

“GOOD SAFETY” – A COST TO THE BUSINESS OR A POSITIVE BENEFIT TO THE BOTTOM LINE...?

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World Class Safety Health & Environmental performance is a prerequisite to being allowed to continue to operate in today's ever more stringent legislative climate. On its Polyester/Petrochemical plants in the north east of England AdvanSA recognised the vital link between safety performance, operating standards, world class manufacturing performance and tangible financial benefits to the bottom line – critical for the sustainability of the businesses. Using the principles of the 6 Sigma methodology the BWC Group targeted operational standards and focused on “inputs” rather than “outputs”. As a result its manufacturing improvement journey started to reap real cash and major safety improvements. Unit costs were reduced by 30% over 3 years and the Site achieved a 7 year period without a single day or shift lost due to an injury – a credible achievement in a high risk industry where many take injuries as a way of life.

INTRODUCTION/HISTORY

AdvanSA owned and operated two polyester petrochemical plants on a large integrated manufacturing site on Teesside, North East of England. AdvanSA was owned by the Turkish Sabanci Group, which had a number of joint ventures in a range of industries from cement, clothing, power generation, car assembly, to chemicals. At the time AdvanSA was Europe's largest polyester enterprise producing polyethylene terephthalate (PET), polyester intermediates and polyester fibre/filament in the UK, Germany and Turkey. The Company was fully integrated upstream into PTA (Pure Terephthalic Acid) which is the main raw material for the production of PET and integrated downstream into the production of PET Bottle performs.

The Polyester plants on Teesside were once part of ICI and in the last 10 years the operating teams have had spells under DuPont, Sabanci and Spanish ownership. The various management styles exposed the team on Teesside to a variety of cultures along with the inevitable “multitude of initiatives” that go hand in hand with multi national companies.

HISTORY

Injury performance across the site through the 1990's was much improved over the previous decade but had started to plateau at an average of about 5 lost time injuries per year. New ownership in 1998 brought a very different set of values and behaviours at the top and safety performance started to show the required improvement. The site came down off the plateau and started on the real journey to ZERO.

Ten years ago the concept of Zero serious injuries was seen as a dream that no one really believed possible – yet recently the polyester plants on Teesside achieved over 7 years without a single lost time injury to one of the team and over 4 years without a lost time injury to any contractor or sub-contractor!

At the same time operational performance had been deteriorating through the mid 90's with plant productivity measured in terms of Uptime hovering around the 70%.

Over the years numerous internal and externally led audits had identified what needed to be done to reverse this trend. It was just that the execution had always struggled to deliver since it lacked the Senior leadership commitment which is so integral with the 6 Sigma approach.

Traditionally safety and operational improvement had been treated as two quite separate journeys but the BWC Group, established by the COO to drive improvement, recognised that key elements within the safety programme were identical to those that they were trying to tackle as part of improving financial business performance.

These included:

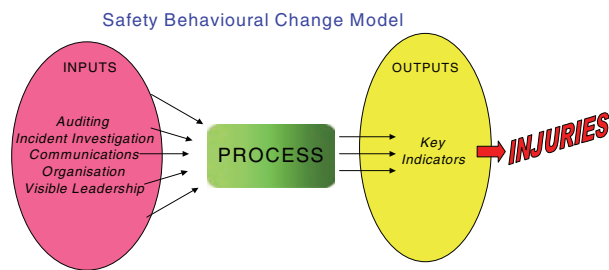
- Standards
- Communications
- Alignment/Focus
- Involvement
- Waste/Quality/Rework
- Root Cause analysis
- Defect Elimination

If they could apply the same focus to production that had already started to show benefits on safety performance could this start to reverse the trend? For a variety of reasons there had always been resistance to operator involvement and standards when it came to things like start-up/critical task/patrol checksheets were poor. However, it was far easier for employees to relate to injuries or to near misses than say quality assurance or waste reduction and of course harder not to embrace changes where a reduction in injuries was the key objective. It was easier to improve involvement from the operators when the topic concerned protective clothing than say agitator gearbox reliability.

In addition the safety and housekeeping elements were very visible. A quick tour round the plant or factory could give an indication of the levels of involvement and the standards set by management. So the team focused on using safety as the mechanism to improve levels of involvement, raise standards and thus start to change behaviours.

CREATING THE FOUNDATION FOR ZERO

The 6 Sigma methodology is a business improvement philosophy that focuses on the inputs rather than outputs. It has been around for about 15 years now having been pioneered by the likes of General Electric, Motorola and Kodak but is typically applied to technical problems where the mathematical tools and masses of data can help prove statistically the links between inputs and outputs. The safety journey is not a technical problem requiring the advanced statistical tools however the team found that the philosophy could help provide focus.



Rather than focus on the injuries, incidents or near misses, which are all outputs, the team worked at identifying the key inputs and on establishing metrics that measure and focus on these inputs.

The framework or foundations are shown below. This shows two enablers – leadership and organisation alignment with “vital” processes at the centre.



Leadership

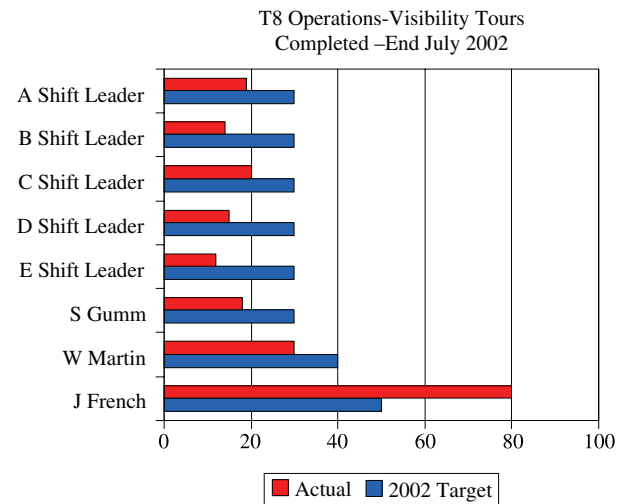
In the mid 90’s the company had embarked upon a journey of “empowerment” but this is now considered to have been misinterpreted or misunderstood locally. The result was a group of Senior Managers who spent very little time out on the plants. They in turn encouraged the Middle Managers to limit the amount of time out on the plant as this was seen as getting in the way of the supervisors.

New ownership in the late 90’s brought a different approach that had a very positive impact on the business from a safety and manufacturing aspect. This approach,

which initially “forced” Senior Managers to spend quality time out on the plants, is now the norm and has been applied to other manufacturing sites with similar success. Visible leadership has been key in turning around the safety and manufacturing performance when coupled with:

- Clarity of goals and expectations
- Demonstrated personal commitment
- Passionate and visible

Rather than a loose commitment to spend more time out on the plants engaging with people clear targets for visibility tours were set and performance widely published. Not performing against the targets because one was “too busy” was no longer accepted and was tackled as part of the performance appraisal system. The E Shift Leader below for example would have had a difficult monthly review session with his senior manager



Organisation Alignment

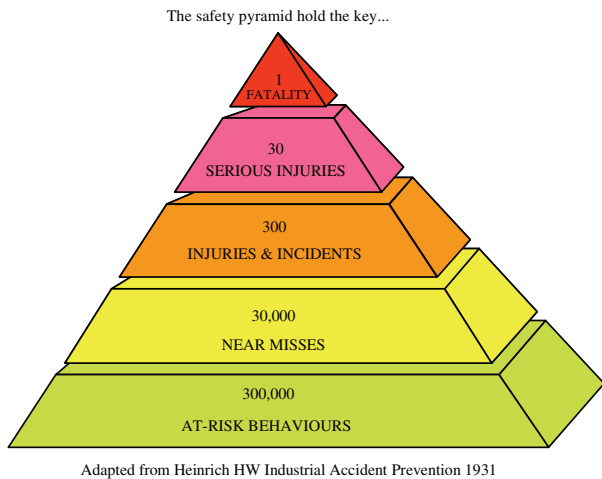
The team saw that it was possible to achieve short term and short-lived change relatively easily with a little more leadership focus but if we want to deliver a sustainable longer term change in behaviours then we must make sure the organisation is geared up for this. We needed to make sure we addressed each of the following for real long-term change:

- Organisation structure
- Roles, responsibilities and accountabilities
- Reward, recognition, promotion and compensation principles

Vital Processes

Heinrichs⁽¹⁾ Safety or Accident Pyramid is well over 70 years old now and though there have been numerous papers arguing about the true shape of the pyramid our experience supports the principle. The base of the pyramid and bottom up approach is where much of the effort needs to go but there is still a need to look at the top of the pyramid and understand the significant risks. Where there is say the potential for a fatality then we cant wait for data

to be collected from all related near misses. Robust Systems and Procedures must be put in place to prevent these very serious incidents. A combination of ‘Top-Down’ and ‘Bottom-Up’ approach is best when we refer to the use of the pyramid.



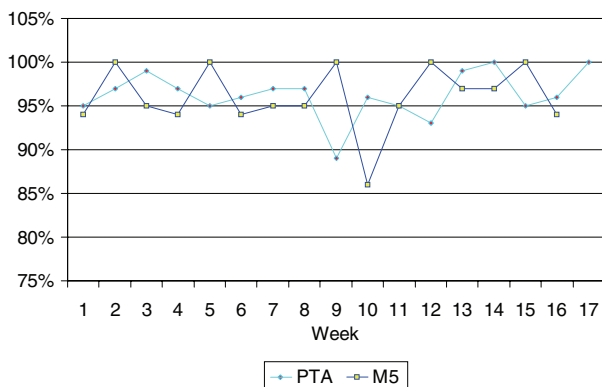
The three vital processes that are focused on identifying and eliminating the ‘at risk’ behaviours are as follows:

- Visibility Tours
- Root cause investigation and Incident management
- Communications

A good example of how we measure the inputs is the data that comes from the Visibility Tours. Blatant ‘at-risk’ behaviours are eliminated very quickly but we also found that if the percentage of people working safely starts to decline then unless something is done to reverse the trend then an injury will occur.

Use Leading Indicators...

Eg : % People Working Safely



THE LINK TO PLANT PERFORMANCE

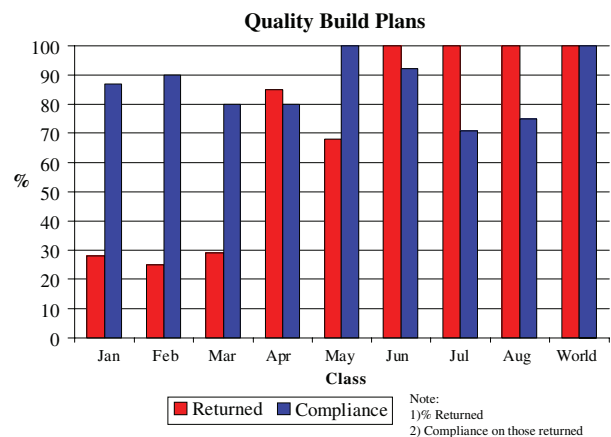
Often when you mention safety and of driving to zero incidents people automatically think of cost. Clearly it depends on the starting point or baseline and yes there may well be some limited expenditure on hardware but all the data

from sources such as HSE shows that 90–95% of injuries/incidents are people related. Spending lots of money is not necessarily the answer. The same applies to plant Uptime or machine efficiency – spending money on new pumps for example will not, on its own improve reliability. If start-up procedures are in place but not used by the operators or quality build plans in place and not followed by the technicians then the pumps will not operate to their best.

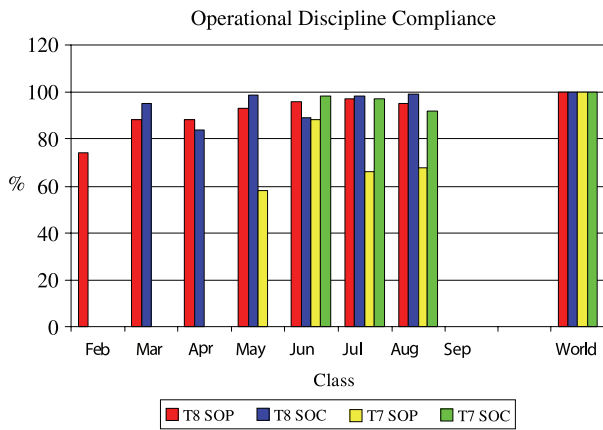
The key is to focus on the people and to raise the standards whether that related to the housekeeping in their area or to their use of check sheets or wearing of the appropriate protective clothing. The two enablers, namely Leadership and Organisation Alignment along with the Vital Processes will make this happen. Where you see an improvement in standards and more involvement from the shop floor this will start to show benefits in operations.

For example – if housekeeping is poor leaking pumps go unnoticed. If as a result oil levels get low then pumps will fail, sometimes catastrophically. However if leaks get noticed and reported very early on the maintenance team can react proactively. This will result in a lower maintenance cost but could prevent lengthy plant downtime, which is normally the really expensive bit. Likewise if start-up procedures and quality build plans are up to date, accurate and followed, then equipment will operate for longer. All this links to improved reliability, higher Uptime and lower unit cost.

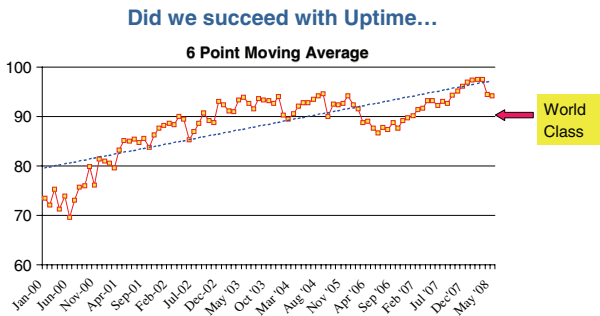
Systems were put in place to monitor compliance of things such as standard operating procedures (SOP’s – designed to ensure the plant was started up correctly, safely and efficiently); Standard Operating Conditions (SOC’s) and Quality Build Plans (QBP’s – designed to ensure machines were overhauled consistently to the correct standards). Examples below:



On the plants at Teesside we did see the impact of the strong focus on safety compliance and operational discipline. The improvement of standards and greater levels of operator involvement did have a knock on effect on the plant performance and Uptime. Clearly this wasn’t a quick fix and it does take time for higher standards to roll through



to higher levels of reliability, less breakdowns and higher Uptimes but the graph below shows how plant performance measured as Uptime % was improved from the low 70's to the 90's over a 24 month period.



CONCLUSION

There are a number of important reasons why we should focus on improving safety and striving for ZERO. We have a moral responsibility that we shouldn't be running plants or factories and hurting people and at the same time there is the whole 'license to operate' issue linked to the legislation. However we have also seen great benefits to the bottom line that come as part of the journey to ZERO.

Focusing on safety alone will not deliver a step change in plant performance but we believe that there is significant evidence from our experiences in the UK and Turkey that shows that good safety is a prerequisite for World Class Manufacturing Performance.

It is difficult for people to argue why they shouldn't get involved in safety improvement or why they don't need to follow the procedures when the consequences could be an injury to themselves or to a colleague. It is also very visible – a quick tour round the plant or factory when people are working will give you a pretty good indication of the culture and the operating standards. If you enter the workshops and all heads quickly turn away but reappear wearing light eye protection, then it is unlikely that compliance to the quality build plans and therefore equipment reliability will be very good. If there is a culture of non-compliance and poor standards then it will be highly unlikely that the Site will have the capability of achieving world class manufacturing performance in terms of unit cost or Uptime.

REFERENCE

1. Heinrich HW Industrial Accident Prevention 1931.