

Key lessons from incidents related to procurement

Introduction

The procurement process is a part of the company's corporate strategy and a vital component that helps in ensuring effective supply chain management. The procurement process involves elements such as purchase planning, development of specifications along with supplier research and selection in case of new suppliers and contract administration. When hiring contractors, the tender should specify the required qualifications, adequate knowledge and evidence from the contractor company. Companies need to be intelligent customers when procuring services or equipment that may impact on the control of major accident hazards.

Case 1 – Chemical plant

On January 23, 2010 there was a release of highly toxic phosgene as the hose burst while an operator was inside the phosgene shed performing a routine operation. He was exposed to the phosgene and died in the incident. A braided steel hose connected to a one-ton capacity phosgene tank suddenly ruptured, releasing phosgene into the air.

Key findings

There was an ongoing dispute about the flexible hoses between the site and the corporate experts since 1987. The corporate standard listed acceptable construction materials for flexible hoses and recommended three types of those acceptable for use with phosgene. Corporate experts suggested the use of one of those hoses. However, the facility involved in the accident followed the practice using a flexible hose made of a polytetrafluoroethylene (PTFE) inner core and a braided stainless-steel reinforcement material. Stainless steel was not recommended for phosgene service, as it is susceptible to stress corrosion cracking from chlorides. In fact, extensive corrosion was localised under the area covered by the tape. The permeable PTFE and braided stainless steel of the hoses had provided an ideal environment that caused stress corrosion cracking. Furthermore, phosgene permeation through PTFE had resulted in leaks in the past; however, the Process Hazard Analysis team did not consider this hazard for the phosgene cylinder hoses.

Although questions were raised concerning whether the hoses used were the ideal choice for phosgene transfer, the company had calculated the risk and cost-effectiveness of purchasing replacement hoses to be too high. This occurred even though, as of 2010, the Compressed Gas Association Standards for PTFE-lined hoses stated that the use of "PTFE-lined [hoses] are not suitable for use with poisonous, toxic, or pyrophoric gases because permeation of gas through the PTFE wall creates a potential hazard".

Case 2 – Hydroelectric plant

An incident occurred on October 2 in 2007 in a pumped storage hydroelectric plant, and caused the fatality of five and injured three workers. The fatally injured workers were trapped deep underground during an operation to coat the inside of the tunnel with epoxy using highly flammable solvents. The tunnel was several thousand feet long and connects two reservoirs with electricity-generating turbines.

Key findings

The investigation revealed, that corporate policies regarding contractor selection did not adequately ensure contractor safety performance for the project and that contractor selection methodology did not disqualify contractors with substandard safety records from bidding on the project. After the pre-qualification process, the company reviewed the proposals and in this case the contractor's safety performance was graded as a zero, the lowest possible score. However, contractor disqualification from the bidding process was based upon financial capacity not based on past safety performance. The evaluation rating form stated that the score of zero did not meet minimum requirements and required automatic rejection; nevertheless, the contractor was still allowed to compete for the contract and its proposal was ranked as best based predominantly on its low price. The company's policies addressing contractor selection relied upon self-reporting and did not include specific procedures to verify contractor submissions. While safety records themselves may not be an accurate indicator of contractor performance, it is important to understand the nature of the records and indications that may show.



The ISC believes that leadership across six key functional elements is vital to achieve good process safety outcomes. These elements are:

- systems & procedures
- engineering & design
- assurance
- knowledge & competence
- human factors
- culture

In the *What can I do* section below you can see how each of these elements plays a part.

Figure 1: The ISC Framework

What can I do?	
Management	
● ●	<ul style="list-style-type: none"> Having a solid procurement procedure in place involving elements such as purchase planning, development of specifications along with supplier research and selection in case of new suppliers and contract administration is a good practice.
● ●	<ul style="list-style-type: none"> Ensure that requests for proposals and selection processes include criteria and procedures for prequalifying or disqualifying contractors based on specific safety performance measures and qualifications. Ensure these cover more than simply Lost Time Frequency Rate, as this is a poor indicator for process safety.
● ●	<ul style="list-style-type: none"> Make sure to implement written verification procedures for the safety information and documentation submitted by contractors during the bidding and selection process.
● ●	<ul style="list-style-type: none"> Make sure to develop qualification steps for supplier approval to minimise risk to the plant integrity.
● ● ●	<ul style="list-style-type: none"> It is vital that a proper approval process exists when procurement takes place for new and untried supplier. This should involve company technical experts as well as procurement personnel.
● ● ●	<ul style="list-style-type: none"> Ensure to set up a procedure for contractor selection based on their process safety competence; see evidence of their competence, for example safety policy, qualifications of their staff and training, accident history records and proof of adequate resources.
● ● ●	<ul style="list-style-type: none"> When hiring contractors, the tender should specify the required qualifications, adequate knowledge and evidence from the third party company.
● ● ●	<ul style="list-style-type: none"> Ensure procurement personnel have the right level of process safety awareness and competence to make decisions where the purchase may impact plant integrity.
● ● ●	<ul style="list-style-type: none"> Dialogue between the procurement team/department and process safety engineers is not only beneficial but recommended prior to any modification in the procurement procedure. The engineers have the right level of competency and technical skills to determine what safety critical elements are really critical in the process and must not be altered as a consequence of cost reduction. Make sure that such a two-way communication between these roles is made available in the company.
Process Engineer/Supervisor	
● ● ●	<ul style="list-style-type: none"> Revise the contractor safety policies to require a comprehensive review and evaluation of their safety policies and procedures to ensure that any bidding contractor meets or exceeds company safety requirements.
● ● ●	<ul style="list-style-type: none"> Conduct periodic safety audits of contractor selection and oversight to ensure adherence to corporate contractor procurement and safety policies.
● ●	<ul style="list-style-type: none"> Make sure to provide appropriate information, instruction and supervision covering third party workers on site.
● ●	<ul style="list-style-type: none"> Regularly monitor and assess third party workers' performance and compliance with company procedures. If notice any non-conformities, report it to management.
Operator	
● ●	<ul style="list-style-type: none"> Ensure that you have the skills, knowledge, training and experience to carry out the work associated to you safely.
● ●	<ul style="list-style-type: none"> Ensure you understand the hazards associated with the work you are doing.
● ●	<ul style="list-style-type: none"> If you notice anything that could pose additional risk to your safety or the safety of those around you, report it to the supervisor.