

Where there's a will, there's a way

How the **Bangkok Synthetic Company Ltd** achieved a company-wide revolution in process safety and safety culture with **DuPont Sustainable Solutions**

The Bangkok Synthetic Company Limited (BST) is the largest producer of mixed C4 products, including synthetic rubber, in Southeast Asia. The company operates plants in two sites in Thailand and employs around 700 people. Mindful of the high hazard materials it handles, BST's mission is to ensure "no harm to anyone, any time". Embarking on a program of process safety management improvements in 2013 to make that mission a reality, the company sought to strengthen its capabilities in key areas with the help of external safety and operations management consultancy, DuPont Sustainable Solutions (DSS). DSS was contracted to support BST in the development of critical Process Hazard Analysis (PHA) and Process Safety Information (PSI) skill-sets and systems.

Richard Emerson, Manufacturing Director at BST, says, "We recognized that we needed to work on PHA to improve in the long run. We knew this was a pretty significant skill-set development that was going to require significant resources and wanted to use somebody that we considered to be a real expert, not just in training, but in practice as well. DSS clearly provided that expertise."



BST Operations and Safety Improvement Program Achievements



↓ **50%**

reduction in Restricted Work Cases/Lost Time Injuries from 2016 to 2018



↓ **35%**

reduction in Medical Treatment Cases from 2016 to 2018



↓ **36%**

reduction in First Aid Cases from 2016 to 2018



↓ **36%**

reduction in Unsafe Acts/ Near Miss Cases from 2016 to 2018



↓ **23%**

reduction in incidents related to Operational Discipline from 2016 to 2018



↓ **50%**

reduction in deviations approved per month due to improved operational discipline



↓ **25%**

reduction in the number of work permits being issued due to better planning and improved operational discipline

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FIGURE 1: PROCESS HAZARD ANALYSIS PROGRAM FOR BST

Improving process safety management

BST first asked DSS to focus on building PHA capabilities and develop a thorough PHA program (see figure 1).

Supachai Homdee, Maintenance Manager and PHA project participant, admits, “We knew the technique of carrying out PHA, but did not really understand its function. In the past, everyone at BST was focused on production targets. If anything happened, everyone tried to keep the plant running without interruption. Safety could wait.”

The DSS program set out to change that. After an in-depth examination of existing systems, DSS prioritized high-risk process units based on fire, explosion and chemical exposure index calculations.

“When the top has a very clear commitment, the whole organization starts to move.”

PARAMATE NISAGORNSSEN, MD

In a first step, DSS began training BST in PSI skills, then upgraded common BST PSI/PHA standards and reviewed existing PSI to identify gaps such as data management, which is critical to ensuring risks can be identified and managed effectively. Supachai Homdee, PSI Element Leader explains. “Before, we had a lot of data, but we did not combine it or know what was updated. Now we have a structure, assigned data owners for updating data, and plan to combine data into one single PSI database.”

The next focus was PHA foundation training for a wide group of people, and coaching for sufficient HAZOP/LOPA (Layers of Protection Analysis) facilitators and scribes for each unit to be able to sustain the program.

One of the process engineers who became a HAZOP/LOPA scribe, Tanes Sekekul, reflects on the changes he has seen. “Before we worked on HAZOP with DSS, we didn’t know what the objective of HAZOP reports was. After working with DSS, we examined the causes and how they can have troubling consequences.” Production engineers have also realized that PSI and PHA can help other elements of PSM such as Management of Change (MOC). In addition to HAZOP and consequence analysis, DSS furthermore carried out technical studies

such as a human factor review, which looked at the impact of human behavior on safety at BST, a vapor cloud explosion study to evaluate impact on occupied buildings, and a Layers of Protection Analysis for select sections of three process units to determine if existing protection was adequate. BST management continued the PHA program and has to date implemented more than 200 recommendations to reduce risk from hazardous events through elimination or control. This was a significant commitment in terms of both time, resources and investment, but it paid off.

Additional benefits from the PHA and PSI program Over time, Richard Emerson noticed a change in behavior as a result of the work with DSS. “The attitude and motivation of the team members involved in the PHA implementation program was different. People would stop me at lunchtime and say, ‘we really enjoy this’, or ‘I am learning a lot.’”

That change in behavior began to be noticeable to the rest of the company as well and, along with the overall success of the PHA implementation program, prompted Richard Emerson to think about the impact leadership could have if it engaged the shop floor in cultural transformation.



“ After reviewing PSI with DSS, we obtained useful information which produced benefit beyond safety.”

CHOWARON KIJSAPTAWEE, PHA IMPLEMENTATION PROJECT LEAD

“The best systems in the world fall apart if no-one follows them,” he says. “Our behaviors did not match our systems.” So, BST asked DSS to help the company take a more holistic approach to safety.

The role of values, attitudes and beliefs in safety

Key to changing the safety culture at BST was a clear understanding of the current state in the company, and the development of a vision for the future. DSS used a structured approach to help company management envision the future state it wanted to achieve and then plan the transition. The goal was to move from a mindset focused on compliance to one focused on commitment. BST and DSS therefore carried out a Values Attitudes and Beliefs (VAB) survey of all employees and conducted a five-day safety culture assessment in May 2016 looking at leadership, organization and processes. At the end, DSS organized a “Mirror Gallery Walk” which reflected the status quo in the organization using photos, observations, insights, quotes and points of view. BST managing director Paramate Nisagornsen recalls initial reactions, “People got a wake-up call when they saw the results of the diagnostic assessment. When they heard people in the organization talking about silos, about two cultures in the company, they were shocked. They didn’t see those as issues”. Richard Emerson likens the reaction to the stages of grief: denial, anger and, finally, acceptance. The eye-opener to many in the leadership team was that management wasn’t aligned on the value of safety.

This assessment gave BST insight into the areas that required improvement and helped them to realize the need for a new, integrated approach to safety at leadership level.

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Transforming safety culture

To help BST find its way through a myriad of issues without becoming overwhelmed, DSS took senior management through a leading and managing change course, then trained and individually coached 25 senior managers in four core competencies: the value for safety, my role in safety, engaging others and felt leadership. DSS likewise worked on and implemented operational discipline (OD) on the shop floor.

C4 Operations leader and turnaround manager, Somkiat Boonsaksri, who took part in the coaching and training, has witnessed a marked shift in attitudes and safety behaviors, not only amongst others at BST, but also in himself. "When we did the workshop with site and plant leaders from different functions in the same room, there

“ *Operational Discipline not only improved safety, it improved everything. And it made us do everything differently.* **”**

SUPACHAI HOMDEE, MAINTENANCE MANAGER

were many questions. I saw the journey of the leadership over one, two, three days, then weeks, months. I think other people will feel like me. I now believe safety is the first thing for any activity, not only at work, but at home. I was surprised that we changed like this. DSS was like a catalyst. The environment is now much more supportive of safety.”

A focus on two-way communication

Part of leadership coaching was a new approach to communication. A two-way, questioning style of communication is fundamental to facilitating continuous improvement and applies also to the way in which DSS coaches.

Consequently, the way in which Safety Observation Tours (SOTs) are conducted at BST has changed markedly. Somkiat Boonsaksri says, "Previously, our supervisors conducted SOTs like the police. Workers were scared. Now, SOT is about asking questions and engaging employees to become self-aware and take ownership. If you see a mistake, don't point it out but ask, is that condition ok like that? And the worker might say, perhaps not. Then they may suggest an alternative. That makes them feel good, valued,



encouraged, and supported.” Site leader Wirote Loedsalak has noticed the difference this approach makes. “In the past, everyone had good intentions, but the way we did it did not work. Now, people listen and are open, so we get feedback, good input, and creative new ideas. That allows us to solve problems together.”

This openness to communication, and willingness to listen and solicit suggestions, for example through monthly feedback sessions, helps to cascade BST’s vision for safety and OD through the organization.

The results of a change in commitment to safety

The BST safety culture program embarked on with DSS in 2016 has led to a significant transformation. There is consistent commitment to safety in the company and that shows. Recently, the business wanted to test maximum output capacity for a plant, but an employee questioned the ability of the relief systems to cope with higher feed rates. Management quickly decided not to conduct tests outside the safe zone even though that meant sacrificing potential income. Richard Emerson points out two interesting aspects. “Firstly, in the past, people might not have had the courage to ask that question; secondly, the hard decision not to press into an area that we might have in the past was a very clear example of how our decision-making had changed. That sent a very strong message to the organization.”

Paramate Nisagornsen adds, “For me as MD it should have been a difficult decision because you are talking about foregoing a lot of money – maybe above 10 million US dollars, but nobody doubted what we had to do. I was surprised. Even the other senior managers, the shareholders did not challenge the decision. That mindset, that belief in safety has developed quite fast in this organization. It helped people make good decisions when there were conflicting objectives.”

This shift from a focus solely on production and profit to one that is safety-driven is now prevalent. Recently, a heat exchanger in the C4 production unit needed to be cleaned when it started fouling. It could either be shut down for maintenance or cleaned it while it was still running, drastically increasing the risk of an incident but avoiding the cost of a stoppage in operations. Management immediately decided to shut down.

“ *Every time we work with DSS, they let us do the thinking about what we have to do. As a result of coaching, now when I go to see a job, I have more discussions and ask more questions. We used to start with telling, not with open questions.*”

CHATCHAWAN KHANTHATATBUMROONG, LEADER OF THE BST NB LATEX PRODUCTION SITE

The fact that management visibly backs safety, that two-way communication is encouraged and safety supported is remarked on throughout the BST organization. There is also a much better understanding of the need for safety and the way in which BST wants to approach it.

Have behaviors really altered?

When DSS went back in the fourth quarter of 2017 and conducted the same Values, Attitudes and Beliefs survey among the 25 senior leaders it had trained, there was a noticeable difference. Leadership was more aligned, teamwork was better, senior managers had bonded together and were collaborating more effectively. Not only had technical competencies improved, but capabilities in general had developed and there was a very clear shift in mindset and behaviors. Business leaders displayed greater self-confidence with regard to safety and paid more attention to the social context of risk.

The effect of the work BST did in conjunction with DSS on both process safety management and culture transformation has led to major achievements including a recent five-week turnaround that involved 4,000 contractors which was completed without a single incident. It was the best turnaround result BST has ever experienced with outstanding outcomes both from a timing and safety perspective. It also demonstrated a recognition of the need to delegate authority and responsibility from head office to the site. For many individuals and senior managers, the turnaround marked a turning point in their view of the new BST safety program. It was proof of the theory that good safety is indeed good business.

No harm to anyone, any time

The very first line of BST's vision says, "no harm to anyone is a commitment we all make and model, to reduce the risk of harm." This is a goal echoed by many companies, but one that is often superseded by production targets. In the last four years, BST has changed its focus and discovered that a strong safety culture, role-modelled by senior leadership, coupled with consistent process safety management systems not only improves safety performance, but can also have significant productivity benefits. Since the start of the operations and safety improvement program, BST has cut lost time injuries and restricted work cases by an impressive 50 per cent. Medical treatment cases, first aid cases and unsafe acts are also all down by 35 to 36 per cent.

Despite these achievements, managing director Paramate Nisagornsen says the company still has a way to go. He has a vision for the path forward. "I believe that safety is a never-ending journey. When the top has a very clear commitment, the whole organization starts to move. I make everyone see that I am driving safety," he says.

BST has undergone a tremendous change since 2013 from viewing safety as a purely technical issue to realizing that people are at the crux of any safety effort. Reviewing BST's experience since 2012, Richard Emerson says, "If I step all the way back and look at the journey we've been

on, the thing I am happiest about overall is that we are now talking about behaviors. That was not the case in the past. We now recognize it is all our behaviors we need to change, not just shop floor and contractors, but all the way from the management to the floor level." With everyone in the company pulling in the same direction, BST is justifiably optimistic about future safety achievements. The company is now working with DSS on the integration of SHE in its capital projects in a program due to be completed by 2020.



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WIROTE LOEDSALAK, SITE LEADER

About DuPont Sustainable Solutions

DuPont Sustainable Solutions (DSS), a business unit of DowDuPont Specialty Products, is a leading provider of world-class operations consulting services to help organizations transform and optimize their processes, technologies and capabilities. DSS is committed to improving the safety, productivity and environmental sustainability of organizations around the world. Additional information is available at:

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