

The BIG Picture

Emergency Service Managers know that getting detection and protection systems to work properly on a large high-risk industrial site can lead to compromises in safety. With a new generation "Integrated Safety System" (ISS) from Kidde you can at last see and take control of the big picture!

The list of safety systems in use today seems endless: linear heat detection and foam extinguishing systems on floating roof storage tanks; water mist, sprinkler, explosion suppression, and toxic gas detection systems in process areas; gaseous fire suppression and high sensitivity smoke detection systems in control rooms; and smoke detectors, manual call points, and fire alarms in office areas.

INTEGRATED SAFETY SYSTEMS

To take a truly integrated and coherent approach to such a wide variety of safety systems, what you need is an "Integrated Safety System" (ISS). This provides centralised monitoring and control of all the safety systems on-site, which in turn means improved safety and reduced costs (and fewer site walks!).

ISSs have come of age recently due to dramatic advances in the speed with which electronic data can be handled. Today they can do much more than just link up individual safety systems. For example, they now offer remote monitoring with CCTV images to assess the status of an area, enabling safety officers to make judgement calls about deploying personnel and evacuating non-essential staff.



Furthermore, where a fire system is protecting a process area there may be a requirement under alarm conditions to stop the process in advance of potential product loss. Some processes are very dangerous and could either add fuel to the fire or cause a secondary hazard such as an explosion if not shut down properly. An ISS can have a built-in Emergency Shut Down (ESD) system that will carry out a series of routines to ensure a system is shut down safely.

JOINED UP SAFETY

How does a modern ISS work? Well, each safety system located around a site has a number of electrical inputs and outputs (I/O). These are linked directly to a central control panel or "Programmable Logic Controller" (PLC) in an arrangement called "Centralised I/O". More often nowadays, however, the I/O is located locally to the safety systems in junction boxes or "I/O

modules" in an arrangement called "Distributed I/O". These I/O modules are in turn linked to the PLC by a high-speed fibre-optic communication loop, which runs around the entire site.

What happens if a digger accidentally cuts through the communication loop? Believe it or not, it continues to operate! That's because it is "bi-directional", or in other words the signals passing between the I/O module and PLC run in two directions simultaneously. If at any time the communication loop is broken, the I/O module simply sends its data in the opposite direction and continues to communicate with the PLC. Moreover, the signal is sent not just once, but three to five times! This ensures the signal is real and not just a spurious noise blip. All this is possible because the speed of communication using fibre-optic cable is incredibly fast - a mind-boggling 1000 million bits of data per second!

SAFETY INTEGRITY LEVELS

The importance of the reliability of an ISS cannot be overstated. The leading independent approval body for ISSs is the German organisation TUV, which tests them against a standard that uses Safety Integrity Levels, or SILs. These are measures of the safety of a critical control system and are ranked from 1 to 4. The higher the SIL, the greater the impact of a failure. SIL 4 = catastrophic community impact; SIL 3 = employee and community protection; SIL 2 = major property and production protection (possible employee injury); SIL 1 = minor property and production protection.

TUV Requirement Class	Safety Integrity Level (SIL)
-	No safety requirements
1	No special safety requirements
2, 3	1
4	2
5, 6	3
7	4



The type of ISS you need depends on the SIL level of your facility. A “1oo1” (one-out-of-one) or Simplex System uses a single PLC to control the system. A higher SIL rating may require additional reliability measures such as “Modular Redundant Systems” which have various numbers of additional or redundant processors in the PLC. A Dual Modular Redundant (DMR) system employs two isolated parallel processors and extensive diagnostic features integrated into one system. Failure of one processor means there is still another one to continue. Similarly, in a Triple Modular Redundant (TMR) system, failure of one processor allows the other two to decide whether or not the status of the system is correct.

KEEP IT SIMPLE, STUPID!

There are fire equipment companies that supply safety systems, and there are electronics companies that supply Integrated Safety Systems. But there is only one company that supplies both, namely Kidde. The largest independent supplier of fire and safety products in the world, Kidde is uniquely placed to ensure that safety systems from any manufacturer work together as an integrated whole. A single company in control ensures that specifications, lead times, and budgets are met, and a consistent design philosophy further enhances reliability. While Kidde Integrated Safety Systems inevitably get abbreviated to “KISS”, it is perhaps fitting that the same acronym also stands for “Keep It Simple, Stupid!”