A TECHNICAL PUBLICATION OF ASSE'S CONSULTANTS PRACTICE SPECIALTY

THE Advisor

VOLUME 10 • NUMBER 2

SH&E Professionals Visit China

BY PAM (FERRANTE) WALASKI, CSP, CHMM

A group of 37 delegates traveled to Beijing and Shanghai in early November. While there, we met with several safety-related government organizations and nearly 50 SH&E professional colleagues.

As I write this article, I am sitting on a United Airlines plane en route home from co-leading a delegation of SH&E professionals to China. By all measures, the trip was a tremendous success, and it is certain that the delegation has set the stage for future trips and activities designed to enhance ASSE's global brand as the premier organization for SH&E professionals.

Under the skillful leadership of Chris Patton, our group of 37 delegates traveled to Beijing and Shanghai in early November for 9 days. While there, we met with several safety-related government organizations and nearly 50 SH&E professional colleagues. This article provides only a brief summary of our trip; more will surely follow. Watch for an article in *Professional Safety* and a session at Safety 2011 in Chicago.

The mission's main objective was to develop ongoing professional relationships that would lead to the improvement of workplace processes.

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ADMINISTRATOR'S MESSAGE

Reflections on CPS

At a recent Society meeting, much discussion was held on the upcoming 100-year celebration. Members have been contributing various items, ranging from PPE and fire safety items to pamphlets, forms and booklets. I have a memo from a previous employer which discusses an OSHA conference that was attended in 1973. It provides an interesting perception on how this "new" agency, OSHA, was going to affect business. To see what was thought to be the outcome of the agency and how things really turned out is fascinating. It made me sit back and think. It made me reflect on the past.

WILLIAM R. "BOB" COFFEY

If you think about it, ASSE's 100-year anniversary is about reflection. We are collecting these items, stories, videos and all of the other items from the past and present to help us reflect on where the profession has been and where it is going. We are trying to look beyond just changes in technologies to try and see how the profession has changed in attitudes (both those of SH&E professionals and the perceptions of others), skill sets as well as the profession's impact in general.

I admit all of this reminiscing is not quite my thing. I am not a sentimental person. I deal a lot more in the here and now, trying to work on how to improve for the future. But this reflection has struck a chord with me. We forget that what brought us to the point we are at can help us move past what is holding us in place and can provide clues for our future. So while there is a concentration on looking to the past at a Society level, I am looking toward the past specifically at the Consultants Practice Specialty (CPS) level.

I think back to how I first started with CPS. Linda Tapp and I were both presenting at a regional ASSE conference. She discussed CPS with me and asked me to help with an Insurance Task Force. One thing about CPS that people may not be aware of is our history of volunteerism. Of course, the Society is made up of volunteers, but you would be amazed at how hard it is for some practice specialties to get their members to step up and actually help out. I remember past administrator's messages in which I have written about how CPS Advisory Committee members are always ready to lend their time when needed. I remember that our Advisory Committee is one of the most established, with members who have been a part of CPS for years, who tirelessly and quietly use their time to keep CPS running.

I am also reminded of the efforts made to have consultants recognized in the Society for all of the work and resources they bring to our profession and our association. I am reminded of the numerous times ASSE members have reached out to me, Advisory Committee members or staff for help on consulting issues or advice on how to become a consultant and how the help and advice were provided. CPS may not have a 100-year history, but it has its own rich history, and we should be proud of what we have done.

As always, my thoughts turn to the future, but with the perspective my reflection provides, it is a hopeful future. We have a strong Advisory Committee. If we continue to provide outlets and opportunities for our members to work with various projects and committees, our Advisory Committee will stay strong and grow. We have made inroads on changing the perception of consultants and have highlighted the benefits that consultants have brought to ASSE. This should be easy in that we just ask our members to continue highlighting their Society activities as well as their volunteer service outside of the Society. We have aided consultants and have tried to portray an accurate picture of what being a consultant is.

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THE Advisor

CONSULTANTS PRACTICE SPECIALTY

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By Debby Shewitz, CSP

Marketing Opportunities for CPS Members

At least once per year, we include a blurb in *The Advisor* discussing the Consultants Practice Specialty (CPS) Advisory Committee's efforts to offer more assistance to CPS members in terms of marketing/advertising support. We know from years of membership surveys that business-related concerns, as opposed to technical SH&E information, are the issues where members seek the most help. We are working hard on a new generation of the ASSE-sponsored Consultants Directory, trying to take advantage of new technology, which of course changes faster than we can even evaluate it. We hope to make an announcement about the new service relatively early in 2011.

In the meantime, the Advisory Committee would like to let you know about a relatively new website called Simplified Safety that offers free listings for SH&E consultants. Midway down the page you will see options to "Join the Network" and a "Get Me Started" button. Just click on the button and follow the directions to create your listing. In addition to a searchable directory of SH&E consultants, the site has sections for many different safety forums and a safety blog.

ASSE does not endorse any outside services, and that applies here, too. However, Simplified Safety has put much effort into developing a relationship with ASSE overall and with CPS in particular. The firm had a booth at Safety 2010, and Chris Pollock of Simplified Safety wrote the article, "Making Your Presence Known: A Guide to Marketing Yourself on the Internet" for the previous issue of *The Advisor.* Many CPS members (including Advisory Committee members) are already listed on

the site, so we feel comfortable informing other members that this opportunity is available, especially since it is free.

The CPS Advisory Committee strongly believes that networking, both in technical SH&E information and in sharing tips for managing a consulting business, is the greatest benefit of CPS membership. We know a lot of informal networking goes on all the time, and we are always looking for ways to share good information with as many members as possible. As always, we encourage members to submit suggestions, comments and ideas to any of the officers listed on page 2.

Debby Shewitz, CSP, *has been a member of the Consultants Practice Specialty Advisory Committee since 2003 and currently serves as* The Advisor *editor. She is the principal of Shewitz Consulting LLC in Cleveland, OH.*

Register for Safety 2011!

Registration for ASSE's annual Professional Development Conference & Exposition is now open.

ASSE will commemorate its 100-year anniversary in 2011. The Society's 100th-year theme is "Your Safety Is Our Business. Your Future Is Our Mission." For the 2011 conference, the Society will deliver a technical program that reflects the breadth and depth of the profession and addresses the professional development needs of SH&E professionals.

For more information, visit http://www.safety2011.org.

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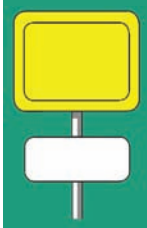

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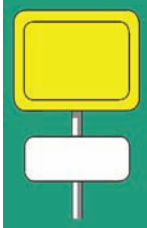

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A S S E

By Carol J. Robinson, CSP, CIH

Final OSHA Cranes & Derricks Standard

On Aug. 9, 2010, OSHA published its long-awaited final rule on Crane and Derricks in Construction (29 CFR Part 1926 Subpart CC). According to OSHA, the rule's purpose is to "address key hazards related to cranes and derricks on construction worksites, including the four main causes of worker death and injury: electrocution, crushed by parts of the equipment, struck-by the equipment/load, and falls." Equipment covered by the rule includes "power-operated equipment, when used in construction, that can hoist, lower and horizontally move a suspended load." Certain equipment is excluded from the standard, such as power shovels, excavators and backhoes, and other equipment is covered with limited exclusions applying to knuckle-boom truck cranes. Forklifts are covered by the final rule when they are configured like a crane.

Most provisions of the rule went into effect Nov. 6, 2010, with some to be phased in over the next 4 years. State plan states will be expected to adopt an "at least as effective" standard or to amend their existing standard within 6 months.

This article is not intended to provide comprehensive details about the new regulations that would be appropriate for those in the construction industry who regularly operate cranes and derricks. However, employers in general industry might need to understand the basic requirements of the new standard, and this article provides an overview of the key points.

Who Is Covered Under the New Regulation

General industry crane and derrick operations are governed by a separate set of rules found at 29 CFR Part 1910, Subpart N. However, businesses usually regarded as being in general industry may, in fact, be covered by the new regulation.

•An organization covered by the general industry standard may perform construction work. Construction work is defined in OSHA's existing regulations as work ". . . for construction, alteration and/or repair, including painting and decorating." It is possible for projects conducted by the maintenance or facilities department of a general industry employer to cross over and be covered by the construction regulations.

•An organization could become the "controlling entity," which is defined by the new rule as "the employer that is a prime contractor, general contractor, construction manager or any other legal entity, which has the overall responsibility for the construction of the project—its planning, quality and completion."

Significant Requirements of the New Standard

The rule establishes comprehensive new requirements for the following:

•assessment of ground conditions;
•assembly/disassembly;
•work conducted near power lines;
•qualification of operators, riggers and signal persons;
•inspections;
•operations.

In addition, it emphasizes the use of synthetic slings during assembly and disassembly, and employers must comply with the manufacturer's recommendations along with certain other requirements (e.g., for padding).

As part of ground conditions assessment, the controlling entity must inform the equipment user and operator of all known underground hazards, including those that may be in writing at locations other than the worksite.

During assembly and disassembly, the employer must follow the manufacturer's procedures and prohibitions. A provision states that the employer may substitute his or her own procedures if it can be demonstrated that they meet all of the OSHA standard's requirements. Assembly/disassembly must be conducted by a qualified rigger if any workers will be within the fall zone.

There must also be a designated "Assembly/Disassembly (A/D) director," who meets the OSHA definitions of both a "qualified person" and a "competent person." The A/D director role may be filled by either one person who meets both criteria or by two separate people.

If it is possible for workers to get within 20 ft of power lines, the employer has three options:

1) have the equipment deenergized and grounded;

2) have a planning meeting and delineate the 20-ft clearance zone in a specified way (including both passive and active demarcations, such as alarms, spotters, range limiters, or warning links); or

3) obtain the voltage of the power line from the utility company and follow Table A to determine minimum clearance distances.

If it is not feasible to maintain the specified minimum clearances or to deenergize the line, the employer and power line owner must plan together to meet specified alternative requirements.

Equipment operators must be trained to recognize and avoid hazards and must understand the training. Training may be oral or written, and must be in a language the employee understands. Operator qualification/certification can be achieved through one of four options (Table 1).

Operators are required to obtain state or local licenses immediately if they are working in a state or locality that has operator licensing requirements meeting Subpart CC's requirements. Between Nov. 8, 2010, and Nov. 10, 2014, employers must have ensured that operators are competent to operate the equipment safely and are trained and evaluated on that training before operating the equipment. By Nov. 10, 2014, all operators must be certified. Employers must pay the cost of certification for their operators who are not currently certified or qualified.

While the standard does not require that riggers be certified, riggers must be qualified persons for the performance of specified hoisting activities, such as during assembly/disassembly work and those that require employees to be in the fall zone to handle a load. The rigger would be considered qualified through possession of a recognized degree, training, knowledge or professional standing.

A signal person is required when the point of operation is not in full view of the operator, the operator's view of direction of travel is obstructed or other similar site-specific concerns exist. Signal persons need not be certified. However, a signal person's employer must ensure that the signal person is qualified (by means including written/oral and practical tests) by a qualified evaluator, who may be a third party or an employee of the signal person's employer.

Inspections must be conducted in accordance with the criteria in Table 2.

Operations must follow the manufacturer's procedures. If the manufacturer's procedures are not available, operations procedures must be developed by a qualified person and those relating to the capacity of the equipment must be developed by a registered professional engineer who is familiar with the equipment. Operators cannot be engaged in activities that distract their attention while operating the equipment (e.g., no cellular phone use is allowed unless it is used for signaling).

Table 1 Options for Achieving Operator Qualification/Certification

Type	Transferable	Valid
An accredited testing organization	Yes	5 years
An audited employer program	No	5 years
U.S. military	No*	Set by issuing entity
State or local license	No, valid only in jurisdiction	Set by issuing entity, not greater than 5 years

*Subject to state and local requirements and whether or not the military/state training meets accredited requirements.

Table 2 Criteria for Inspections

Type of Inspection	Who Inspects
Modified or repaired/adjusted equipment	Qualified person
Post-assembly to ensure the manufacturer's requirements are met	Qualified person (in conjunction with a registered professional engineer if the manufacturer's requirements are not available)
Shift	Competent person
Monthly	Competent person
Annual	Qualified person

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By Norm Keith

Legal Services Branch

In the Administrator's Message in the last issue of *The Advisor,* Bob Coffey provided an introduction to the new Legal Services Branch of the Consultants Practice Specialty (CPS). As branch chair, I would like to take this opportunity to personally invite everyone to join the new branch, given that it is free with membership in CPS. I hope you enjoy this new ASSE initiative, which has been in the works for several years, to help SH&E consultants, their legal advisors, staff SH&E professionals and their in-house and outside legal counsel in a plethora of issues and interactions in the SH&E profession.

Legal risks in SH&E are ever-present for American, Canadian and international corporations. ASSE members are called upon to not only be aware of legal requirements, but also to answer the question of how to comply with legal requirements. As part of CPS, the Legal Services Branch will provide resources, referrals, connections, information, advice and interactive services for consultants seeking legal expertise as well as for lawyers seeking the expertise of SH&E consultants.

Having recently completed my Masters of Law on the subject of the constitutional rights of corporations that may be charged with SH&E offenses, I was struck by the complexity and diversity of legal issues that advisors, both at a consultancy and legal level, to corporations must face in dealing with SH&E enforcement and prosecution activities. Regulators in the SH&E and workers' compensation areas also need assistance on how effective or ineffective legal standards and their enforcement are in achieving the ultimate goals of a better and safer workplace and a healthier and safer world.

The Legal Services Branch is intended to provide a forum for information sharing, discussion, debate and exchange of contacts for exactly that purpose. It has a LinkedIn page and a Facebook site. I truly hope that the development of the branch will dramatically increase the number of lawyers in the U.S. and internationally who will be aware of and will take advantage of ASSE membership and CPS. The Legal Services Branch is intended to assist both lawyers who are ASSE members and those who would consider joining to interact with consultants, staff SH&E professionals and technical experts who advise in the SH&E area of organizational operations.

I invite and welcome comment, referral of memberships and other inquiries directly and through the ASSE to get the branch off the ground, up and running, and serving ASSE members most efficiently and effectively.

Please feel free to contact me directly at (866) 862-5787, ext. 85699, or norm.keith@gowlings.com.

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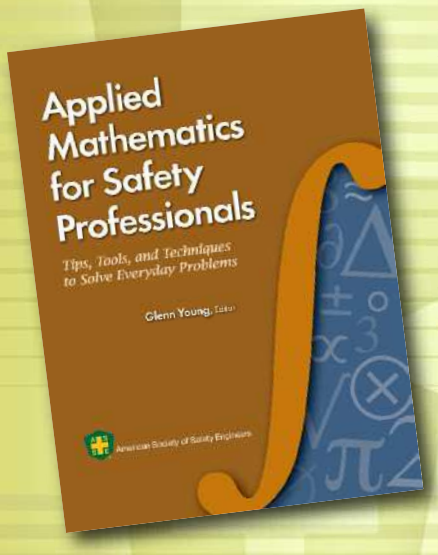

Glenn Young, Editor

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By Curt Johnson, CPEA, &
Russell Boesch, CPEA, CHMM

OSHA, Fire Code Amendments, Welding Carts & More

In the last issue of *The Advisor*, we presented a broad picture of the various fire codes and the intersection with safety issues that safety consultants ought to have within their body of knowledge, or at least have a basic understanding. As discussed in the last issue, the major fire codes in use in the U.S. (International Fire Code (IFC) and NFPA-1 Fire Code) are updated on a three-year cycle to remain relevant with respect to new developments and developing technology (to find out which fire code applies in your jurisdiction, consult state regulations, local regulations or building codes or a state/local fire marshal's office). This article addresses a few specifics from recent amendments to IFC 2009 and NFPA-1FC 2009 that you may find useful in your practice.

In Use vs. In Storage

Fire codes have extensive information about proper segregation of incompatible hazardous materials, and if you have ever worked with a client on this issue, you have probably run into the question of whether the cylinders of oxygen and acetylene used in welding need to be separated. These two gases certainly meet the definition of incompatible materials, but do applicable standards and codes really intend to regulate commonly used containerized materials on a welding cart? From OSHA's standpoint, the question of when cylinders of incompatible gases need to be separated comes down to whether the cylinders are in use or in storage. If in storage, cylinders of oxygen and acetylene must be separated by at least 20 ft or by a noncombustible barrier at least 5 ft high (see 29 CFR 1910.253(b)(2) and (4) and 29 CFR 1926(a)(10)).

When are cylinders in use and when are they in storage? Many people take the easy way out and ignore the issue. After all, industrial settings and construction sites can have numerous welding carts, and if you bring up the segregation issue, you will likely get the "Are you serious?" look, and there are often much bigger fish to fry. Consider that in July 2010, the U.S. Chemical Safety Board (CSB) noted that 15 serious hot work-related incidents had occurred in the first six months of 2010, resulting in 6 deaths. How these particular fires or explosions started could be a result of any number of things, but once any fire starts, you would certainly like it to involve as little compressed gas as possible.

OSHA has wrestled for years with when to call cylinders of welding gases in-use and when to consider them in storage and has produced a handful of guidance letters. OSHA has also considered whether it really wants to spend any time enforcing this question and said that the agency would consider storage of a single cylinder of oxygen and a single cylinder of welding gas (like acetylene) on a welding cart to be a de minimis violation. Some other conditions must be met such as the caps on the cylinders, the cart on a firm, level surface and not located where the cylinders are likely to be struck or damaged.

At construction sites, where the risk of changing conditions and

movement of vehicles, equipment and materials is increased, OSHA added another condition. If the prior conditions are met and it is likely that welding will occur within 24 hours, storage of cylinders on a welding cart would be considered, at worst, a de minimis violation.

Welding Carts

OSHA's guidance talks about single cylinders of oxygen and fuel gas on a single welding cart, and the fire codes agree with OSHA concerning the single welding cart. However, OSHA is silent about the possibility of multiple welding carts, while the 2009 amendments to IFC view multiple welding carts as a concern. Under IFC 2605.2.1, single cylinders of oxygen and single cylinders of welding gases can be left on the same cart, but such welding carts must be properly separated if the cylinders will be left in place on multiple carts.

IFC will not help you with the "Seriously?" look concerning welding carts (refer to CSB for why it is a real risk), but it provides specifics for dealing with an issue found in many organizations.

Combustible Dust

OSHA has also been wrestling with whether and how to proceed with regulating combustible dust. NFPA has already established requirements for combustible dust and even issued amendments to NFPA-1FC: 40 in 2009. Included in the amendments are requirements for:

- establishing regular cleaning frequencies for walls, floors, equipment, ducts, pipes, etc., and use of cleaning methods that minimize dust cloud generation;
- controlling ignition sources, bonding and grounding for conductive components and using powered industrial trucks approved for the electrical classification of the area;
- operating plans and emergency plans that must be reviewed annually and as required by process changes;
- initial and refresher training for employees that work in combustible dust environments; and
- annual certification by employers that training was conducted and that operating and emergency plans were reviewed.

Furthermore, both IFC 2009 and NFPA-1FC 2009 amended requirements for stationary storage batteries, such as those supplying emergency uninterruptible backup power to computer and communications systems. IFC in Section 608 and NFPA-1FC Chapter 52 reflect advances in battery systems and increased use of gels and lithium metal polymer batteries.

Lockdowns

IFC 2009 amended its Emergency Planning and Preparedness Chapter 4 by adding obligations concerning lockdowns. Lockdown procedures have become appropriate additions to many emergency plans in schools and other places of public gatherings due to threats of violence or terrorism. Lockdown is another name for some shelter-in-place strategies during chemical releases. While IFC 404.3.3 does not establish an obligation for lockdown procedures, it describes what must be part of lockdown procedures when lockdown is incorporated into facility emergency procedures.

When part of a facility emergency plan, the local fire code official must approve the lockdown procedures, and the procedures must include:

- employee training and a set frequency for conducting lockdown drills;
- distinctive signals for going into lockdown and for returning to normal activity;
- instructions for reporting a lockdown emergency to local officials;
- procedures to properly account for occupants who are in lockdown; and
- means of two-way communication between a central location and each secure area.

IFC also addresses fire safety concerns for emerging transportation technologies in its 2009 amendments to its Flammable Gases Chapter 35. IFC establishes requirements for storage and use of flammable cryogenic gases, such as might be used at fueling stations for hydrogen-powered cars. Requirements for metal hydride storage systems, such as are used in hydrogen fuel cells, were also published in IFC 2009.

Conclusion

The changes published in IFC 2009 and NFPA-1FC 2009 demonstrate the ability of standards bodies to act more quickly than OSHA to new understandings of existing risks and new risks presented by technological developments. While some of the fire code amendments are mirrored in OSHA regulations, some provide additional meaningful details, while others establish the first specific requirements for safety and fire prevention. All are worth considering in your practice. ✪

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By Bernadette Lindquist

Globally Harmonized System of Classification & Labeling of Chemicals

In a world of extensive global trading, it has long been recognized that a need exists for communicating chemical hazard information in a consistent way to people who use many different written and spoken languages. It was recognized that a common approach for classifying and communicating chemical hazards would serve as the foundation for effective national chemical hazard communication programs.

To that end, an international mandate for development of a harmonized system for the classification and labeling of chemicals was adopted at the United Nations (UN) Conference on the Environment and Development, the Earth Summit, held in Brazil in 1992. The system, GHS, was to include a coherent approach to defining and classifying hazards of chemicals and a method for communicating such information on labels and in safety data sheets, including easily understandable symbols.

In 2002, a UN committee of experts approved the first version of GHS (the Purple Book), and GHS has been available for implementation since 2003. The UN's had hoped that GHS would be fully operational by 2008.

In developing GHS, the working committees drew upon the best aspects of the major existing hazard classification/communication systems. These included the UN transport recommendations, the European Union directives on substances and preparations, the Canadian workplace system (Workplace Hazardous Materials Information System), the OSHA workplace regulation (HazCom Standard), and U.S. and Canadian requirements for consumer products and pesticides. GHS has been revised biennially, most recently with the publication of the third revised edition in 2009.

The term *chemical* in GHS is used broadly to include chemical and chemical products, both as individual chemicals and as mixtures. All hazardous chemicals are covered, although GHS may not be applicable at all stages of a chemical's lifecycle. For example, GHS does not apply at the point of intentional intake of pharmaceuticals, food additives, cosmetics and pesticide residues in food. However, these groups would be covered where workers could be exposed or where exposure could occur during transport.

Chemical Classification

GHS includes schemes for classifying chemicals with respect to physical, health and environmental hazards, as well as methods for classifying mixtures. Under GHS, chemicals are classified with respect to various hazard endpoints, known as hazard classes. For example, physical hazard classification incorporates criteria for classifying chemicals with respect to explosivity, flammability and reactivity.

In addition, chemicals are classified according to whether they may present health hazards. These hazards include skin and eye irritation or corrosivity, acute and chronic toxicity (from short- and long-term exposure, respectively); ability to induce an allergic reaction; and potential to cause cancer or developmental effects and others. A scheme is also provided for classifying chemicals with respect to short- and long-term effects on the environment. These are currently limited to hazardous effects on the aquatic environment and to the ozone layer.

Within each of the physical, health and environmental hazard classes are one to seven hazard categories into which a chemical may be classified. Classification in a given category is based on whether the chemical meets the classification criteria associated with that category. Classification is based on available data for the chemical. GHS itself does not require testing; in classifying mixtures, GHS may, under some circumstances, allow use of data from similar mixtures and data from components in a mixture.

Within each hazard class, the hazard categories can be viewed as the building blocks of GHS. GHS incorporates a building block approach through which a regulatory scheme can be developed by a competent authority based on the needs of the target audience for that information. In understanding the building block approach, consider, for example, the transportation sector. This sector focuses on classification and labeling elements for acute and physical hazards only and does not currently classify with respect to chronic hazards. Thus, the transportation authorities have not adopted the building blocks related to chronic hazards. Similarly, OSHA has not proposed adopting the environmental classification and labeling building blocks since OSHA's focus is the workplace and it does not regulate with respect to adverse effects on the environment.

Another aspect of the building block approach is the option to not adopt all categories within a given hazard class. That is, a regulatory authority may choose to regulate some, but not all, of the hazard categories within a class. The most severe hazard category within a class must be adopted if that class is regulated by a given authority. For example, if flammable liquids are regulated, Category 1 (the most severe classification) must be adopted. The remaining adopted categories must form an unbroken sequence. Specific criteria are used to define the hazard categories, for example:

Flammable liquids classification criteria:

•Category 1: Flash point < 23ºC and initial boiling point ≤35 ºC;

•Category 2: Flash point <23ºC and initial boiling point >35 ºC;

•Category 3: Flash point ≥23 ºC and ≤60 ºC;

•Category 4: Flash point >60ºC and ≤93 ºC.

Certain regulatory authorities, including the European Commission, have chosen not to adopt Category 4 for flammable liquids. Thus, the building block approach will result in certain chemicals being regulated as flammable liquids (Category 4) in some, but not all, countries/regions.

Hazard Communication

Use of GHS worldwide will minimize differences, not only in the way chemicals are classified around the globe, but also in the way that chemical hazards are communicated. The UN's ultimate goal is that use of a consistent and easily understandable hazard communication scheme will enhance protection of human health and the environment.

The harmonized hazard communication approach provided in GHS includes standardized pictograms, signal words, hazard statements and precautionary statements. Each hazard category (e.g., Categories 1 to 4 for flammable liquids) within a given hazard class (e.g., flammable liquids) associates with standardized labeling elements: pictograms, if applicable; signal words; and hazard phrases (Figure 1). Based on the needs of the target audience and the needs of the competent authority, each competent authority will determine which GHS hazard communication elements will be incorporated and how those elements will be applied within its own regulatory scheme.

Standardized Labeling Elements

GHS pictograms are composed of black symbols on a white background with a red diamond frame. Within GHS implementation, competent authorities are given freedom to allow black borders for domestic shipments. Of the nine GHS symbols, seven are standard symbols used in the UN recommendations on the Transport of Dangerous Goods, Model Regulations. Two new health symbols are introduced in GHS: the exclamation mark and health hazard symbols (Figure 2).

The exclamation mark is used for less severe adverse health effects that may result from short-term exposure (e.g., eye or skin irritation) while the health hazard symbol is used for more severe effects, such as respiratory sensitization, aspiration hazard and hazards resulting from chronic exposure (e.g., reproductive toxicity and carcinogenicity).

Two signal words are used in GHS to alert users of potential hazards: danger and warning. Danger is used for the more severe and warning for the less severe hazard categories.

Figure 1
Categories for Flammable Liquids

Hazard Class	FLAMMABLE LIQUIDS			
Hazard Category	Category 1	Category 2	Category 3	Category 4
Pictogram				*No pictogram*
Signal Word	Danger	Danger	Warning	Warning
Hazard phrase	Extremely flammable liquid and vapor	Highly flammable liquid and vapor	Flammable liquid and vapor	Combustible liquid
GHS Criteria	FP <=23C and BP <=35C	FP <=23C and BP >35C	FP >23C and <=60C	FP>60C and <=93C

Figure 2 Exclamation Mark & Health Hazard Symbols

Standardized hazard phrases (codified in GHS as H phrases) are used to describe the hazards, and where appropriate, the degree of hazard severity. Standardized precautionary phrases (P phrases) are used to describe recommended measures to be taken for minimization or prevention of adverse effects resulting from exposure to and from improper storage and handling of hazardous chemicals. Precautionary phrases include: 1) general information (e.g., recommendations to read the product label before use); 2) preventive information (e.g., special handling instructions); 3) response information (e.g., first-aid measures and instructions in case of a spill or fire involving the chemical); 4) storage recommendations; and 5) information on disposal of the chemical. While standardized hazard phrases associated with GHS categories should not be subject to variation, precautionary phrases are not fully harmonized and require more professional judgment in assigning these to chemical products. More work in the standardization of P phrases is anticipated in future editions of GHS.

Global Implementation of GHS

Since GHS became available for implementation in 2003, multiple countries/regions have adopted this classification and labeling approach into their national legislation. Some have adopted a phased-in approach (e.g., the European Union requires reclassification and relabeling of

"substances" by Dec. 1, 2010, and "mixtures" by June 1, 2015). Others have provided a single deadline applicable to all products (e.g., China with a date of May 1, 2010, for entry into force with a grace period for compliance ending May 1, 2011). Many countries are in various stages of GHS adoption, from conducting impact and cost-benefit analysis to drafting/proposing new national regulations.

In the U.S., the Department of Transportation has aligned its classification criteria with GHS, while OSHA has proposed modification of its Hazard Communication Standard to align with GHS. OSHA issued a proposed notice of rulemaking in September 2009.

Conclusion

GHS is bringing global change in the way chemical hazards are classified and communicated. Proper assessment of chemical hazards and presentation of hazard information clearly and consistently across all sectors and in all parts of the globe are expected to contribute to safer use, transport and disposal of chemicals. The UN hopes that global implementation of GHS will ultimately lead to enhanced protection of human health and the environment.

Bernadette Lindquist *is a board-certified toxicologist who has worked in the areas of hazard communication, regulatory affairs and toxicology for the past 17 years. Presently, she is a toxicologist with Ashland Inc. where she is involved with implementation of global regulations and standards in the area of hazard communication. She is the current chair of the board of directors for the Society for Chemical Hazard Communication.*

Editor's Note: *At the time this article was written, OSHA was holding public meetings on the Globally Harmonized System of Classification & Labeling of Chemicals (GHS), and there was no clear timeline of when final regulations might be published. However, consultants should already be helping their clients who work with global suppliers to understand the basics of GHS since many other countries are already using elements of the system. In particular, U.S. personnel who have been trained for many years under the NFPA and HMIS rating systems that a "1" is low hazard and a "4" is high hazard must understand that the GHS numeric rating system is exactly the opposite. An example of how this may be important is when a company is evaluating a new chemical to determine whether the hazard level is acceptable for the company to use in its operations—the company needs to be certain that it knows what numeric rating system is used in order to properly understand the relative hazard.*

For more on GHS, join the International Practice Specialty and stay tuned for upcoming interviews and articles on this topic.

9th Annual Safety-on-the-Job Kids' Poster Contest

ASSE's 9th annual Safety-on-the-Job" poster contest for children ages 5 to 14 helps to educate the public on how to be safe at work and why. The contest runs through Feb. 14, 2011.

The contest is open not only to ASSE members' children, grandchildren, nieces and nephews, but also to children of ASSE members' coworkers and schools sponsored by ASSE members. To enter, a child must be sponsored by an ASSE member.

Children in five age groups, 1) 5-6; 2) 7-8; 3) 9-10; 4) 11-12; and 5) 13-14, are invited to create and submit posters no larger than 11 x 14 that best illustrate being safe at work. The first-place winner in each age group receives a $1,000 savings bond, the second-place winner receives a $500 savings bond, and the third- and fourth-place winners receive a $200 savings bond.

The poster contest winners will be announced the first week of March 2011. In addition to being featured on the North American Occupational Safety and Health (NAOSH) Week poster, the posters are displayed in Washington, DC, during NAOSH Week and at ASSE's annual conference, to be held in June 2011 in Chicago. Lamar Advertising also donates billboards featuring the local winning posters in their hometowns.

Visit http://www.asse.org/naosh10 for highlights of last year's events and winners and http://www.asse.org/newsroom/naosh11/poster-contest.php to view the contest rules and entry form.

By Lawrence B. Cahill, CPEA

Measuring an SH&E Audit Program's Success

SH&E audit program managers often ask, "How do I know if my program is working?" This is certainly a legitimate question and is often a "pass-down" of the same question asked of the program managers by senior management, including the board of directors. This article explores the possible metrics that could be used to determine success or failure. As with most things in life, the answer is not obvious and can be complex.

Six common metrics are often touted as valid measuring sticks:

1) reduction in environmental releases and workplace injuries;

2) improved compliance as defined by a reduction in fines and enforcement actions;

3) reduction in the total number of audit findings;

4) reduction in the number of high-risk audit findings;

5) reduction in the number of repeat audit findings;

6) high rate of on-time closures of audit action items.

Analysis of these six metrics shows that none singularly provides a logically compelling performance measure. Of the group, the most compelling metric seems to be the last—a high rate of on-time closure of audit action items.

External Measures

The first two measures relate to how improved performance might be evaluated using external metrics: a reduction in incidents and a reduction in notable regulatory noncompliances.

1) Reduction in Environmental Releases & Workplace Injuries

If only there were a direct correlation between the rigor of an audit program and a reduction in environmental releases and workplace injuries. A relationship may exist, but little evidence suggests a direct causality.

Certainly an audit program can contribute to improved performance, but history shows that audit programs, no matter how rigorous, are not an adequate substitute for establishing sound management systems and controls at sites. Audit programs are meant to be verification programs; that is, the objective is to periodically verify compliance with applicable rules and regulations and self-imposed corporate standards and controls.

Once audit programs are used as a surrogate for sound onsite SH&E management systems, the site is doomed to fail. Accountability must reside with site management and the systems and controls that have been implemented on site and not rely on a checkup visit once every 2 to 3 years to get back on track.

For any number of reasons (e.g., independent audits occur once every 2 to 3 years and are typically only a snapshot evaluation of compliance), expecting a reduction in releases and workplace injuries as a result of periodic audits misplaces the emphasis of who in fact is responsible. In many cases, the audit program manager becomes the fall guy when an incident occurs ("Why didn't the audit program identify the situation that resulted in the incident?").

Bottom line evaluation of this metric: Poor.

2) Improved Compliance as Defined by a Reduction in Fines & Enforcement Actions

This measure is often considered by management to be a good way to determine the value of an audit program. However, the measure is typically relevant only in the U.S. where regulatory agency fines and enforcement actions are common. For example, EPA issued more than $186 million in civil and criminal enforcement penalties in its last full fiscal year, and OSHA issued its largest fine ever of $87 million in 2010. Most other countries' regulatory agencies have a more cooperative approach with the regulated community; fines and enforcement actions are rare. For multinational companies, this is not a good measure.

Secondly, even in the U.S., the enforcement posture of the federal government can change from one presidential administration to the next. For example, under the Obama administration, EPA's budget has increased by 35%. In fiscal year 2011, the budget for the EPA's Office of Enforcement and Compliance Assurance (OECA) alone is $618 million, the largest budget in OECA history and larger than OSHA's total budget. OECA states one of its main enforcement goals going forward is, "Aggressively go after pollution problems that make a difference in communities. Vigorous civil and criminal enforcement that targets the most serious water, air and chemical hazards. . . ."

Similarly, on June 18, 2010, OSHA published and made effective its severe violator enforcement program directive. OSHA announced that it was "implementing the program to focus on employers who continuously disregard their legal obligations to protect their workers." As a result, the playing field has changed substantially over the past year and a half in the U.S., and the number of fines and enforcement actions likely will rise,

independent of the rigor of any company's audit program.

Bottom line evaluation of this metric: Poor.

Internal Measures

The following four measures relate to how improved performance might be evaluated using internal metrics: a reduction over time in the number of total, high-priority or repeat findings and a high rate of closure of audit action items.

1) Reduction in the Total Number of Audit Findings

This metric is rather easy to calculate but even easier to dismiss as not meaningful, principally because all findings are not created equal. For example, say that an audit team finds that a regulatory program does not exist at a site because the site erroneously believes that the program does not apply to them—one finding.

A second team visits the site 2 years later and finds that much work has been undertaken, and the program has been largely implemented. However, four administrative requirements that are still not being met completely—four findings.

The one finding on the first audit far outstrips the importance of the four findings on the second audit. Hence, if one uses total number of findings as a measure, the results would be misleading.

Bottom line evaluation of this metric: Poor.

2) Reduction in the Number of High-Risk Audit Findings

Many companies rank individual audit findings by the level of risk posed to the organization. They might even use a scheme similar to the following:

•**Significant: Highest priority action required.** Situations that could result in substantial risk to the environment, the public, employees, stockholders, customers, the company or its reputation or in criminal or civil liability for knowing violations.

•**Major: Priority action required.** Does not meet the criteria for Level I but is more than an isolated or occasional situation. Should not continue beyond the short term.

•**Minor: Action required.** Findings may be administrative in nature or involve an isolated or occasional situation.

Thus, one potential metric would be the trend in the number of high-risk findings. Over time, one would expect the number of high-risk findings to decrease as sites are audited a second and third time. Even with the definitions provided, a lack of consistency often exists in applying the ratings scheme, leaving some to question the merits of using this metric. Reasons for inconsistency include:

•No matter how well vetted within the organization, the definitions leave room for interpretation.

•Some but not all auditors believe that no regulatory finding could possibly be minor.

•Some but not all auditors (and at times legal counsel) believe that all regulatory findings should be classified as significant.

In addition, many companies do not classify findings based on risk, believing that all findings are equally important. For these companies, this metric is not appropriate.

Bottom line evaluation of this metric: Fair.

3) Reduction in the Number of Repeat Audit Findings

Many corporate audit programs are designed to capture and report on repeat findings on individual facility audits. A repeat finding can be defined as:

•a finding that had been identified in the previous independent audit of the same topic (e.g., environmental, employee safety) for which a corrective action has not been completed;

•a finding of a substantially similar nature to one that had been identified, and reportedly corrected, in the previous independent audit of the same topic.

These repeat findings are typically considered serious findings and justifiably receive significant management attention.

The problem with using repeat findings as a valid metric for measuring performance is that most companies have not defined what is and what is not a repeat finding.

This results in varying interpretations by auditors. One auditor might say that any exceedances of wastewater discharge limits would be a repeat finding had this been identified on the previous audit. Another auditor might look a bit deeper and determine that due to product changes, the treatment plant might have needed to be operated differently and that the current pH exceedances have a different root cause.

As a consequence, auditors need to focus on the intent of the repeat findings classification before proceeding to label something as a repeat. The question actually is, "Did a breakdown in a management system really cause this repeat failure or was it simply an isolated case of a similar nature?"

For example, on any given fire safety audit of a large manufacturing site, auditors, if they look long and hard enough, could almost always find an issue with inspections and maintenance of portable fire extinguishers. Should a missing inspection tag on one fire extinguisher out of a universe of several hundred constitute a repeat finding if another extinguisher was without a tag on the previous audit? Probably not, if the fire safety management system is found to be fundamentally sound.

These situations should be thought of as recurring findings, not necessarily repeats. Similar situations can be found in other compliance areas where the universe of items to be audited is also large (e.g., MSDS, hazardous waste manifests, wastewater discharges).

Repeat findings should not be used as a performance metric unless everyone is working off the same playbook. Sites should not be punished by the repeat classification when the system is otherwise fully implemented and effective.

Bottom line evaluation of this metric: Good if the term repeat finding has been defined, and a uniform understanding of the term is applied to the audit program.

4) High Rate of On-Time Closure of Audit Action Items

Any audit results in a corrective action plan, usually developed by management at the audited site. The plan includes a description of the finding, the proposed corrective action, the person responsible and the target date for completion. Many companies formally track the closure of these action items and calculate the percent of those that are completed on time. It is all about, "Say what you do, and do what you say."

This metric can be useful in determining the value of and commitment to an audit program. Its benefits:

•simple measurement;

•responsible individuals define the actions and set the dates;

•provides a true measure of management's commitment to compliance;

•using a percent closure metric normalizes performance among differing operations.

Despite these advantages, there are challenges. Some observed in companies that use this as a metric include:

•the numerator and denominator of the ratio (i.e., action items closed on time to total action items) should be clearly defined and reported consistently;

•complete 100% on-time closure is unrealistic and should be challenged;

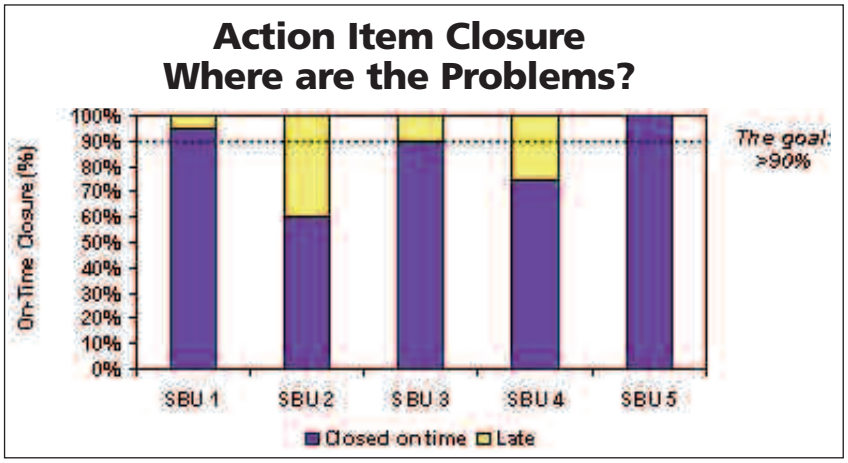
•original timelines need a sanity check; there is a tendency to revise/extend dates when being tracked;

•original target dates need to be fixed, unless an extension is reviewed and approved by a senior executive.

Figure 1 is an example of how action item closure might be presented for a company's five strategic business units (SBUs) for the latest 6-month period.

The goal is to have each SBU achieve a greater than 90% on-time closure rate, recognizing that the ultimate objective in a perfect world is 100%. What conclusions can be drawn from the results? First, SBUs 1 and 3 are in good shape and are meeting the goal. Second, SBUs 2 and 4 are not meeting the goal, with SBU2 achieving only a 60% on-time closure rate. This is clearly a red flag. And third, SBU5 should be praised for a perfect 100% or scrutinized for its perfection, depending on the relative cynicism of the reviewer.

Figure 1 Action Item Closure: Five Strategic Business Units



Bottom line evaluation of this metric: Good to excellent. ✪

Lawrence B. Cahill, CPEA, *is a technical director with Environmental Resources Management and has more than 30 years' SH&E experience. He is the editor and principal author of* Environmental, Health and Safety Audits.

***This article originally appeared in the Aug. 23, 2010, issue of* EHS Journal.**

MCC OSHA Outreach Trainer Requirements

To become an authorized OSHA outreach trainer, Metropolitan Community College's (MCC) OSHA Outreach Training Institute Education Center requires students to complete the entire list of requirements as prescribed by the OSHA Directorate of Training and Education. These requirements are:

Construction Industry

•Completion of OSHA 510, Occupational Safety and Health Standards for the Construction Industry course;

•5 years of construction industry safety experience;

•OSHA 500 Trainer Course in OSHA Standards for the Construction Industry.

General Industry

•Completion of OSHA 511, Occupational Safety and Health Standards for General Industry course;

•5 years of general industry safety experience;

•OSHA 501 Trainer Course in OSHA Standards for General Industry

Safety experience has been defined as follows:

At least 3 years of work experience with safety and health responsibility and possess one of the following:

1) college degree in environmental health and safety or occupational health and safety;

2) associate safety professional (ASP), CSP or CIH designation in the applicable training area.

For more information, contact Annette Braam, director, EHS, OSHA Outreach Training Institute Education Center, MCC Business & Technology, 1775 Universal Ave., Kansas City, MO 64120; (816) 604-5422; annette.braam@mcckc.edu. ✪

SH&E Professionals Visit China
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The Delegation & Mission

More than a year ago, Chris Patton was approached by People to People International about leading a group of SH&E professionals on a mission to China. Chris worked with the ASSE executive board to garner support for the trip, then invited ASSE members to participate. The original goal was the minimum required delegation of 15, but the application process closed when the number hit 40 and a waiting list was established. Delegates paid their own way—a cost of nearly $6,000 per person, not including airfare to the destination city of San Francisco. The trip costs for the leader and co-leader were covered by People to People.

Thirty-seven delegates made the trip, representing the U.S., Canada, Singapore, Germany and Trinidad. The individual safety sectors in which they practice also spanned all major arenas, including manufacturing, construction, government, loss control and consulting. Most delegates had vast years of experience and worked in management-level positions with large national and multinational companies or ran their own consulting companies.

The mission's main objective was to develop ongoing professional relationships that would lead to the improvement of workplace processes and would reduce the number of injuries, illnesses and fatalities in both countries. Specific tasks included the following:

•Discuss mutual expanded educational, training and networking opportunities to improve the professional proficiency of those engaged in the practice of protecting people, property and the environment.

•Provide and increase informational resources to support the knowledge and professional efforts of those engaged in incident prevention.

•Demonstrate new and improved products and services meeting the needs of professionals managing occupational safety and health programs.

•Discuss current occupational safety and health trends impacting different countries.

•Identify emerging business and industry trends that impact workplace injuries, illnesses and fatalities, such as safety management practices for nanotechnology.

•Discuss existing workplace safety and health management practices.

•Recommend areas for ongoing mutual collaboration.

The group left San Francisco on Nov. 5, 2010, traveling first to Beijing where we stayed for 3 days. The morning of the first day was spent organizing the delegation, meeting each other and learning a little about Chinese culture and history in order to be able to work more effectively with our Chinese counterparts.

Those familiar with conducting business in Asian countries understand the importance of developing relationships, "saving face," and observing Chinese customs and protocol during all business-related meetings and activities. Our national People to People guides proved to be helpful in this respect and shepherded us through the entire trip with the able assistance of local guides in each city we visited.

The afternoon was spent in a meeting with representatives of the State Administration of Work Safety (SAWS), including Huang Yi, chief engineer, spokesperson and deputy director-general of SAWS. SAWS is the agency directly under the Chinese State Council that provides overall supervision and regulation of workplace safety throughout the country. It is also the working body of the Office of the State Council Work Safety Commission. Its nearest U.S. counterpart would be OSHA, as SAWS is the group that establishes and enforces workplace safety regulations in China.

The SAWS meeting was our most formal meeting, and we were able to meet with fairly high-ranking government officials. It followed a typical meeting agenda of formal introductions, presentations by the Chinese representative, a brief opportunity to ask questions, and the presentation of gifts from the delegation, the latter being an obligatory custom of the country. This meeting was not only videotaped, but a government photographer took pictures for nearly the entire meeting.

The second day in Beijing involved two more meetings with governmental agencies tasked with workplace safety. In the morning, we met with the China Academy of Safe Sciences and Technology (CASST). CASST is an organization under the jurisdiction of SAWS and is a national academy. It was founded in 1980 and was originally named the Institute of Labor Protection of Labor Administration. CASST would be the NIOSH counterpart, as its staff conduct research on workplace safety and make recommendations to SAWS.

Major roles that CASST plays include providing technical support to SAWS; promoting the development

of safety science and technology, education and trade; providing services for enterprises related to work safety technology; and information and management. CASST is made up of six general management departments and 12 special sections. CASST staff have a strong science and technology background and consist of 47 senior research fellows and 20 members with doctoral degrees.

This meeting was somewhat less formal, and the staff with whom we met seemed eager to ask questions and learn about what we do in our home countries. They were particularly interested in the various certification processes for CSP and CIH. China currently has a similar process for safety professionals, called certified safety engineers, in use for 14 years. It requires a bachelor's degree although no professional experience. Obtaining the certification requires passing an exam. Maintaining it requires continuing education credits.

In the afternoon, we met with the China Occupational Safety and Health Association (COSHA). As part of the China Association for Science and Technology, COSHA is a nationwide specialized, nonprofit social organization. Formerly known as the Chinese Society for Science and Technology of Labor Protection, it is composed of workers and institutions relevant to the national work of occupational safety and health, has been approved by the State Council and is registered by the Ministry of Civil Affairs in China.

COSHA is administratively led by SAWS and operates under the instruction of the China Association for Science and Technology in terms of business operation. It functions as an important social force in boosting national workplace safety and occupational safety and health and in protecting the safety and health of laborers. Delegates met with Ren Shukui, vice president of COSHA, and Yi Lie, secretary-general of COSHA. COSHA would be similar to ASSE, AIHA or any of the various SH&E membership organizations. A key difference, however, is the connection and oversight of COSHA by SAWS.

After two intense days of meetings and traveling, the delegates used the last day in Beijing to kick back and relax, enjoying some of the most famous cultural sites in the world, including Tian'an Men Square, The Forbidden City and The Great Wall. It was also a time of bonding and continuing to develop the relationships among the delegates.

The second leg of the journey took the delegation to Shanghai. While there, the delegates toured a hospital construction site and held a meeting with the project's chief engineer, superintendent and safety officer, learning about best practices in construction in the country with an incredible building boom. The delegation observed the bamboo scaffold planking and the on-site living quarters for the laborers and noticed that green hardhats are not worn by safety staff as green hats are a sign of bad luck. Blue helmets are worn instead.

In addition to the construction site tour, the delegation visited the Bagoing Steel Plant, the largest in China with a current capacity of 35 million tons per year. We were able to walk through a rolling mill and drive down to the harbor, where the raw materials were unloaded and sent along a vast conveyor system as well as the loading of the rolls bound for other parts of the country.

The highlight of the Shanghai visit, and possibly the entire trip, involved a 4-hour meeting between the 37

delegates and nearly 50 fellow SH&E professionals from Shanghai. Following some general introductions and presentations, the delegates and the Shanghai safety staff were able to meet in small working groups to engage in discussions about best safety practices and challenges of the profession. From that meeting came a series of future activities that include developing a LinkedIn site for the meeting participants to continue to discuss and network.

It remains to be seen whether China can learn from the mistakes of other developed countries, including the U.S., as it tries to create safer workplaces and to apply the best practices that have been developed over the years by others for their benefit.

Cultural activities in Shanghai included a performance of the world-famous Shanghai Acrobats, visits to a Silk Museum and the Shanghai Museum, a tour of Old Town and the Yu Gardens, and a visit to a silk rug factory. Shopping was also plentiful in Shanghai's many silk and pearl markets.

As the delegation reflected back on its visit during the long plane ride home, we discovered that the same core message was delivered by the Chinese across all of the professional meetings: China is a vast country and is developing at a pace unparalleled in modern society. While proud of their accomplishments to date, they often acknowledged, formally and privately, that they are in a similar position as the U.S. was about 80 years ago as the Industrial Revolution began.

Workplace accidents happen too frequently and fatalities, while decreasing, continue to be unacceptably high. The workforce is primarily illiterate, making safety education a challenge, and overcoming the cultural tenet of never making one's supervisor lose face creates difficulties in reporting injuries or safety hazards. In some cases, supervisors and higher-level managers lose their jobs when a worker is killed on a site.

It remains to be seen whether China can learn from the mistakes of other developed countries, including the U.S., as it tries to create safer workplaces and to apply the best practices that have been developed over the years by others for their benefit. And all of this needs to be accomplished under a governmental structure that still dictates much of daily life, despite growing pushback from the younger generations who are much less concerned with culture and traditions than older generations.

As I finish this article and the inaugural formal ASSE visit to China comes to a close, the hope of the delegation to begin to develop relationships with our counterparts has succeeded. But as noted, this mission's goal was to serve as the beginning of future opportunities to collaborate and share for the good of both countries. I was honored to have been selected by ASSE to serve as its co-leader. It was a professional opportunity that will rank near the top of the list of the highlights of my career.

Pam (Ferrante) Walaski, CSP, CHMM, *is president of JC Safety & Environmental Inc. in Pittsburgh, PA, and assistant administrator of the Consultants Practice Specialty. She may be reached at pam@jcsafety.com or (412) 414-4769.*

Administrator's Message
continued from page 2

I guess looking over my list, the reflection did less to show me what new things need to be and more to remind me of why we do the things we do. Maybe that is the most important part of reflection, to remind us what is important and to provide renewal to keep going.

I hope all CPS members enjoy the upcoming celebrations and can join us in Chicago for Safety 2011. It is as much a CPS celebration as an ASSE one. So enjoy, because right afterward, the work will still be waiting.

Safety: Then & Now

As ASSE's 100th anniversary rapidly approaches, we would like to highlight our practice specialties by providing members with a "Then and Now" view of professions in a variety of fields. If you would like to participate, please choose an area within consulting and provide a view of what that job was like in 1911 (or what it was like when it first emerged), how that job has changed and what it is like today. Feel free to reach out to any colleagues or SH&E professionals who might be able to assist in this effort.

Send all materials to ASSE Practice Specialties Manager, Krista Sonneson, at ksonneson@asse.org.

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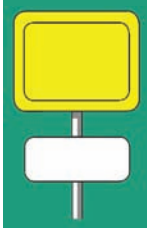

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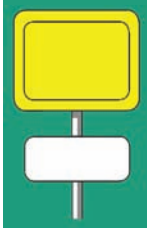

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