Healthy, safe and productive

Marc Slater

The health and safety of employees, contractors, customers and others affected by our activities is a priority and an ongoing commitment for ABB.

In 2004, all business units were required to implement a formal health and safety management system. Training and communications are critical parts of the initiative.

From October 2004 to March 2005, a series of safety leadership workshops were held around the globe for top ABB managers, focusing on the role ABB leadership plays in developing a positive safety culture within the company.

Regional health and safety advisors also attended, and key messages from the workshops are being cascaded down into all ABB businesses during 2005.

Among the key activities being pursued in 2005 is a review of health and safety policy and principles at ABB. This is to ensure these are closely aligned with the current business, with future goals and activities, and that they are fully implemented.

Minimum rules for maximum safety

As a further measure, ABB is continuing to develop and improve minimum rules for high-risk activities like working with electricity and working at height.

ABB's health and safety program is very much about behavior. It's important to have rules, but it's also important to work on changing behavior at work – people need to know what they should and should not be doing on the job.

Part of that process involves the active engagement of managers on the issue of job safety – taking time out to make a safety tour of work areas, asking questions. Managers do not have to be safety experts, but must show interest and concern for safety in the workplace by asking questions and discussing safety issues.

To reinforce the importance of this interaction, one of ABB's key actions in 2005 is safety observational tour training for all senior managers.

Reinforce good behavior

Incidents often occur at work because the behaviors that create the problem are being reinforced – for example, by incentives for productivity, but not for working safely. Managers and supervisors will only change the behaviors of others by demonstrating their commitment to improving safety.

ABB wants to develop a positive health and safety culture, to the point where identifying and preventing unsafe behaviors and conditions is second nature.

Overall, the number of lost-day incidents at ABB decreased in 2004, but every incident is unacceptable, and the company is determined to increase the focus on health and safety.

Unsafe behavior typically happens in two ways – making a mistake, or breaking the rules. Breaking the rules gets a lot of focus after an incident, but the evidence shows about 80 percent of incidents are actually caused by mistakes – doing the wrong thing at the wrong time, or forgetting to follow a series of prescribed steps.

The International Labor Organization estimates that 2.2 million people die from work-related causes every year.

Some mistakes are fatal

Of course everyone makes mistakes, but a mistake working with high voltages or at height will likely be somebody's last. Training and experience alone are not enough to prevent incidents either.

In a successful health and safety program, it is critical to build in safeguards that alleviate any pressure to take short cuts, and prevent a lapse of attention.

Apart from ongoing workshops for senior ABB managers, more training is scheduled at the country level, as well as increased efforts to cascade key safety advice and guidance to where they are most needed through a new regional safety organization.

ABB is committed to improving its health and safety performance in 2005 and beyond with an active, committed health and safety leadership at every level, and by promoting a positive health and safety culture across the Group.

Workplace health and safety that works

In the blink of an eye, an ordinary workplace can turn into an extraordinary tragedy for people on the job. Fortunately, there are ways to prevent this from happening. Workplace health and safety guidelines are the key, and ABB Engineering Services can help.

It is a sobering, nearly invisible statistic: every second of every day, someone working somewhere in the world is injured or killed on the job.

The International Labor Organization (ILO), a UN tripartite agency comprised of governments, employers and unions, estimates that 2.2 million people die from work-related causes every year: 750,000 women and 1,500,000 men.

The dangerous workplace

Accidents are not inevitable – injuries, sickness, mutilations and death on the job don't just happen; they are caused.

Furthermore, the ILO estimates spending as a direct result of occupational illnesses and work accidents (benefits and compensation to victims' families, medical expenses, lost time etc.) equals about four percent of the combined GNP of all countries on earth – an amount in the hundreds of billions of dollars.

Yet safety experts are also convinced that hazardous workplaces can be made safe by learning and observing the appropriate health and safety standards. Workplace injury, illness or death often boils down to an absence

of organizing and planning, usually linked to a lack of training and information.

ABB Engineering Solutions

That is where ABB Engineering Services (formerly Eutech Engineering Solutions Ltd, the engineering consultancy subsidiary of ICI Group) can help, with an array of safety, health and environmental (SHE) management consulting services.

Headquartered in Daresbury, U.K., ABB Engineering Services is a leading provider of engineering consultancy to industries, particularly the chemical, petroleum, and pharmaceutical sectors.

One of the manufacturing and engineering services the group provides is safety management, which includes:

- Effective health and safety management processes.
- HAZOP[1)] and life cycle hazard studies for new projects and existing plants.
- Hazard and Quantified Risk Assessment (QRA).
- Functional safety systems management (IEC 61508).
- Human factor reviews and HSE culture change.
- Workplace safety.
- Fire and explosion safety management.
- Control of major accident hazards (Seveso ll/COMAH) compliance.
- Process safety management (PSM).
- Consequence assessment and gas dispersion.
- Electrostatic hazards.
- Dust explosion hazards.

Managing safety

Allen Ormond, a health, safety and environmental consultancy manager with ABB Engineering Services, says companies must manage safety issues in ways that take into account risk, are linked to business needs, and are cost-effective.

Ormond says a good safety management program incorporates the bedrock interrelations between people, the places where they work and the systems they work with.

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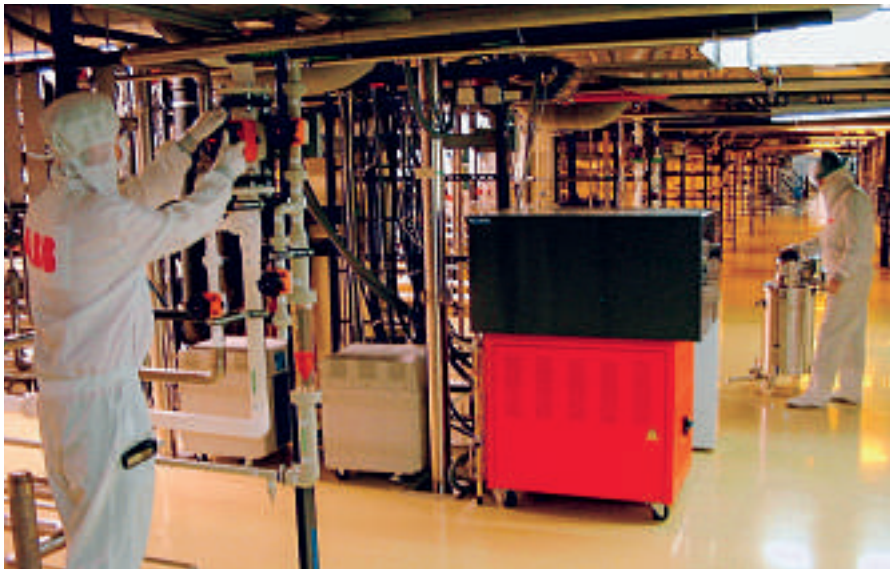
That means plant and equipment, systems and processes must first of all be appropriate to their use. Secondly, they must be properly maintained and updated. Thirdly, employees must be competent to use the equipment and processes, and working within a culture that encourages safe behavior as well as a belief that accidents can be avoided.

Risk management

Risk management is a system that "ensures workplace risk is managed by developing and improving the interrelationships of people, plant and systems."



The key to delivering sustained safety, health and environmental improvements lies in culture change in the workplace, Ormond says. "Without a good safety culture in place, safety initiatives by themselves are unlikely to lead to lasting safety, health and environmental improvements."

ABB Engineering Services uses a three-step approach to manage culture change – diagnosis, to determine the current safety culture and develop a vision; implementation, to define and install the processes needed to bring about the required values, beliefs, behaviors, and SHE performance; and finally, a review of the business performance, as well as corrective action if required to further drive improvements.

Engineering Services offers independent, informed and practical guidance in all areas of risk management, across a range of industries – from basic tools to assess performance and spot potential areas for improvement to a complete, cost-effective SHE solution, including the people, resources, backup and assessments needed to create a total SHE management system.

Safety auditing

Ormond says Engineering Services' well-proven behavioral safety auditing system has won excellent reviews from customers – including ABB, where it has been effectively used at an ABB low voltage switchgear factory employing roughly 150 people in Sunderland, northeast England.

Identifying hazards and unsafe behavior is essential, but involving the workforce is key. Ormond says the approach taken in Sunderland allowed the workforce to select critical behaviors themselves – building commitment to the subsequent audit program and "visible improvement" in terms of workplace safety in the plant.

Another project at M.W. Kellogg Limited – a full service engineering, procurement and construction contractor primarily serving the hydrocarbon market – was to sustain and improve an already exemplary safety record.

ABB Engineering Services initiated a safety survey, and sat down with senior managers to identify areas of improvement, create targets and a plan.

ABB health and safety consultants then used measures such as safety workshops, better auditing procedures and performance management to create measurable improvement in the perceived value of working safely at M. W. Kellogg. In addition, they initiated more effective audits and clear personal goals for safety, linked to the performance review process.

A range of expertise

ABB Engineering Services knowledge of safety systems is bolstered by a broad range of expertise in other areas, including asset assurance, care and performance improvement; business process optimization; capital project management and execution; energy and utilities; engineering design services; environment services and IPPC; manufacturing process optimization; operational plant support; organization and competency development; software solutions; and validation services.

Ormond says the first step to improving SHE in the workplace is a comprehensive assessment of safety management guidelines and audits already in place, in order to determine their effectiveness and suitability.

These findings are then carefully benchmarked against world-class workplace health and safety standards for a comprehensive look at the safety culture of an organization.

"We can then devise and implement an achievable and sustainable program of planned improvements," Ormond says, adding specialist safety support is also available where needed.

Guide to top international safety standards

Cutting-edge consulting services are available for compliance in the full life cycle safety requirements of IEC 61508 and IEC 61511 standards.

"We led the development of and are registered assessors for the IEC 61508 conformity assessment of safety related systems (CASS) scheme, and offer a set of validated safety management software tools for SIL[2)] determination and the maintenance of safety functions."

IEC 61508 is an international standard for achieving functional safety in the workplace, requiring both hazard analysis and risk assessment to ensure that no one is exposed to unacceptable safety risk.

IEC 61511 merges U.S. and European standards of functional safety, and is the internationally recognized code of best practices for implementing automatic safety systems in process industries.

Functional safety

Functional safety depends on a system or equipment operating correctly in response to inputs. An example is a machine with a rotating blade, protected by a hinged cover.

The cover is interlocked and when it's lifted to access to the blade, power to the motor is cut and a brake applied, stopping the blade before it can injure the operator.

Findings are carefully benchmarked against world-class workplace health and safety standards for a comprehensive look at the safety culture of an organization.

A hazard analysis and risk assessment can determine if this is safe enough. How often is the cover lifted? Daily? Once a month? How far should the cover move before the motor brakes? How quickly should the blade stop? What happens on contact? Amputation? Or a bruise?

Answering these and other questions paints a clear picture of the safety function requirements that must be performed for this work, and the degree of certainty necessary that they will be carried out – the safety integrity requirements.

Together, this is the essence of functional safety. In the end, an operator is safe when all the equipment necessary for the safety function is working, which in this example means the interlock, the associated electrical circuit and the motor and braking system.

Predicting safety in complex functions

Safety functions are increasingly performed by complex electrical, electronic or programmable electronic systems, and in practice it is extremely difficult, if not impossible, to predict every possible weak point or potential safety failure.

The challenge is to design the system in such a way as to either prevent dangerous failures or to control them when they arise – from incorrect specifications of the system, hardware or software; omissions in the safety requirements specification (eg, failure to develop all relevant safety functions during different modes of operation); random hardware failure mechanisms; systematic hardware failure mechanisms; software errors; common cause failures; human error; environmental influences (eg, electromagnetic, temperature, mechanical phenomena); supply system voltage disturbances (eg, loss of supply, reduced voltages, reconnection of supply).

IEC 61508 and 61511 standards contain guidelines to minimize these failures, and keep a company's valuable workers safe, and working. These standards and more are discussed in greater detail on page 47 of this issue.

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Footnotes

1) See textbox on page 49.
2) See pages 47–53.