

As Health, Safety and Environmental Issues become more apparent in the Modern Process Plant, what is Preventing Companies from Adopting Burst Detection Systems?

- A focus on how wireless technology will overcome traditional issues

1. Introduction

The last 50 years have seen a complete revolution in risk and hazard management systems and practices. Since the early 70's when Imperial Chemical Industries pioneered Hazard and Operability studies there has been a general consensus to adopt a 'safety culture' in process plants. Safety issues have therefore warranted great attention due to its high significance in the running of these plants. With great investments been made by process plants to ensure their applications operate with limited risk and the addition of many OH&S acts specifying that employers will be found guilty of a breach if the company had a practicable way of identifying a hazard that it did not employ, it is disturbing that there has not been a greater take up of burst detection systems alongside the regular purchase of pressure relief devices.

Pressure relief detection systems act as a simple, practical and very reliable means of highlighting when serious events take place within a process. At first glance in the modern world with environmental concerns, health and safety issues and high downtime costs, the importance of having reliable sensors and detection in place to warn of risk is a necessity.

2. Relevance of Bursting Discs and associated Detection Systems in the modern process plant

Due to their excellent corrosion resistance, negligible leakage and maintenance free designs bursting discs are becoming an obvious and cost effective choice over other types of pressure relief devices. As modern process plants strive towards achieving a 'safety culture' other pressure relief devices such as pressure relief valves represent a significant threat to the goal of zero emissions and plant safety.

As process plants strive to be environmentally aware and increasingly safety conscious it is surprising that the take up of burst detection systems is significantly low. With plant control systems and staff lacking remote indication of a disc burst event process plants could face serious environmental or safety issues consequently leading to high and costly levels of downtime especially with the size of today's modern plant. The unreliability of the older detection systems, coupled with time consuming and expensive wiring has made the downsides of traditional detection systems outweigh the benefits. However, with the introduction of very robust and reliable wireless systems coupled with newer fail-safe detection equipment the barriers to poor take-up of these systems should be have been removed long before now.

3. Poor take up of Bursting Discs in the Industry and Why?

Industry has made significant advances in the development of wireless technology over the past 5-10 years, and unlike traditional sensors, wireless options enable continuous monitoring of

bursting discs using non-invasive sensors. With low installation costs, easy and reliable continuous monitoring a number of benefits can accrue from this technology and will continue to be accrued as further advancements take place.

Because traditional burst detection systems have had a number of downsides the adoption of such technology has been significantly lower than expected across the process industry. Many traditional burst detection systems such as membrane sensors, breakwire or pneumatic switches are invasive to the process and can be either easily damaged or face damage following repeated use. More recent non-invasive burst detection systems based on magnetic field sensing have eliminated a number of the issues caused with the traditional detection systems but still have not been adopted as much as expected. Although modern magnet and read switch sensors require one time installation many believe that it is the initial wiring costs that have caused the poor uptake of this technology. With the wiring of such systems taking several days and costing between £25 and £40 per foot (almost 4 times this for explosion-proof or intrinsically safe wiring), it is not surprising that process plants believe the downsides of such detection systems outweigh the benefits. Fig 1 highlights further the poor uptake of burst detection systems in relation to the general sale of bursting discs

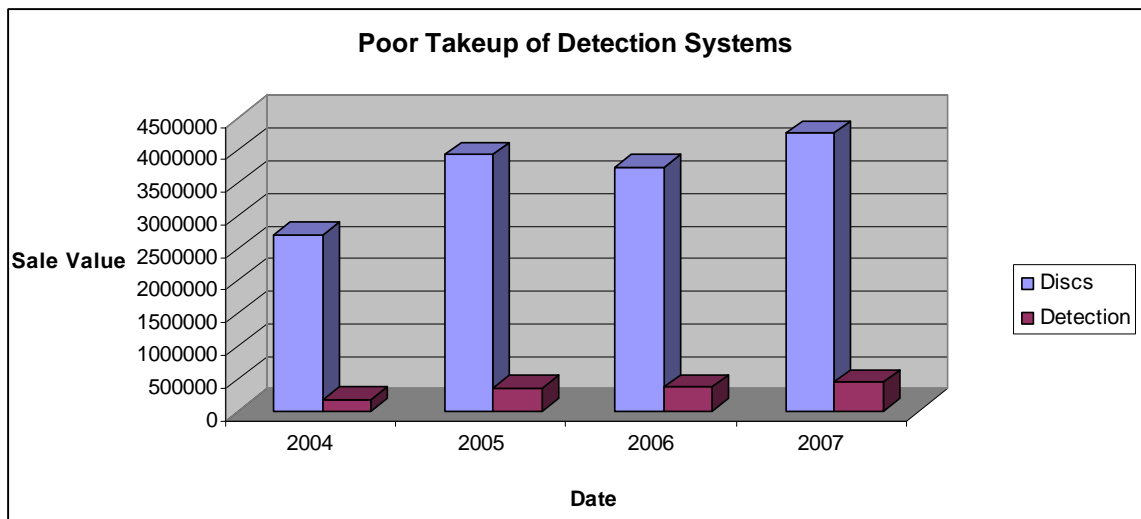


Fig. 1

Modern wireless systems use radio waves instead of physical wires as the communication medium, this eliminates all the historic concerns industry has known with both the traditional type systems and more advanced magnet and read switch detectors.

4. Challenges in Wireless Overcome

With wireless systems having a number of benefits outweighing traditional type sensors why aren't modern process plants more forthcoming in adopting this technology. Fig.2 highlights the key challenges that are preventing the adoption of wireless technology.

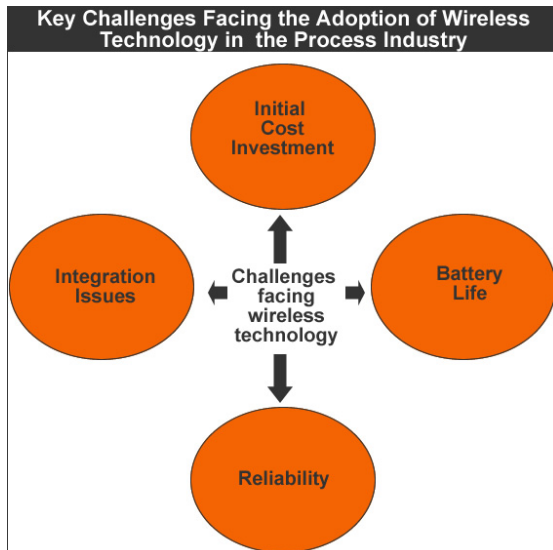


Fig. 2

With modern process plants and industry in general still believing that wireless systems are unreliable, have low battery lives, cause problems with integration and incur a generally high investment cost it is not surprising that suppliers are facing several issues on convincing customers to reap the ongoing benefits of wireless monitoring systems.

The fact that wireless technology is a fairly new phenomenon within the process environment poses a big challenge in the form of end users not readily accepting the technology and there still seems to be a general lack of trust in wireless systems. Due to the critical nature of some of the industries, such as chemical, pharmaceutical and oil and gas, reliability concerns assume very high importance among end users. Most analysts describe the process industry as staying cautious about the large-scale deployment of wireless sensor networks, not least because of concerns over reliability but also because of the perceived lack of standards. Improvements in wireless technology are starting to address these concerns with properly implemented wireless systems being now as secure as many traditional ones, complete with many wireless systems now boasting the additions of web based software monitoring. With the latest wireless burst detection systems being available for use in explosive atmospheres and conforming to the stringent quality standards such concerns are becoming dated. Advancements in wireless technology are making such systems both failsafe and reliable and when used in the process monitoring of pressure relief devices, because the wireless monitoring technology does not affect the operation of the bursting disc even if the radio frequency signal was lost the benefits of the technology strongly outweigh the concerns.

With modern wireless systems boasting battery lives of between 2 and 5 years maintenance schedules are dramatically reduced. And unlike wired systems or plants that have no detection systems in place, the wireless sensors require minimal regular inspection, reducing many costs associated with this process.

There are a number of reasons to chose wireless systems over wired solutions, the most obvious being the installation costs. Estimates vary, but when you start to tally up the upfront costs of wired systems, including installation, start-up as well as the infrastructure to support a typical wired system, the total cost can far exceed the cost of detection itself. Wireless systems, however, have minimal installation costs and are very easily expanded upon and can actually cut installation costs up to 90% by eliminating field wiring. Additionally, wireless instruments are quick to install require minimal maintenance and do not run the risk of having the communication path being affected by corrosion, being cut, burned, shorted or dug up.

The advantages offered by wireless technology are likely to drive wireless device adoption but not before the challenges prevalent in their adoption are overcome, with the perception of integration issues still being common it is important that potential users of wireless technology are confident that signals cannot be affected by other wireless systems or completely lost altogether. With modern wireless systems operating on unique frequency waves and having set data messages concerns over interference should almost be eliminated. And with manufacturers designing their systems with the end users in mind, radio frequency signal boosters are available to ensure wireless technology can function in even the toughest of operating environments.

Customers in the process industry know they need greater visibility of their processes and immediate indication of disc burst events. With wireless monitoring systems offering burst disc indication within 2 seconds a number of benefits could be achieved through implementation of such systems across these plants. With wireless systems being more readily available on today's market combined with increased and stricter H&S regulations wireless technology should be strongly advised.

5. Conclusion

A number of industry reports believe that the market for wireless devices and equipment will grow dramatically over the next 4 years, with the launch of products that comply with industrial standards, reduce integration issues and lessen battery life concerns, such benefits can only support the main drivers to adopt and outweigh the benefits of wired systems. With many modern wireless systems boasting its own monitoring or web based software or SMS alerts there are a range of solutions to meet the customers needs and it seems the benefits of wireless technology can only increase. With the main driving force for wireless process monitoring being the dramatically lower installation costs it is the first step in encouraging the normally change-adverse process industries to use wireless technology wherever they can. And with the ability to easily integrate a reliable and robust detection system into existing plant infrastructure, such systems will allow companies to comply with environmental standards, thus taking a major step in moving closer to the frequently talked about 'safety culture'.

Before any installation involving a wireless system, it is important to perform a site survey to determine if there are any potential radio frequency problems and to gain a better understanding of the plant in which the wireless system will operate. As one of the worlds leading manufacturers of bursting discs and associated detection systems Elfab is actively leading its industry in promoting wireless monitoring systems. With its Radio-Tel system overcoming a number of industry concerns Elfab have a fully robust, easily expandable, ATEX-approved system that will improve process monitoring for a number of plants and industries world wide.

