the workgroup cycle through the process.

With our process with 10% of the workgroup as observers it will take 5 years to get everyone through once. With our ability to convince people of the benefits of the process this also is about the right rate. We maybe should consider shortening phases and targeting less improvement and pull harder on observer recruitment to speed this up, but this would also increase the administrative burden in setting up checklists, training observers etc. So on balance I think we are not far off the optimum and you can judge from our injury rate graphs as to whether you believe that the process is delivering fast enough.

You will have to make your own judgements in this area, dependent upon how rapidly people will volunteer to be observers and the severity of your safety challenges.

Safety outside the Workplace

I am now beginning to move the process into trying to influence behaviour outside of the workplace. Obviously I would expect and have seen in my own behaviour, some translation of safe behaviour at work to safe behaviour at home and on the way there. I am now trying to reinforce the link.

I started down this track in moving B-Safe[®] into the office block, where we have found some antagonistic attitudes. In simple terms these have been expressed as "why are we wasting our time in the office block – we don't have accidents". Whereas clearly the office block is inherently safer than a chemical plant, there are real risks and I personally know someone who fell up stairs in an office block and broke his leg. I have a colleague who knows someone who from university days has been in a wheelchair because of a staircase accident. Yet all around us we see people not holding handrails. They have not got this message.

The other turning point in my thinking has been following a safety day we held, we had a guest speaker who produced some ROSPA statistics. These show in the UK 12,000 people a year dying through accidents. If we all aspire to live 80 years that means nearly 1m people around us will die through accident. If on average we are half way there that equates to all of us having about a 1% chance of dying through accident. This really puts beef on the bone into context!

Having had another of our shift managers recently involved in a serious road accident, I am now promoting through our B-Safe[®] Coordinators defensive driving training. The cost of this is around £60. I would advocate using this as another means of motivating staff into buying into behavioural safety.

Olefines 6 is a joint venture plant owned by ICI and BP Chemicals. It is operated by ICI

For further information on the B-Safe[®] process, contact BSMS Inc on +1 (317) 736 8980, or visit www.b-safe.net

APPENDIX 1

**Tees Valley Business Awards 1998 - Category: The Safety Award
Submission: The B-Safe[®] Process**

From: The B-Safe Team Olefines Business

ICI Wilton

Contact name: Paul Rayson, B-Safe Coordinator. Ext. 4199.

Summary:

The introduction of any new or novel idea is never easy. It is even more difficult when the idea is safety related and the current safety performance is seen to be 'good' by everyone in the business.

Being 'good' was not enough for the Olefines Safety Committee. We knew that we could compete with the 'best in class' anywhere in the world. All we needed was the right vehicle, the right commitment and the willingness to participate wholeheartedly.

We believed the process would be successful because:

- We realised that we needed to win the hearts and minds of all the workforce.
- We realised that we had to challenge the 'norm'.
- It raises the awareness of all employees
- There is total participation
- There is Senior Management support and commitment
- We implemented a structured process of change
- The workforce themselves are driving the change
- We are confronting reality
- There are effective two way communications
- We are extensively sharing learning

We are pleased and proud to submit this entry on behalf of all Olefines employees.

History:

It is six years since our last reportable injury, with a total of over three million man hours worked which is a remarkable achievement by anyone's standard, bearing in mind the size, complex nature and amount of maintenance work carried out on the Olefines plants.

However the Olefines Business Safety Committee were still concerned at the number of accidents occurring within the Business and had been looking at implementing a behavioural approach to safety management. We realised that some 80-90% of all accidents were triggered by 'unsafe behaviours' and it was this aspect that we sought to improve so that all the workforce were thinking positively about what they were doing and how, all of the time.

Which System?

A number of systems were looked at and discarded as not being user friendly, some were run 'by committee', others took up much of the resource that was available, and finally a joint decision was made to run with the B-Safe[®] system. B-Safe[®] is a Shop Floor owned and driven system of managing safety that modifies people's behaviour and allows the results to be measured.

Philosophy:

The philosophy behind the B-Safe process is:

- That behaving (or working) correctly reduces accidents.
- That safe behaviour is brought about and reinforced by acknowledging and praising safe behaviour rather than punishing unsafe behaviour.
- That behaviour can be measured by regular and random observations.
- That everybody should have the opportunity to be involved in setting safety improvement targets.
- That the best person to define anybody's safety is that person themselves.

Implementation:

The B-Safe team studied all accident and incident reports from 1994 through to 1996 in order to identify those issues that repeated themselves and their causes. A number of unsafe behaviours were identified that were thought to be responsible for recurring accidents. These were used to develop checklists of potential unsafe behaviours that could lead to accidents. These checklists were circulated and extensively discussed and refined by each workgroup until a final version was agreed.

Observers

Volunteer observers were trained in the concept of the B-Safe[®] process and how to use the checklists to measure the safe and unsafe working on the plant. The observers then had an observation period of four weeks, which was used to benchmark the current behavioural patterns, this period is known as the 'Baseline'. After this the Observers and the B-Safe Coordinator meet

with the rest of the workgroup to report their findings and set their 'Target Goals' for the 'Live' observation period. Everyone in the workgroup has a part and place to play in setting this target and thereby gaining wholehearted buy in.

Many of those who volunteered to be observers had to equip themselves with new skills. It is important that the observers lead the weekly safety meetings, as they are seen as a local 'process champion', and in order to carry this out they have to be proficient in communication skills and lead with some confidence. It is also necessary for the observers to adopt a higher profile within their teams as the custodians of best safety practice. In addition to this the observers need to equip themselves with some presentation skills to help them in the running of their team meetings.

The Observers are in place for seven months, after which time they are 'retired' and replaced by another group of observers and a new checklist. The process is then repeated. This is a vital component of the system and helps keep the whole process refreshed. The Olefines 'Cracker' Plant JVO6 was the first to implement the system in the early part of '97 when it commenced phase 1. Phase 1 was suspended for two months because the JVO6 complex shut down for its four yearly overhaul, the B-Safe[®] process was used as the main vehicle for managing safety on the plant during this critical period. The '97 shutdown safety performance was seen to be the best ever! (further explanation later)

Phase 1 restarted after the overhaul and was completed at the end of 1997. Phase 2 of the B-Safe[®] process started in January '98, with phase 3 beginning in July. The rest of the Olefines business adopted the system this year with most areas completing phase 1 and will soon be commencing phase 2.

Involvement:

The whole process relies on the involvement and participation of each individual within the workgroup and **extends to everybody who comes onto the Olefines work areas!** To date 45% of the workforce are directly involved as observers. This will increase to 55% by the end of January '99 at the commencement of future phases. Eventually it is hoped that each member of the workgroup (i.e. everyone) will undertake a phase as an observer because the people who benefit most from B-Safe[®] are the observers. Enclosed is written evidence from a phase 1 and 2 observer to support that the process heightens each individuals safety consciousness on a rotating basis. This process never ends, the outcome being directly related to ongoing improvement in standards.

Communications:

Communication is a vital part of the B-Safe[®] process. It is fundamental that everyone knows what B-Safe[®] is contributing to making the plant a safer place on which to work.

The weekly feedback given by the Observers to their teams consists of the best scoring items and the worst scoring items from the checklist, everyone then knows where standards need to be raised to reach the agreed targets. Large graphs are displayed in prominent places for everybody to see how they are performing. Feedback is also given at the plants weekly safety meetings and the monthly business safety committee meeting which is attended by the business managers and

the safety reps. The B-Safe team publish a newsletter to publicise how the process is benefiting everyone. The Newsletter is put together by the Coordinator based around the Observers contributions and the achievements of the whole team.

Other communications such as SHE awareness days have taken place with our employees and resident contractors so that everyone appreciates the scope and purpose of the B-Safe process. In all this encompassed some 400 people.

Spin Offs

Some spin offs have come about through the process. These have been highlighted from the comments section on the checklist and the Observer led weekly meetings.

One such positive has been the amount of cash saved by more thorough management of the scaffolding requirements on the plants. Staging is now dismantled and taken off hire at an earlier time than ever before, leading to real cash benefits for the business.

Another spin off has led to better clarity of responsibility over the disposal of barreled waste from the plants. A clear instruction has been well publicised that clearly defines who is responsible at each stage of waste removal. This covers the empty barrel stock check, the identifying of the waste and then removal from the plants for disposal.

Trivia ?

These are simple and seemingly unimportant issues that highlight the necessity for standards and ownership to be clear. If, as an organisation, we cannot solve and bring clarity to the trivial issues then we have no chance of making progress with the more important ones.

As a strong, world class organisation we have to maintain and improve our already high standards and procedures which in turn we have to clearly communicate to all concerned.

Outcome :

We can now statistically show improvement in terms of behaviours and reduction in the injury rate and give anecdotal evidence to support that behaviours have changed. (see attached Graphs and A view from a Phase 1 and 2 Observer)

During 1997 we had seven classified injuries to shift personnel on JVO6, however none of these injuries related in any way to the checklist observations that were carried out during phase 1. The phase 1 checklist was developed using past accident and incident reports from 1994 through to 1996. The phase 2 checklist was developed by retaining items from the phase 1 checklist where further improvements were needed and looking at the behaviours that were the causes of the classified injuries in 1997 and adding these to the checklist.

Examples of this are :

"All blanks are fitted to on line equipment"

A shift technician walked passed an open end and it was intermittently ejecting hot BFW (boiler feed water) it hit him on the calf which resulted in a nasty and painful injury.

"All relevant hot and cold surfaces are lagged"

Three of the classified injuries resulted from burns which had been caused by contact with unlagged pipework.

During phase 2 of the B-Safe[®] process we had no classified injuries (Jan. 14th/July 24th '98) which is a significant improvement and proof that the process is working. To date this excellent safety performance has extended to the time that I write November 20th.

The B-Safe[®] process is sufficiently flexible to allow it to be adapted for improving performance in areas other than safety. We implemented a B-Green category on the checklist aimed at improving our environmental performance. To date this new B-Green category has improved our environmental performance by raising peoples awareness to the importance of environmental issues.

The process has been highly successful in driving improvements across the Olefines Business and is the vehicle for safety management for the future. It is also being adopted by four of the major contract companies who work on Olefines.

There have been numerous inquires relating to B-Safe[®] from other ICI. Businesses, both on and off the site, as well as other Companies. Both the B-Safe[®] Champion and Coordinator have been instrumental in 'selling' the system to others that are interested.

Shutdown - How we did it!

In April/May '97 the JVO6 Complex shutdown for it's four yearly overhaul. It was decided that the B-Safe system would be used as the basis for the overall safety initiative during the overhaul. The intention was to proactively involve in excess of 2500 contractor personnel in ensuring that the plant was a safe place in which to work during the shutdown period.

In contrast to the normal application of the B-Safe[®] system which operates over a seven month timescale with weekly feedback meetings, the B-Safe[®] process was adapted to cater for the shutdown period of six weeks. This meant that each day of the shutdown was treated the same as a week of the normal period, with the baselining being established over the first four days of the shutdown and feedback was given on a daily basis.

By analysing the accident and incident reports from previous shutdowns and by including data gathered from the construction industry a safety performance checklist was generated. This analysis showed certain behavioural trends which were then used to indicate the desired behaviours that were required for safe working. The checklist focussed on four key areas: access, use of tools, housekeeping and use of protective equipment.

Observers were recruited from the major contract companies and the safety team. As the plant had been divided up into ten areas for maintenance requirements it was decided to have one

observer per area. Training of the Observers was carried out by the B-Safe team and the Coordinator ensured that they was consistency in the scoring by moderating during the baseline period.

A system of providing feedback on a daily basis was set up in the form of a table of daily scores, a graphical representation of daily scores and an area specific of worst scoring and best scoring items. These were delivered to all those working on the shutdown at their daily toolbox talks. In addition to this, two weeks into the shutdown three large graphical feedback boards were placed on site in prominent places to ensure everybody could see the daily performance scores.

It was also decided to have regular weekly meetings with the Observers to provide them with support, feedback and to sort out common problems. Due to the number of people involved in the shutdown, the observers themselves agreed the goal setting target of 85%. This was then briefed onto the Shutdown Management Team and also published in the shutdown newsletter.

Observations were carried out by each Observer twice per day. This enabled feedback to be based on the previous afternoon and present morning. Feedback was given at the daily toolbox talks and at the daily management meeting. Plant average scores were placed on the three graphical boards.

In terms of safety performance over the shutdown period all ten areas showed improvements of around 20%. The target of 85% safe was reached on the 30th day of the shutdown period (see attached graph). The number of minor accidents was restricted to about 40, with no reportable injuries occurring and only 3 classified. Given that 2768 contractors worked in excess of 500,000 man hours during the shutdown these results testify to the effectiveness of the process.

'97 SHUTDOWN SAFETY STATISTICS

- 550,000 Man Hours worked
- 3 Classified Injuries
- No reportable injuries

How we compared with previous shutdowns

<i>YEAR</i>	<i>Man Hours worked</i>	<i>Classified</i>	<i>Reportable</i>	<i>Injury Rates</i>
1990	346,000	9	2	Classified 3.18 Reportable 0.58
1993	288,000	1	2	Classified 1.04 Reportable 0.67
1997	550,000	3	0	Classified 0.55 Reportable 0

Anecdotal Evidence :

A View from a Phase 1 Observer

I started my employment with ICI in 1970 at Wilton, during this time I have worked on most plants.

My view of safety was that the management paid it lip service; in that when there were problems with the kit, safety went out of the window, while the workforce took chances and put the job right.

Once or twice a year was spent watching a 'Super 8' safety film and a lecture from a Safety Engineer would go in one ear and out of the other.

I'm afraid that wearing goggles, ear muffs, helmets and protective clothing seemed to 'hinder the job' and many times I'd hear members of the workforce state "It's okay for managers sat on their backsides telling us to wear all this gear, they should try to work in it!" Often after the management went home the goggles, helmets etc. would be cast aside!

Every now and then a new idea or direction would be thrown into the melting pot. P.S.A. Personnel Safety Awareness, the next 'buzz' word would be P.S.K. Personal Safety Knowledge. You could move around the words, put up a few new posters but to myself and I think a lot of the shop floor there was NO COMMITMENT TO SAFETY.

B-Safe[®] was introduced to Olefines 6 in January 1997. The shop floor view was that this was just another safety scheme and would soon be forgotten. The interest was 'luke warm' to put it mildly!

Over the first few weeks I started to realise that through B-Safe[®] the workgroup could get things improved. On my second day of observing, one of my shift team informed me that ladders had removed insulation from a large valve, leaving their debris behind them. I reported this to the B-Safe Coordinator, normally I would have reported it to my Supervisor who would have had to go through the various departments and red tape to get the area cleaned. The B-Safe Coordinator had the ladders back in 20 minutes and the area was left 'spick and span'. The shift teams were impressed! "Maybe there's something in this B-Safe[®]" a few were heard to say.

As I started my daily observations, I realised that I would have to show a far greater commitment to safety. I could not walk around the plant pointing out to people the error of their ways while still taking short cuts myself!

Over the following weeks I was amazed at the change in my own behaviour. In a way it was just like when wearing seatbelts in your car became law. After a while it became normal just like starting the engine.

You find yourself thinking much more about how you will do a task, not cutting corners and looking for a safe alternative to the short cut !

After you have completed your phase as an observer you find that the good habits stay with you and have become second nature.

B-Safe[®] is controlled and driven by the workgroup, **It's a WINNER !**

Tony Redshaw

Principal Technician

Olefines 6

10/3/98

A View from a Phase 2 Observer

I have seen at first hand, the impact that 'B-Safe[®]' has had on the Olefines Business Area, to improve our overall performance in all aspects of Safety, Health and Environmental issues.

Initially, the whole concept of trying something different, proved wholly unpopular, but as the process and the results it brought with it, started to deliver, people then began sit up and take notice!

It was important to stress that we were the people who would ultimately benefit from working in a safer workplace. Since my involvement in Phase 2, I feel I have become more aware of everything that surrounds me. I look at situations in a different way, assess things differently, and my approach to just being on the plant has been altered in a very significant, but positive manner. As I carry out everyday tasks, I am constantly (probably subconsciously) reminding myself of things I must and must not do! I find myself noticing things (AND DOING SOMETHING ABOUT IT !!) that I may have ignored before. The B-Safe[®] process is designed to change people's behaviour, well I have experienced that, and feel that my behaviour has changed, obviously for the better.

I have been impressed with the results that B-Safe[®] has brought along with it. It may have been a 'hard slog', but B-Safe[®] has now become an established, and maybe more importantly, an accepted part of our everyday activities, and I am sure that, with the same level of commitment, will continue to be as successful.

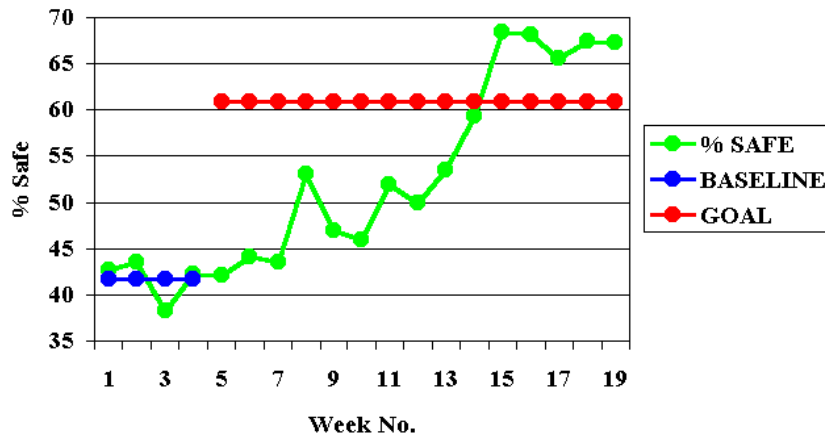
Steve Gell

Principal Technician

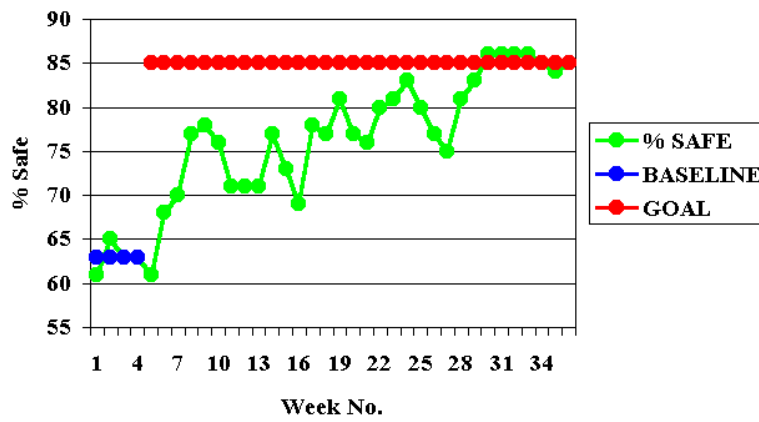
Olefines 6

20/9/98

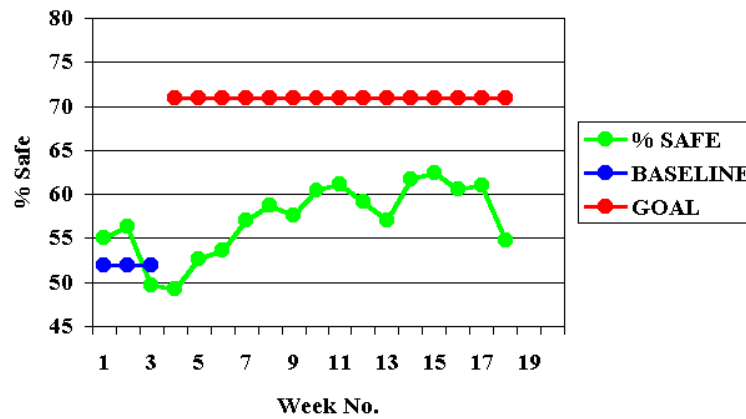
Phase 1 Cracker Results



Shutdown Results



Phase 3 Cracker Results



APPENDIX 2

What's B-Safe® Ever Done For Us

Over the last two years the shift teams were having difficulty in obtaining new wheeldog pouches. B-Safe® found a supplier who modified the pouches to the shift team requirements. Knee-Pads was another problem - getting comfortable and practical ones, the same supplier got what the shift teams wanted. Winny highlighted barrelled oil waste at the J1710's that had been there for 18 months - B-Safe® got it removed! Poor scaffolding access on the J1701 could have led to an injury. This was highlighted by Bri Poulter - B-Safe® had it rectified within 20 minutes.

So ...What's B-Safe® ever done for us ?

Several shifts had difficulty in getting the Fork Lift Truck garage tidied. B-Safe® was approached and it was tidied within two hours. Unsafe scaffold standards on the furnace scaffold stores were highlighted by Ron K on a Friday afternoon. B-Safe® got the unsafe scaffold rectified immediately. A similar occurrence was highlighted to the B-Safe® office by Steve Rowlands on Good Friday afternoon. Dismantled scaffold had been left stored unsafely at a height on E1833 - fixed within two hours thanks to Roly, Watto and the scaffolder who came out. In the past incidents like these would have been left over the weekend. Still on the subject of scaffolding standards, Atko through his shift highlighted several scaffold jobs that were causing problems - which were rectified immediately after the involvement of B-Safe®.

So ...What's B-Safe® ever done for us ?

After years of complaining, pressure through B-Safe® has culminated in the Fork Lift trucks being replaced by hired ones. Another area that was a constant problem that was not getting resolved until B-Safe intervened was the Caustic/Petrinex loading area - this area is now spotless. Bri and Phil removed lagging straps that had been holding open a safety gate. They also removed a scaffolding trailer that was parked in front of Emergency Safety equipment. During B-Safe observations it was noted that safety chain was missing from T.L.X. bottoms and Caustic areas. B-Safe® ordered the chain and had it refitted thereby making the areas safer. East Battery Limit - Nowsco connections were still connected to the plant after start up, B-Safe® brought this to the attention of the Shut-down Management and they were removed immediately.

So ...What's B-Safe® ever done for us ?

All the Observers have made our workplace safer by highlighting problems when carrying out their B-Safe observations. They have identified numerous safety faults which through B-Safe® have been addressed. Here are just a few of them - vibrating pipework on the D1705A was secured properly, openings found on J1701 HP platform were repaired, numerous scaffolding and housekeeping issues have been sorted as well - old joints, nuts and bolts, redundant steelwork, out of compliance hoses, scaffolding gear, oil spills, general rubbish and debris have all been removed from the plant. Thanks also to the other Technicians who have helped rectify some of these faults.

The area used for cleaning the Cooling Water Screens has had a bund placed around it in order to eliminate the hazard of the walkway being covered in mud and stones. A nozzle gun has been fitted to the water hose for better control when cleaning the screens. The J1704/5 Compressor House floor area has had the drain covers fitted flush to eliminate the trip hazard. The Petrinex and Caustic offloading areas have been concreted for safer access and easier cleaning; bund walls have also been fitted to contain any spillage's.

So ...What's B-Safe® ever done for us ?

The C1830A & B I/V's are positioned at ground level with the spindles sticking out at face level. Handrails have been fitted to stop people walking into them. The Furnace lift area was being used as a store which is clearly unsafe. The makings defining the area to be kept clear had faded. These have now been repainted. The pebbled area near the caustic separator has been concreted for safer access to the service points. A concrete path has been completed around F1792 to eliminate the trip hazard.

Numerous scaffolds have been dismantled and removed using the "Scaffold to dismantle" sheets developed by F Shift. The long standing problems around scaffolding are also being addressed. Standards are being reinforced with the contractor and also with the responsible person from ICI who "owns" the job. This should eliminate the problem of numerous scaffolding platforms being left erected when they have been finished with.

So ...What's B-Safe® ever done for us ?

Metal cladding and lagging debris has been removed from the pipe-rack south of the Furnaces after being highlighted by 'Rolly' on an observation. New Kennedy Grating has been fitted on the Superheaters to eliminate a hazard left after redundant linework was removed. Numerous hoses that were out of compliance have been removed from the plant and re-tested. Numerous barrels of waste have been removed from the plant.

Poor housekeeping issues have been dealt with; loose scaffold gear, old joints, nuts and bolts, redundant steelwork, oil spills, rubbish and debris have all been removed.

So ...What's B-Safe® ever done for us ?

After many complaints hose storage stations have been designed with the majority's approval and fitted around the plant where they were requested. Waste Bins have been purchased and fitted around the plant after consultation with the shifts. The air connections on the Driers have been repositioned, after a request by E.E. Fire extinguisher holders near Buta Sub station have been replaced. Fire cladding has been fabricated and fitted to F1731 dump.

For further information on the B-Safe® process, contact BSMS Inc on +1 (317) 736 8980, or visit www.b-safe.net