The Product Safety Engineering Newsletter

Vol. 8, No. 4 December 2012

IEEE PSES Product Safety Engineering Society

What's Inside

President's Message

Happy 2013!

A happy and prosperous New Year to everyone! While I thought 2012 was a good year on balance, I am looking forward to a great year ahead and hope all of you have a wonderful 2013. The beginning of the second year of my presidency is a great time to review the Society accomplishments in 2012, and talk a little bit about the plans and initiatives for 2013.

Know Who you Are and Know Where You're Going To ("Slade," 1970s)

Know who you are
Know where you're going to
Just take a look at the things
That make up a good living
Tied off your socks
Trying your father's on
Run round the world taking all
That you want you can carry

Maybe you're wrong
Finding a new way out
Trying to work out a way
To include one another
Think what you are
Think where you're going to
'H' sing a song to make out
That you're playing is easy

Know who you are
Know where you're going to
Read a new book
Finish the other one
Right from the start try and
Work out the finishing answer

Chorus
Know where you are
And where you've been
And where you're going to
'H' old 'H' sing a song

While writing this article I have just noticed that my term as President of the PSES has almost reached its midpoint. This should be a time for contemplating where we are as a Society, how well have I, in particular, and the Board of Directors (BoD), in general, served you our members, and where can we better serve you in the future. As quoted from the famous song from "Oliver Twist," "*I'm reviewing the situation…*"

Indeed, up to now I am glad to say that 2012 has been thus far a very enjoyable and rewarding year for me in my capacity as President of the PSES. Over the past year, I have had many excellent op-

The
Product Safety Engineering Newsletter

Newsletter Committee

Officers of the IEEE PSES

IEEE PSES Web Sites

http://www.ieee-pses.org/
http://psessymposium.org/
http://product-compliance.oc.ieee.org/
http://www.ieee-pses.org/emc-pstc.html
http://www.ieee-pses.org/newsletters.html
http://www.ieee-pses.org/pses.html

Continued from Page 1

portunities to personally reach out to our members around the world on various occasions: through Chapter visitations and presence in several global symposia, engaging in fruitful discussions of issues as well as new ideas that would benefit the PSES. Indeed, it is my firm belief that the President and members of the BoD should be more "visible" to the members of the Society. I believe that this goal was met quite well, particularly in Region 8 (Europe, in particular) and in Region 9 (Latin America). At the end of the day, networking is one of the most important benefits of membership in a professional society such as the PSES.

In my visits I regularly observe the ever-increasing interest in PSES. Globalization did not make our life easier in that respect. Safety is a global need, and when compromised, tragic outcomes are saddening and frustrating, regardless of borders and boundaries. That is where networking becomes so useful. Meetings are so much better than written words; person-to-person contacts break some barriers which are otherwise there, regardless.

PSES Accomplishments in 2012

The just-concluded 2012 has been a vibrant and active year for our Society and we have been very busy in expanding into new areas both technically and geographically. As we look back on our initiatives and accomplishments over the last year, we can be proud of several things, including:

- Formation of Standing History and appointing a representative to the IEEE History Committee;

- **Increased Global Outreach**, in particular, Argentina and South America in general as part of the ArgenCon 2012, June, 2012 (which resulted in the formation of an annual joint PSE and EMC sponsored by the Argentina Section, and South Africa, October, 2012 (please see a separate report on this outreach visit in this issue), which may result, eventually, in the formation of an EMC chapter in South Africa.

- **Development of the very successful Writers' Workshop/Webinar**. Thanks to the efforts of Doug Nix, VP for Conferences and Ed Perkins, a series of very successful webinars took place, providing tools and guidance as to how to write conference and newsletter articles. Feedback was outstanding and we are certain that this webinar will result in an increased flow of papers to our Conferences.

- **Appointment of Liaisons to various global communities**. Liaison with the international professional community is important for visibility and effectiveness of the PSES. In the course of 2012 we have appointed liaisons to the IEEE-U.S. Government Relations R&D Committee and to the IECEE (Worldwide System for Conformity Testing and Certification of Electrotechnical Equipment and Components. Additional opportunities are available. If any PSES member is interested. Please contact me (see contacts below).

- **Commenced the development of the PSES Strategic Plan**. During the course of 2012, we have approved the core values of the Society, the Mission and Vision, as well as the Strategic Goals that will be guiding our actions in years to come. See more about that below.

What a Conference…ISPCE'2012 in Portland, OR

"*A conference is a gathering of people who singly can do nothing, but together can decide that nothing can be done*.**"** (Fred Allen)

Joking apart, the symposium is probably one of the most important and effective services the Society can offer its members. ISPCE 2012 was no different!

One of the best opportunities to network with your colleagues, experts and novices alike, is at the annual IEEE International Symposium on Product Compliance Engineering (ISPCE). This year, the 2012 ISPCE took place in Portland, Oregon, organized by the outstanding and energetic team with the leadership of Anna Klostermann, which excelled and exceeded all that you have been accustomed to in previous years.

From my personal perspective, the days of the Symposium are the most exciting, interesting and… yes, most tiring days of the year. So much to do, so little time! It was no doubt a true challenge to keep track of the technical sessions, workshops and tutorials, meetings, and social events. I am sure all of you who attended this symposium shared this feeling. "*Comfortably*

Continued on Page 14

Chapter Safety Probes

To see current chapter information please go to the chapter page at: http://www.ieee-pses.org/Chapters/index.html

Central Texas Chapter

Meeting Date: 10/16/2012
Topic: "Carbon Nanotube-Enhanced Polymers: Release Potential & Measurement Methods"
Speaker: Betsy Shelton, MSIH, Safety Officer & Project Administrator, Applied Nanotech, Inc.

Meeting opened with general announcements concerning upcoming meeting topics, the CTPSES website and LinkedIn access, the 2013 Product Safety Symposium (in Austin) as well as other regular business. After the announcements, Betsy Shelton, Safety Officer & Project Administrator, Applied Nanotech, Inc. was introduced. Betsy's topic covered the basic definitions and properties of nano materials (specifically carbon nanotubes), various ways these materials can be released into the environment, how they can be measured when released and the current theories regarding “safe” values of these releases. She also gave examples of the standards being developed to meet the challenge of defining safe limits of use. Several questions were asked about specific areas of interest in this topic after Betsy's presentation and discussion followed based on those questions.

The meal for this meeting was provided by Austin Manufacturing Services. AMS is a custom manufacturer of electronic assemblies based in the Austin, TX area.

Telecom Safety Technical Committee

Discussions at the monthly TSTC TAC meeting have included discussions about cell tower back-up power during Hurricane Sandy, grounding and isolation in proximity to a battery in a battery cabinet, follow up of ISPCE 2012 and Joe Randolph receiving best paper for his “Introduction to Lightning and AC Power Fault Surge Protection for Telecom Signaling Cables”, a discussion about IEC 62368 – MOV requirements, and US TAG TC 108 ongoing activity (currently discussing updates to battery section).

Long Island (NY) PSES chapter

Aziz Orumbaev is now Chapter Chair, and Tom Lanzisero is Vice Chair. Tom is now serving as Chair of the IEEE Long Island Section. He is looking to increase PSES involvement through activities such as joint technical meetings with related society chapters, including PES/IAS, EMBS, EMC, NPS, Legal Affairs, etc.

News and Notes

IEEE PSES 2012 Elections Report

The 2012 PSES elections are over and here are the results. Our 2013–2015 Board of Directors:

New members: Bill Bisenius
Grant Schmidbaur
Continuing members: Richard Nute
Kevin Ravo

Thanks to Luis Claudio Araujo, Lock Kai Sang and Lijuan Hao for their interest and effort to run for the board.

In Portland, at ISPCE2012, the board elected Kevin Ravo as our new President-Elect. He will serve in this role in 2013, and will be the IEEE PSES President in 2014-2015, replacing Elya Joffe, who will serve as Past-President for that period. With the support of our board, Dan Roman, Doug Nix, Thomas Ha, and Ivan Vandewege will continue through 2014 as VPs of Communication Services, Conferences, Membership Services, and Technical Activities respectively.

As past-president and head of your nominating committee, I would encourage all IEEE PSES members to become active in YOUR IEEE society. That could be in chapter activities, conference/workshop support, writing papers, etc. Your participation is only limited by your ideas and enthusiasm. Being active is a great way to gain professional success and satisfaction, as well as serving as a base for being elected to our board of directors.

Please let me know if you are interested in running to join our board in 2013.

Thanks to Jim Bacher and Jim Knighten for their support on the Nominating Committee.

Murlin Marks, IEEE PSES Past-President and Chair, Nominating Committee

PSES Outreach Visit to South Africa, October, 2012

by Richard Nute, Life SM and member PSES Board of Directors

In the IEEE Sections Congress 2011, PSES Vice President Elya Joffe met with Saurabh Singh, past South Africa IEEE Section Chair. Elya and Saurabh are good friends. In the past, Saurabh was instrumental in forming the IEEE EMC Chapter in South Africa. Elya and Saurabh discussed the possibility of forming an IEEE PSES Chapter in South Africa. Saurabh was very enthusiastic to assist in forming a South Africa PSES Chapter.

During the November 2011 IEEE Technical Activity Board meetings, Elya again met with Saurabh. Although no longer the South Africa Section Chair, Saurabh was glad to provide Elya with contacts in the South Africa Section: Jacques Van Wyk, the Section Chair, and Joyce Mwangama, the Students Activity Chair. Saurabh suggested that we organize a series of workshops with local universities in Johannesburg, Durban, Cape Town, and Pretoria, in order to reach out to the South African engineering community, especially since there were no PSES members in South Africa.

As a consequence of Saurabh's recommendation, Elya (now PSES President) contacted Jacques and Joyce, and the plans for setting up the outreach visit were initiated, and the dates and the program were set. Joyce Mwangama did all the arrangements, and then, unfortunately, was called out of the country during our visit so we didn't get to meet her.

At the February, 2012, PSES Board meeting, Elya asked for a volunteer to speak at the South Africa workshops. Richard Nute volunteered.

As part of the PSES cooperation with the Consumer Electronics Society chapter development, and with the hope to form a joint PSES and CES chapter, Elya suggested that the CE Society President, Stephen Dukes, join the trip and workshops, which he enthusiastically accepted. However, at the very last minute, due to other needs, he asked that Daniel Wiens fill in for him. Daniel is associated with Ifixit.org (San Luis Obispo, California) working to reduce waste and recycling by

Continued on Page 25

A Short History of the Evolved Power Supply

Address by Frank Toich on the occasion of Kepco's 50th anniversary

The power supply industry dates back to the early 1920s, when crude devices were first developed to serve as "B" battery eliminators to power radios in both the commercial and consumer markets.

1926 Ad for Motorola battery eliminator

The market for separate power supplies evaporated around 1929, when most radios manufactured included a built-in power supply. The need for stand-alone power supplies remained relatively small in the 1930s and into the 1940s. The dominant technology during this period consisted of vacuum tube linear regulators.

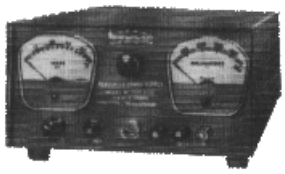
Power supplies used vacuum tubes for both the power and control elements. Typically, a voltage regulator (VR) tube, the predecessor to today's zener diodes, was used to produce a stable reference. Control was pretty much limited to the manual twisting of knobs. In those days we did not care too much about dissipation. Under normal circumstances, vacuum tubes ran pretty hot—and unless the plate of the tubes glowed red, or glass started to melt, no one worried much about it.

Model 700 Vacuum tube power supply, 0-350V, 0-750mA

In the mid 1940s, three companies set up shop in a relatively obscure community in Queens, New York. These companies, who eventually became leaders in the industry, were Lambda, Sorenson and Kepco. While all three companies exist today, only Kepco maintains its independence and original ownership and continues to operate out of Queens, New York.

Early Kepco Laboratories logo

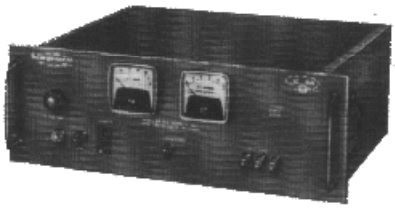
A milestone in the industry occurred in the 1950s when semiconductors were first introduced into the power supply design. As semiconductor designs proliferated in the market (transistors replaced tubes), concerns about dissipation and heat dominated the thinking of power supply designers. Germanium transistors did not have the ability to glow in the dark, as did tubes, they simply melted and quit. Designers of these products suddenly had to take their thermodynamics seriously.



Kepco Type SC, the first "transistorized" power supply

Products using transistors were limited to low voltage models at modest power levels or hybrid designs which used semiconductors in the control circuit and vacuum tubes in the power stage to make possible higher voltage products. In the 1950s, and early 1960s, power supply products adopting mag-amp technology satisfied those applications requiring substantially higher power.

This same time period also brought us the concept of the first remotely programmable power supplies.



Kepco Type KM, A Mag-Amp Design

A pioneer in this field was Dr. Kenneth Kupferberg, one of the founders of Kepco, who, in his career,

Continued on Page 7

Continued from Page 6

was credited with 14 patents.

In the 1960s, the world was still analog. Computers were still in their early phase of development. The big debate focused on analog computing (op-amp control for simulation and modeling) and that strange concept, called digital computing. In this time frame, linear series pass power supplies were seen more as power amplifiers than a power source. This amplifier concept exploited the high gain and linearity of the transistors and created what were, in effect, high power operational amplifiers. As op-amps, they were made to scale, sum, integrate, or manipulate signals. To accomplish this, power supplies were being produced which allowed access to all of the control nodes. Both input and feedback control elements could be removed and substituted by the user to permit manipulation of the output to satisfy many diverse applications.

The 1960s also saw the introduction of true bipolar (four quadrant) source/sink units, and the concept of ferroresonance for correction of source voltage variation in a highly reliable, low parts count package.

In the 1970s an energy crisis, which affected the entire industrial world, provided the switching power supply with an opportunity to re-surface and establish a significant position in the electronic marketplace.

Kepco Model BOP, Featuring Bipolar 4-Quadrant Power

The design and manufacture of switching power supplies can be traced back at least to the 1950s. At that time, these products were produced in huge quantities, mostly to replace vibrators. In those days, vibrators converted an automobile's 12V into high voltage dc by mechanically switching. (The first switch-mode power supply!) Later, germanium transistors were used to switch electrically.

The fundamental problem, which inhibited the advancement and greater use of this topology, was its relatively low frequency range (within the mid-audio spectrum) which caused these products to whistle annoyingly.

The big breakthrough in the 1970s was the development of low-loss ferrite (transformer core material), coupled with the readily available, higher speed silicon transistors that made possible the practical reality of high frequency products which could operate above 20 kHz where they were inaudible.

During this same decade, the high-gain series pass linear power supply was enhanced with a new level of intelligence, the ability to follow commands from a host computer on a standard communications bus.

Digital control was being grafted onto the front end of linear power supply products. The very first interfaces consisted of resistor chains that were parallel with reed relays, to create BCD Digital control. Then came digital to analog conversion (DAC), for voltage control, and finally, in mid-decade, the power supply industry adopted the instrumentation bus standard introduced by the Hewlett Packard Company as HPIB. This was adopted as IEEE-488 by the Institute of Electrical and Electronic Engineers, and later renamed GPIB by Instrumentation Manufacturers. Prior to this industry standard, the industry was limited to the RS232 serial bus which was very slow and restricted to relatively limited distances between controller and instrument. In Europe, this is known as the IEC bus.

The 1980s saw many new start-up companies enter the market producing switch-mode products. Many of these new companies were based in the Pacific Rim, first in Japan, and eventually shifting to Taiwan and Hong Kong.

During this decade, the quality and performance characteristics for switchers were substantially improved. Operating frequencies also increased from the 25–50 kHz range, on up to 100 kHz and even 1 MHz as FETs replaced bipolar transistors.

Here we are now, more than halfway into the 1990s, and we have already experienced numerous developments. For example, this industry, driven by market demands, has produced switching products

Continued on Page 8

Continued from Page 7

which operate at increasingly higher frequencies and are constructed utilizing surface mount technology (SMT), substantially reducing their physical size. We have seen these same products offering such features as wide-range input, to accommodate source voltages worldwide, active power factor correction, to minimize harmonic distortion on power lines, and forced current sharing, to provide these products with the capability of fault-tolerant operation.

Kepco Model HSP, N+1 redundancy with hot swap

Modern fault-tolerant power systems typically employ a technique known as parallel N + 1 redundancy. The advantage of this method over the traditional paralleling scheme, is the ability to distribute power (current sharing) and minimize the stress on individual units. The popularity of the N + 1 redundant system approach with current sharing has increased so rapidly it has become a de facto standard in the industry.

Kepco Model VXI-27, a VXI interface drives up to 27 remote power supplies

Another trend which has enjoyed increased interest, is that which is sometimes referred to as point-of-use stabilization; distributing the power at some intermediate voltage (48V, 150V, 400V). This technique is also known as “distributed power.” It relies on the use of a bulk supply to perform the conversion of ac from the mains into dc, which then, in turn, powers any one of a number of lower power dc-to-dc converters placed directly at the point of load. This technique of power distribution has lowered the system wire count resulting in more manageable harness sizes making the products easier to build and reducing their overall size.

Instrumentation power supplies now interface with the IEEE 488.2 bus, support VXI and embrace various soft-panel architectures. What’s on the horizon for the next phase of the power supply evolution—stay tuned!

Frank Toich was Sales Manager for Kepco, Inc. His anniversary address is reprinted by permission of Mr. Toich and Kepco, Inc.

Busting the Emergency Stop Myths

By Doug Nix

Originally published 3-Sep-2010, MachinerySafety101.com

Part 4 of 9 of a series on Emergency Stop

There are a number of myths that have grown up around emergency stops over the years. These myths can lead to injury or death, so it's time for a little Myth Busting!

What does 'emergency' mean?

Consider for a moment the roots of the word 'emergency'. This word comes from the word 'emergent', meaning a situation that is developing or emerging in the moment. Emergency stop systems are intended to help the user deal with potentially hazardous conditions that are emerging in the moment. These conditions have probably arisen because the designers of the machinery failed to consider all the foreseeable uses of the equipment, or because someone has chosen to misuse the equipment in a way that was not intended by the designers. The key function of an Emergency Stop system is to provide the user with a backup to the primary safeguards. These systems are referred to as "Complementary Protective Measures" and are intended to give the user a chance to "avert or limit harm" in a hazardous situation. With that in mind, let's look at three myths I hear about regularly.

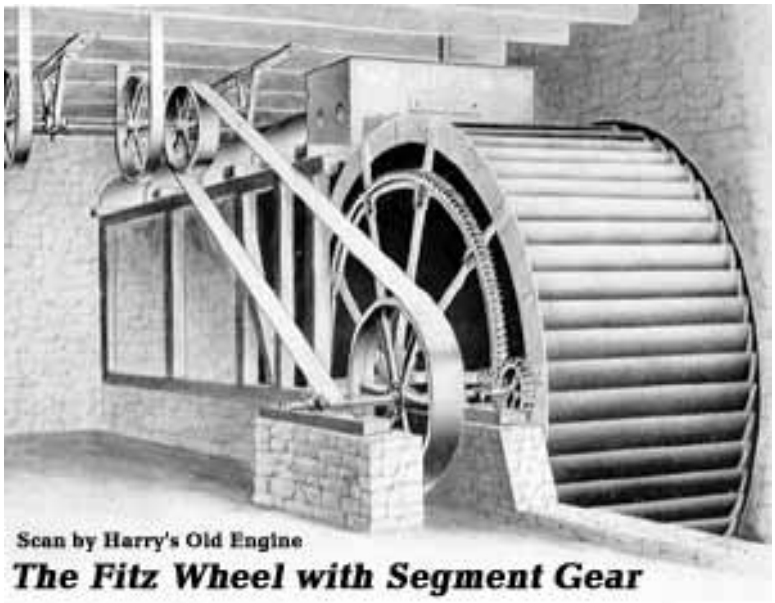


Photo: Larry Evans & www.oldengine.org

Myth #1 – The Emergency Stop Is A Safety Device

Early in the Industrial Revolution machine builders realized that users of their machinery needed a way to quickly stop a machine when something went wrong. At that time, overhead line-shafts were driven by large central power sources like waterwheels, steam engines or large electric motors. Machinery was coupled to the central shafts with pulleys, clutches and belts which transmitted the power to the machinery.

See pictures of a line-shaft powered machine shop or click the image below.

These central engines powered an entire factory, so they were much larger than an individual motor sized for a modern machine. In addition, they could not be easily stopped, since stopping the central power source would mean stopping the entire factory – not a welcome choice. Emergency stop devices were born in this environment.

Learn more about Line Shafts at Harry's Old Engines.

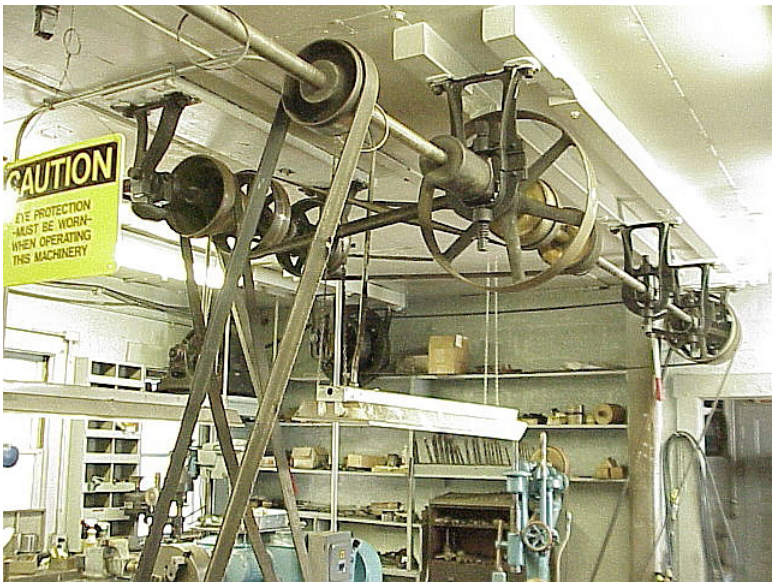
Due to their early use as a safety device, some have incorrectly considered emergency stop systems safeguarding devices. Modern standards make the difference very clear. The easiest way to understand the current meaning of the term "EMERGENCY STOP" is to begin by looking at the international standards published by IEC [1]

Continued on Page 10

Continued from Page 9

and ISO [2].

emergency stop [3]



A Fitz Water Wheel and Belt Drive,

Credit: Harry Matthews & http://www.old-engine.com

emergency stop function

function that is intended to

— avert arising, or reduce existing, hazards to persons, damage to machinery or to work in progress,

— be initiated by a single human action

NOTE 1

Hazards, for the purposes of this International Standard, are those which can arise from

— functional irregularities (e.g. machinery malfunction, unacceptable properties of the material processed, human error),

— normal operation.

It is important to understand that an emergency stop function is “initiated by a single human action”. This means that it is *not automatic*, and therefore *cannot* be considered to be a risk control measure for operators or bystanders. Emergency stop may provide the ability to avoid or reduce harm, by providing a means to stop the equipment once something has already gone wrong. Your next actions will usually be to call 911 and administer first aid.

Safeguarding systems act *automatically* to prevent a person from becoming involved with the hazard in the first place. This is a reduction in the probability of a hazardous situation arising, and may also involve a reduction in the severity of injury by controlling the hazard (i.e., slowing or stopping rotating machinery before it can be reached.) This constitutes a risk control measure and can be shown to reduce the risk of injury to an exposed person.

Emergency stop is **reactive**; safeguarding systems are **proactive**.

ISO 12100:2010

ISO 12100:2010 [4] describes emergency stop as a complementary protective measure in Clause 6.3.1:

6.3.1 General

Guards and protective devices shall be used to protect persons whenever an inherently safe design measure does not reasonably make it possible either to remove hazards or to sufficiently reduce risks. Complementary protective measures involving additional equipment (for example, emergency stop equipment) may have to be implemented.

NOTE The different kinds of guards and protective devices are defined in 3.27 and 3.28.

Certain safeguards may be used to avoid exposure to more than one hazard.

EXAMPLE A fixed guard preventing access to a zone where a mechanical hazard is present used to reduce noise levels and collect toxic emissions.

CSA Z432:04 (R2010)

In Canada, CSA defines emergency stop as a ‘Complementary Protective Measure’ in CSA Z432-04 [5]:

6.2.2.1.1

Safeguards (guards, protective devices) shall be used to protect persons from the hazards that cannot reasonably be avoided or sufficiently limited by inherently safe design. Complementary protective measures involving additional equipment (e.g., emergency stop equipment) may have to be taken.

6.2.3.5.3 Complementary protective measures

Following the risk assessment, the measures in this clause either shall be applied to the machine or shall be dealt with in the information for use.

Protective measures that are neither inherently safe design measures, nor safeguarding (implementation of guards and/or protective devices), nor information for use may have to be imple-

Continued from Page 10

Continued from Page 10

mented as required by the intended use and the reasonably foreseeable misuse of the machine. Such measures shall include, but not be limited to,
emergency stop;
means of rescue of trapped persons; and
means of energy isolation and dissipation.
In the USA, three standards apply: ANSI B11 [6], ANSI B11.19-2003 [7], and NFPA 79 [8]:

ANSI B11-2008

3.80 stop: Immediate or controlled cessation of machine motion or other hazardous situations. There are many terms used to describe the different kinds of stops, including user- or supplier-specific terms, the operation and function of which is determined by the individual design. Definitions of some of the more commonly used "stop" terminology include:
3.80.2 emergency stop: The stopping of a machine tool, manually initiated, for emergency purposes;

7.6 Emergency stop

Electrical, pneumatic and hydraulic emergency stops shall conform to requirements in the ANSI B11 machine-specific standard or NFPA 79.
Informative Note 1: An emergency stop is not a safeguarding device. See also, B11.19.
Informative Note 2: For additional information, see ISO 13850 and IEC 60204-1.

ANSI B11.19-2003

12.9 Stop and emergency stop devices

Stop and emergency stop devices are not safeguarding devices. They are complementary to the guards, safeguarding device, awareness barriers, signals and signs, safeguarding methods and safeguarding procedures in clauses 7 through 11.
Stop and emergency stop devices shall meet the requirements of ANSI / NFPA 79.

E12.9

Emergency stop devices include but are not limited to, buttons, rope-pulls, and cable-pulls.
A safeguarding device detects or prevents inadvertent access to a hazard, typically without overt action by the individual or others. Since an individual must actuate an emergency stop device to issue the stop command, usually in reaction to an event or hazardous situation, it neither detects nor prevents exposure to the hazard.
If an emergency stop device is to be interfaced into the control system, it should not reduce the level of performance of the safety function (see section 6.1 and Annex C).
NFPA 79 deals with the electrical functions of the emergency stop function which is not directly relevant to this article, so that is why I haven't quoted directly from that document here.
As you can clearly see, the essential definitions of these devices in the US and Canada match very closely, although the US does not specifically use the term 'complementary protective measures'.

Myth #2 – Cycle Stop And Emergency Stop Are Equivalent

Emergency stop systems act primarily by removing power from the prime movers in a machine, ensuring that power is removed and the equipment brought to a standstill as quickly as possible, regardless of the portion of the operating cycle that the machine is in. After an emergency stop, the machine is inoperable until the emergency stop system is reset. In some cases, emergency stopping the machine may damage the equipment due to the forces involved in halting the process quickly.
Cycle stop is a control system command function that is used to bring the machine cycle to a graceful stop at the end of the current cycle. The machine is still fully operable and may still be in automatic mode at the completion of this stop.
Again, referring to [6]:
3.80.1 controlled stop: The stopping of machine motion while retaining power to the machine actuators during the stopping process. Also referred to as Category 1 or 2 stop (see also NFPA 79: 2007, 9.2.2);
3.80.2 emergency stop: The stopping of a machine tool, manually initiated, for emergency purposes;

Myth #3 – Emergency Stop Systems Can Be Used For Energy Isolation

Continued on Page 12

Continued from Page 11

Fifteen to twenty years ago it was not uncommon to see emergency stop buttons fitted with locking devices. The locking device allowed a person to prevent the resetting of the emergency stop device. This was done as part of a "lockout procedure". Lockout is one aspect of hazardous energy control procedures (HECP). HECPs recognize that live work needs to be done from time to time, and that normal safeguards may be bypassed or disconnected temporarily, to allow diagnostics and testing to be carried out. This process is detailed in two current standards, CSA Z460 [9] and ANSI Z244.1 [10]. Note that these locking devices are still available for sale, and can be used as part of an HECP to prevent the emergency stop system or other controls from being reset until the machine is ready for testing. They cannot be used to isolate an energy source.

No current standard allows for the use of control devices such as push buttons or selector switches to be used as energy isolation devices. CSA Z460-05 specifically prohibits this use in their definition of 'energy isolation devices':

Energy-isolating device — a mechanical device that physically prevents the transmission or release of energy, including but not limited to the following: a manually operated electrical circuit breaker; a disconnect switch; a manually operated switch by which the conductors of a circuit can be disconnected from all ungrounded supply conductors; a line valve; a block; and other devices used to block or isolate energy (**push-button selector switches and other control-type devices are not energy-isolating devices**).[4]

Similar requirements are found in ANSI Z244.1 and in ISO 13850[3].

Myth #4 - All Machines are Required to have an Emergency Stop

Some machine designers believe that all machines are required to have an emergency stop. This is simply *not* true. The requirement for an emergency stop must be driven from the risk assessment for the machinery. Let me explain.

Emergency stop systems *may* be useful where they can provide a back-up to other safeguarding systems. To understand where to use an emergency stop, a start-stop analysis must be carried out as part of the design process. This analysis will help the designer develop a clear understanding of the normal start and stop conditions for the machine. The analysis also needs to include failure modes for all of the stop functions. It is here that the emergency stop can be helpful. The risk assessment can then be used to determine the value in adding an emergency stop. If removing power will cause the hazard to cease in a short time, or if the hazard can be quickly contained in some way, then emergency stop is a valid choice. If the hazard will remain for a considerable time following removal of power, then emergency stop will have no effect and is useless for avoiding or limiting harm. The key point here is to remember the definition of a complementary protective measure - it can help to avoid or limit harm. It acts by reducing the probability of injury by increasing the possibility of avoiding harm, or by limiting the severity of injury to a person or damage to property.

For example, consider an oven. If the burner stop control failed, and assuming that the only hazard we are concerned with is the hot surfaces inside the oven, then using an emergency stop to turn the burners off only results in the start of the natural cooling cycle of the oven. In some cases that could take hours or days, so the emergency stop has no value. It might be useful for controlling other hazards, such as fire, that might be related to the same failure. Without a full analysis of the failure modes of the control system, a sound decision cannot be made.

Simple machines like drill presses and table saws are seldom fitted with emergency stop systems.

Continued on Page 13

Continued from Page 12

These machines, which can be very dangerous, could definitely benefit from having an emergency stop. They are sometimes fitted with a disconnecting device with a red and yellow handle that can be used for 'emergency switching off'. This differs from emergency stop because the machine, and the hazard, will typically re-start immediately when the emergency switching off device is turned back on. This is not permitted with emergency stop, where resetting the emergency stop device only permits the restarting of the machine through other controls. Reset of the emergency stop device is not permitted to reapply power to the machine on its own.

These requirements are detailed in ISO 13850[3], CSA Z432[6] and other standards.

Design Considerations

Emergency Stop is a control that is often designed in with little thought and used for a variety of things that it was never intended to be used to accomplish. The three myths discussed in this article are the tip of the iceberg.

Consider these questions when thinking about the design and use of emergency stop systems:

Have all the intended uses and foreseeable misuses of the equipment been considered?

What do I expect the emergency stop system to do for the user of the machine? (The answer to this should be in the risk assessment.)

How much risk reduction am I expecting to achieve with the emergency stop? (See the Risk Assessment!)

How reliable does the emergency stop system need to be? (See the Risk Assessment and then look to ISO 13849-1 or IEC 62061)

Am I expecting the emergency stop to be used for other purposes, like 'Power Off', energy isolation, or regular stopping of the machine? (The answer to this should be 'NO'!)

Taking the time to assess the design requirements before designing the system can help ensure that the machine controls are designed to provide the functionality that the user needs, and the risk reduction that is required. The answers lie in the five questions above.

Have any of these myths affected you?

References

[1] IEC – International Electrotechnical Commission.

[2] ISO – International Organization for Standardization

[3] *Safety of machinery — Emergency stop — Principles for design*, ISO 13850, 2006, ISO, Geneva, Switzerland.

[4] *Safety of machinery—General principles for design—Risk assessment and risk reduction*, ISO 12100, 1st Edition. 2010.

[5] *Safeguarding of Machinery*, CSA Z432-04, Canadian Standards Association, Toronto, Canada.

[6] *General Safety Requirements Common to ANSI B11 Machines*, ANSI B11-2008, American National Standards Institute, Des Plaines, IL, USA.

[7] *American National Standard for Machine Tools – Performance Criteria for Safeguarding*, ANSI B11.19-2003, American National Standards Institute, Des Plaines, IL, USA.

[8] *Electrical Standard for Industrial Machinery,* NFPA 79. 2007. NFPA, 1 Batterymarch Park, Quincy, MA 02169-7471, USA.

[9] *Control of Hazardous Energy – Lockout and Other Methods,* CSA Z460, 2005, Canadian Standards Association, Toronto, Canada.

[10] Control of Hazardous Energy – Lockout/Tagout and Alternative Methods, ANSI/ASSE Z244.1, 2003, American National Standards Institute / American Society of Safety Engineers, Des Plaines, IL, USA.

Continued from Page 3

numb," is that how "Pink Floyd" would describe it?

I will write no more on the technical program, and not for lack of words, but rather for the overwhelming amount of words necessary. Suffice it to say that the selection was so large and the organization so well done, that regardless of what session you attended, it was sure to be a success!

New initiatives, more papers, more topics, more exhibitors, an outstanding keynote speaker, and an opportunity to network, communicate and…drink together (as I had mentioned in the pre-symposium issue, the word "symposium" in Greek actually does mean "drinking together.")

Thank you, Anna, Gary and the entire team for a great work done! We now look forward to ISPCE 2013 in Austin, Tx.

Strategy

"Unless a variety of opinions are laid before us, we have no opportunity of selection, but are bound of necessity to adopt the particular view which may have been brought forward." (Herodotus, 484–425 BC, Greek historian)

"Change is not a destination, just as hope is not a strategy." (Rudy Giuliani, 1944 – , American businessman and former mayor of New York City)

In my last message, I shared with you our accomplishments in defining the mission and vision of PSES.
As a brief reminder, the following are the Mission and Vision statements of PSES:

> ***Mission****: The mission of the PSES is to serve the product safety and regulatory profession and the public, by fostering the development and facilitation of the exchange of knowledge in the disciplines of product safety and compliance engineering (PS&CE), as detailed in the PSES's field of interest (FOI), and promote scientific, literary, educational and professional aspects thereof, that benefit members, the profession and humanity.*
>
> ***Vision****: … to be recognized as the respected innovator and global resource for scientific, technological and engineering information and services in the disciplines of product safety and compliance engineering for the betterment of society, and to be the preferred professional development source for our members.*

The next step was accomplished in the Strategic Planning session held by the BoD prior to the Symposium in Portland. The main objective for that meeting was of setting the strategic goals for PSES for the next 5 years. After a full day of discussions and deliberations, the following five strategic goals were approved by the BoD:

1. **Provide Educational and Professional Development Products of Value to Researchers and Practitioners World-Wide:** Researchers and practitioners and their employers around the world will value the PSES as a major resource of highest quality, authoritative information, providing access to and a forum for discussing high-quality product safety and compliance engineering Technical Information.

2. **Global Technology Image, Visibility and Excellence:** PSES will enhance its societal and industry image and the perceived value of product safety and compliance engineering to the profession and to the public, and be a publicly visible, global community of excellence, while visibly embracing the broader concept of Safety.

3. **Improve Membership Development Engagement and Volunteerism:** PSES will identify and develop strategies that result in membership growth and engagement and enhance members' perceived value of volunteerism and participation in PSES activities.

4. **Engage Young Professionals:** PSES will engage students and young professionals by providing them education and engagement opportunities that encourage them to join the PSES and assume an active role in its activities and leadership.

5. **Enhance Community Collaboration:** PSES will:
   - Foster collaboration within the Society;
   - Reach out and engage academic organizations, industry sectors and sister societies; and
   - Create and encourage flexible communities

Continued on Page 15

Continued from Page 14

that develop technical knowledge as well as products and services from this knowledge

These all are all summarized in the logo that will appear on the front page of the strategic plan:

The next strategic planning session will take place along with the February 2013 BoD meeting in Santa Clara, CA on February 10 & 11. **This is an open meeting**! Why not join us (no RSVP required), just step in and share with us your thoughts. Any idea will be considered seriously.

New Officer Elections

As I mentioned in the beginning of this column, I am almost half way past my term as President, looking back in amazement at time, as it flies. I am glad to have yet another one year to serve you as President.

However, in the recent November meeting, the BoD re-elected the vice presidents, who will be continuing their service to you for the next two years and elected the next President, Kevin Ravo, who will be installed as President in January, 2014.

As the preacher says in the book of Ecclesiastes (Qoheleth), Chapter 1: "*One generation passeth away, and another generation cometh: but the earth abideth for ever: The sun also ariseth, and the sun goeth down, and hasteth to his place where he arose: The wind goeth toward the south, and turneth about unto the north; it whirleth about continually, and the wind returneth again according to his circuits: All the rivers run into the sea; yet the sea is not full; unto the place from whence the rivers come, thither they return again*."

Thus is the way our Society goes on: A generation passeth and a new generation cometh, but the earth abideth for ever. We have an excellent slate of officers for the next two years, and no doubt that those elected will drive the PSES to new heights.

Incidentally, do you realize that the last sentence: "*All the rivers run into the sea; yet the sea is not full*" could be a reflection on Ampere's Law (or "Kirchhoff's Law of Currents")? Think about it.

For me, this will be both a year of continued service to the Society as your President, as well as for training my successor, Kevin. I look forward to working with the Officers and the BoD as a whole, and trust that we members of this Society will all benefit from their service.

PSES BOD Meetings

Again, I would like to reiterate that all meetings of the Society Board of Directors are open and you are most welcome to attend. We try to schedule our BoD meetings so as to reach out to you, and we hope that you reach out to us and honor us by attending. As I have said in the past, you are not restricted to being a "silent observer" in the meetings. Indeed, you may talk and express your opinions, make suggestions and take part in our activities. The schedule of BoD meetings is posted on the Society web site (http://ewh.ieee.org/soc/pses/) and in the Calendar section of this Newsletter.

As mentioned above, the upcoming BoD meeting will take place in Santa Clara, CA, on February 10 & 11. If you need more information, please contact our Secretary, Daniece Carpenter, at Daniece_Carpenter@DELL.COM.

PSES Education Committee: Volunteers Needed!

"*Education is simply the soul of a society as it passes from one generation to another.*" (G. K. Chesterson)

Two of the strategic goals of the PSES listed above relate to education.

In my "other hat," I am leading the effort of forming the **PSES Education Committee (PSEEC).** The mission of the committee is to promote education related activities on product safety engineering within the PSES.

The Committee shall recommend to the PSES

Continued on Page 17

Advantages of Membership in the IEEE PSES

Makes you part of a community where you will:

- Network with technical experts at local events and industry conferences.
- Receive discounts on Society conferences and symposiums registration fees.
- Participate in education and career development.
- Address product safety engineering as an applied science.
- Have access to a virtual community forum for safety engineers and technical professionals.
- Promotion and coordination of Product Safety Engineering activities with multiple IEEE Societies.
- Provide outreach to interested engineers, students and professionals.
- Have access to Society Publications.

IEEE | PSES
Product Safety Engineering Society

E-Mail List: http://www.ieee-pses.org/emc-pstc.html
Virtual Community: http://product-compliance.oc.ieee.org/
Symposium: http://psessymposium.org/

Membership: The society ID for renewal or application is “043-0431”.

Continued from Page 15

Board of Directors and implement programs specifically intended to serve and benefit PSES members, the product safety and compliance engineering community, regulatory agencies, and public at large in educational pursuits.

These programs shall include planning of educational activities within PSES, development and delivery of continuing education products, the coordination of pre-university programs, and activities within the PSES field of interest and representation of the PSES in matters regarding product safety engineering education.

The Committee (PSEEC) is seeking volunteers willing to lead or support any of its activities, as listed below.

The Committee plans to prepare and conduct educational programs and develop products designed to support the individual member during his/her professional career, with particular emphasis on continuing education and career development. In particular, the Committee will:

- Define the **educational goals** of PSES;
- Establish awareness of product safety and compliance engineering (PS&CE) education throughout schools, academia and industry;
- Develop a recommended curriculum for product safety and compliance engineering education;
- Create a data base of existing university offerings on PS&CE-related Education;
- Develop a manual of product safety related case studies;
- Collaborate with relevant conferences and symposia on PS&CE education products and their delivery;
- Initiate programs to motivate practitioners to pursue, and their employers to encourage and support, continuing education throughout their careers;
- Promote and reward excellence and innovation in the development and implementation of educational programs and activities that relate to the PSES field of interest;
- Create an on-line PS&CE Education-related Virtual Community and web site

If you are interested in serving on the committee, or for any further details, please contact me at eb.joffe@ieee.org.

Call for Volunteers

The success of our Society is possible thanks to the many fine volunteers who have contributed unselfishly of their time and talent. As the Society evolves, and new initiatives emerge, we are always in need of volunteers. Please, give serious consideration to becoming involved in our broad and challenging goals and objectives.

I look forward to working with all of you who join the volunteers of the Society, helping achieve our goals for the benefit of us all. For making a suggestion, comment, or just for dropping a friendly note, please do not hesitate to e-mail me at: eb.joffe@ieee.org.

I Would Like to Hear from You!

Do you think that the Product Safety Engineering Society is meeting your expectations? I invite your feedback on this matter. We need, we ask for your inputs and suggestions. Please write to me with any comment, or just a “hi” message. (Make sure that “hi” is not the only word in the “subject” line or the message gets deleted.)

I, as your President am at your service. Please do not hesitate to e-mail me at: eb.joffe@ieee.org. I look forward to your inputs.

Elya Joffe
President IEEE PSES

2013 IEEE Symposium on Product Compliance Engineering

Sponsored by the IEEE Product Safety Engineering Society

October 7– October 9, 2013
Austin, Texas, USA
www.psessymposium.org

General Chair
Gary Schrempp
Gary_schrempp@dell.com

Technical Program Chair
Gary Tornquist
garytor@microsoft.com

Conference Management
Chris Dyer
cdyer@conferencecatalysts.com

Call for Papers, Workshops, and Tutorials

The IEEE Product Safety Engineering Society seeks original, unpublished papers and tutorials on all aspects of product safety and compliance engineering including, but not limited to:

Forensics Track:
Papers and presentations detailing:

- The latest findings in failure analysis on new components and miniaturization of common products implemented by the electronics industry.
- Descriptions of failure analysis involving rare failure modes that are not commonly seen in any given product line.
- Developments in the general tools and techniques used for quality failure analysis of electronic and electrical products.
- Dominant failure modes for a given type of component, detailing causes and effects of these failure modes.

Leadership Track:
Papers and presentations on leadership will include:

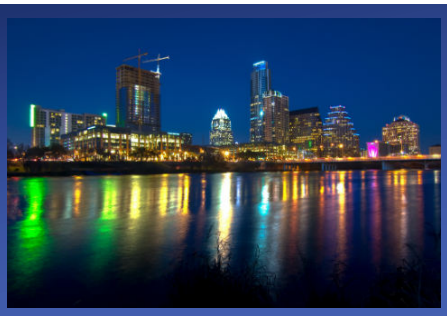
- Management strategies and techniques
- Case studies
- Leading change
- Teambuilding
- Conflict resolution
- Time management
- Communication skills

ITE Product Compliance Track:
Papers and presentations on ITE product compliance will include:

- Information Technology Standards and Regulations
- ITE compliance and non-compliance case studies
- Certification requirements and strategies
- Testing methods
- Labeling

Medical Devices Track - "The impact of the new IEC 60601-1":
Papers and presentations on Medical Devices will include:

- Risk Management process
- Essential performances
- Patient and Operator – different requirements
- How to deal with the Collateral Standards
- Manufacturer opinion
- Consultant opinion
- Testing House opinion



2013 IEEE Symposium on Product Compliance Engineering

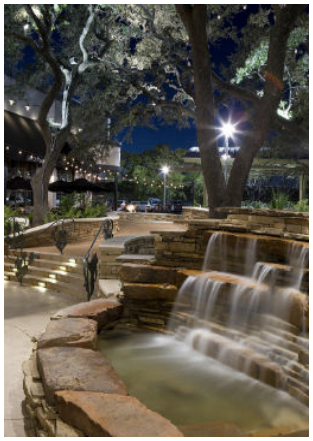
Sponsored by the IEEE Product Safety Engineering Society

October 7– October 9, 2013
Austin, Texas, USA
www.psessymposium.org

General Chair
Gary Schrempp
Gary_schrempp@dell.com

Technical Program Chair
Gary Tornquist
garytor@microsoft.com

Conference Management
Chris Dyer
cdyer@conferencecatalysts.com



Call for Papers, Workshops, and Tutorials

General Track:
Papers and presentations in the General Track will include:

- **Product Specific:** Consumer, medical, computer (IT), test and measurement, power supplies, telecommunication, industrial control, electric tools, home appliances, cellular and wireless, etc.
- **Hazard Specific:** Electrical, mechanical, fire, thermal, chemical, optical, software, functional, reliability, risk assessment, etc.
- **EMC / RF:** Electromagnetic emissions, electromagnetic immunity, regulatory, Introduction to EMC/RF for the safety engineer and compliance engineer.
- **Components:** Grounding, insulation, opto-couplers, cables, capacitors, connectors, current-limiters, transformers, current-limiters, fuses, lasers, ferrites, environmental, electromagnetic suppression & protection, surge protectors, printed wiring boards, etc.
- **Certification:** Electromagnetic emissions & immunity, Environmental, Product safety, Processes, safety testing, regulatory, product liability etc.
- **Standards Activities:** Development, status, interpretations, country specific requirements, Laboratory Accreditation, etc.
- **Research:** Body physiological responses to various hazardous energy sources, unique safeguard schemes, electrically-caused fire, forensic methods etc.
- **Environmental:** RoHS, WEEE, EuP (Energy-using Products), Energy Star, Packaging Directives, REACH (Chemical), CeC, etc.
- **Demonstration Papers:** Demonstrations of product safety testing techniques including mechanical, electrical, fire, etc.

Risk Assessment Track – Are you ready for Risk Assessments in Standards??
Papers and presentations on Risk Assessments will include:

- Introduction to Risk Assessments and various techniques
- Introduction to CSA Z1002 Occupational Health and Safety based on ISO12100. How will it affect Machinery Standards in Canada?
- Functional Safety and Machinery: Are Standards like ISO 13849-1 and IEC 62061taking focus away from other Risk Control Measures?
- New laws in member states of the EU affecting the Directives
- IEC62326 Hazard Based Standard
- Risk Assessments for Electromedical Equipment
- ISO Guide 51

Author's Schedule

All dates require that the associated documents be loaded into EDAS by the due date

Abstract/Draft Formal Paper/Presentation Submission	**May 21, 2013**
Notification of Abstract Acceptance	**June 7, 2013**
Final Paper/Presentation submission	**July 19, 2013**
Acceptance of Papers	**August 16, 2013**

Please go to the Author page of the ISPCE web for comprehensive submission instructions including paper templates on the Authors tab at: www.psessymposium.org

New Requirements for Shipments of Lithium Batteries

by Daniece Carpenter and Bansi Patel

Batteries using lithium-based chemistry are popularly used to power many products because of their long life, energy densities, and charging capabilities. From notebook computers and cameras to power tools and vacuum cleaners, lithium-based batteries provide portable power for many types of products.

However, lithium ion battery packs have a drawback that presents a major risk: overheating or overcharging tend to trigger thermal runaway and cell rupture, which can result in combustion. It is believed that combusting lithium battery power packs have caused at least two cargo plane crashes since 2006, as well as several incidents on the ground. In May, 2012, the United States Postal Service announced that it will no longer ship overseas any product containing a lithium ion battery.

ICAO Logo

The International Civil Aviation Organization (ICAO) is a specialized agency of the United Nations. Its Technical Instructions codify principals and techniques for international air navigation and air transport. It serves as a global forum for its 191 Member States, bringing together states and key industry organizations to develop policies and standards, among other functions.

Meeting in October, 2011, and again in February, 2012, the Dangerous Goods Panel (DGP) of the ICAO discussed revised procedures for shipping lithium batteries by air.

ICAO then published new Technical Instructions for air shipments of lithium batteries. Further information on the DGP, including meeting reports, is available on the ICAO website at http://www.icao.int/safety/DangerousGoods/Pages/DGP.aspx .

The new requirements are included in the 2013-2014 Edition of the *Technical Instructions for the Safe Transport of Dangerous Goods by Air,* and will take effect in most Member States on January 1, 2013. These requirements are more stringent than those in place in ICAO Member States since 2009.

ICAO has issued a recommendation to state aviation authorities to permit a transition period to January 31, 2013. Such a transition period is meant to enable transport of packages prepared in compliance with regulations as of December 31, 2012, to continue in transport to their end point. Each Member State will need to enact this transition recommendation as there is no text within the regulations permitting such a transition period.

IATA Logo

The International Air Transport Association (IATA) publishes annual editions of the IATA Dangerous Goods Regulations (DGR) which incorporate the ICAO Technical Instructions. IATA is an international industry trade group representing 240 airlines comprising 84 percent of scheduled international air traffic. The mission of IATA is to represent, lead, and serve the airline industry. Providing safe and secure transportation for passengers and airline staff is the organization's main aim. Airline rules defined by IATA, adopted by the carriers and airlines, include the regulation of dangerous goods shipping as well as many other aspects of air transportation.

IATA has developed guidance material for complying with the 54th Edition of the DGR (2013) on

Continued on Page 21

Continued from Page 20
transport of lithium based batteries. The Guidance Document explains the definition, classifications, exceptions and prohibitions, guidance on packaging, passenger provisions, and Frequently Asked Questions. The 2013 Guidance Document is available on the IATA website here.
Copies of the IATA Packing Instructions (965 through 970) for shipments of lithium based batteries are available on the IATA website here.

In general, the new requirements will:
- Restrict the exceptions (Section 2) from full regulation under Class 9 to very small quantities per package of lithium cells and batteries.
- Create a new section (Section 1B) in Packing Instructions 965 for lithium Ion, and Packing Instruction 968 for lithium metal batteries bulk shipments.
- Place a net weight limit per package on lithium cells and/or batteries installed in or with equipment.
- In Packaging Instruction 965 (PI 965) for bulk shipments of lithium ion and lithium polymer batteries, new limits on per package contents to be shipped as Excepted Class 9 have been placed under Section 2. The following tables are from PI 965.

Packaging Instruction 965 (Lithium Ion and Lithium Polymer) – Section 2 – Package Limits Table

Contents	Lithium ion cells and/or batteries with a Watt-hour rating not more than 2.7 Wh	Lithium ion cells with a Watt-hour rating more than 2.7 Wh, but not more than 20 Wh	Lithium ion batteries with a Watt-hour rating more than 2.7 Wh, but not more than 100 Wh
Maximum number of cells / batteries per package	No limit	8 cells	2 batteries
Maximum net quantity (mass) per package	2.5 kg	n/a	n/a

Similarly, there are restrictions on contents of packages for Lithium Metal batteries under Section 2 of Packing Instruction 968 (PI 968).

Packing Instruction 968 (Lithium Metal) – Section 2 – Package Limits Table

Contents	Lithium metal cells and/or batteries with a lithium content not more than 0.3 g	Lithium metal cells with a lithium content more than 0.3 g but not more than 1 g	Lithium metal batteries with a lithium content more than 0.3 g but not more than 2 g
Maximum number of cells / batteries per package	No limit	8 cells	2 batteries
Maximum net quantity (mass) per package	2.5 kg	n/a	n/a

A new section, Section 1B, was created under PI 965 and PI 968 for those packages which exceed the restrictions in Section 2. These packages must be shipped as Class 9.
Section 1B packages
- Do not require UN specification packaging;
- Do not require a Shipper's Declaration provided that alternative written documentation or *electronic information* describing the contents is given to the carrier;

Continued on Page 22

Continued from Page 21

- Do require a dangerous goods acceptance check;
- Do require a Class 9 hazard label AND the ICAO lithium battery handling label to distinguish them from other lithium battery packages.
- This is the first time that electronic information is acceptable under ICAO regulations.
- Dangerous Goods training is required for those involved in the transport of packages under Section 1B.
- Information on the shipment must be provided to the carrier by the shipper. The name and address of the both the shipper and the consignee must be provided, along with the appropriate proper shipping name and UN number. The total number of packages with the gross mass of each package must also be provided.
- New net quantity weights of lithium ion or lithium metal batteries under Packing Instructions for batteries contained within or shipped with equipment have been included. Each package is limited to 5 kg under both Section 1 and Section 2.

ICAO does not consider these changes will necessarily reduce the number of incidents involving lithium based batteries, but expect that they will significantly improve safety for air transport cargo.

Following is a summary of the changes effective January 1, 2013.

Requirements for meeting new Exceptions shipping per PI 965 Section II for air shipment

- Individual battery (pack) (less than 100 Wh) must be packed in inner packaging (i.e. plastic bag) that completely encloses the cell or battery for protection.
- Two battery pack package requirements:*
- Needs to be in strong outer packaging (i.e. cardboard box);
- Lithium battery handling label on outside;
- Must pass 1.2 meter drop test;**
- Document communicating contents in the package (lithium batteries), handling (with care) and flammability hazard if package damaged, procedures to follow if package is damaged, telephone number and additional information (if needed). Information on who shipped and where package is shipped (see appendix A)
- Overpack (master carton) requirements:
- Be packed in inner packaging (i.e. plastic bag) that completely encloses the cell or battery for protection;
- Battery pack needs to be in strong outer packaging (i.e. cardboard box);
- Lithium battery handling label on outside;
- Must pass 1.2 meter drop test;**
- Document communicating contents in the package (lithium batteries), handling (with care) and flammability hazard if package damaged, procedures to follow if package is damaged, telephone number and additional information (if needed). Information on who shipped and where package is shipped (see appendix A).
- Pallet requirements:
- Lithium battery handling label on the outer wrap if the label on master cartons is not legible;
- No 1.2 meter drop test;
- Communicate contents in the package, who shipped and where package is shipped.

Continued on Page 23

Continued from Page 22

- Adequate instructions for employee training.

Requirements for meeting new REGULATED CLASS 9 (PI 965 Section IB) for air shipment

- Individual battery (pack) (less than 100 Wh) must be packed in inner packaging (i.e. plastic bag) that completely enclose the cell or battery for protection.
- Package (master carton) requirements:
- Be large enough for contents; be strong outer packaging (i.e. cardboard box);
- To and from address;
- Lithium battery handling label on the package.;
- Hazardous Goods Class 9 label;
- Word Overpack on the package;
- Document communicating contents of the package (lithium batteries), handling (with care) and flammability hazard if package damaged, procedures to follow if package is damaged, telephone number of additional information and who and where package is shipped (see appendix A);
- Weight limit of 10 kg;
- Must be able to pass 1.2 meter drop test.**
- Pallet requirements:
- Lithium battery handling label on the outer wrap if the label on master cartons is not legible;
- No 1.2 meter drop test;
- Communicate contents in the package, who shipped and where package is shipped.
- Full Dangerous Goods (DG) training is required.
- * **Package requirements:** Package containing (two battery packs) must be packed in inner packaging that completely enclose the cell or battery, then paced in strong outer packaging. Cell and batteries must be protected so as to prevent short circuits. This includes protection against contact with conductive materials within the same packaging that could lead a short circuit.
- ** **1.2 meter drop test:** 1.2 meter drop test in any orientation without damage to cells or batteries contained within or shifting of the contents so as to allow battery-to-battery (or cell-to-cell) contact or release of contents.

Requirements for FULLY REGULATED (PI 965 Section IA) for air shipment

- Individual battery (pack) (more than 100 Wh) needs to be packed (in plastic bag) for protection;
- Package (master carton) requirements:
- Comply with UN specification for performance approved packaging;
- To and from address;
- Hazardous Goods Class 9 label;
- Shipper's declaration for Dangerous Goods;
- Who shipped and where package is shipped (see appendix A);
- Weight limit of 5 kg net for passenger aircraft and 35 kg net for cargo aircraft;
- If weight limit of 5 kg net is exceeded add "Cargo Aircraft Only" label for cargo aircraft loads on the package;
- No 1.2 meter drop test;
- Full Dangerous Goods (DG) training is required.

Similar requirements also are issued by ICAO for Lithium Metal Batteries. They are described under Packaging instructions 968 (PI968).

Important note:

Please keep in mind that these requirements are for air shipments of the Lithium Ion and Lithium Metal batteries.

Disclaimer

This article is not intended to take the place of regulations or encompass all of the changes to

Continued on Page 24

Continued from Page 23

the ICAO Technical Instructions. This article serves as a highlight of changes and should not be interpreted as a complete summary of the regulations or used in place of regulations. All customers and distributors should fully understand the 2013 ICAO Technical Instructions and prepare for compliance with the requirements.

It is the responsibility of the person offering a package of lithium cells or batteries for transportation, including those packed with or contained in equipment, to be in compliance with all local, state, and federal regulations for the mode of transport being used. Any customer or distributor who offers for transportation lithium metal and lithium ion cells and batteries will be affected by the changes to the 2013 ICAO Technical Instructions.

Continued on Page 24

Continued from Page 5

repairing broken things, especially electronics.

Our first workshop, Tuesday, was at the University of Witwatersrand in Johannesburg. Wits, as it is called locally, has a reputation built on research and academic excellence. Wits is one of only two universities in Africa ranked in two separate international rankings as a leading institution in the world. Our hosts were Brett Terespolsky and Vinu Nair. Elya introduced the IEEE and the PSES, as well as Daniel and Rich. Rich talked about the models for injury and safety. Daniel talked about repairing equipment rather than discarding it as waste. Elya then talked about risk acceptability. See the workshop announcement and program.

Our second workshop Tuesday was at the University of Pretoria, in Pretoria, about a half-hour drive north of Johannesburg. UP is one of the leading research universities in South Africa and one of the largest in the country. The University has seven campuses. Our hosts were Lebogang Madise and Vinu Nair. We gave the same program. This was our best turnout of the five workshops as may be seen in the picture.

Wednesday, we traveled to Durban, on the southern Africa coast, on the Indian Ocean. Our third workshop was at the University of KwaZulu-Natal. UKZN is a relatively new university, formed in 2004 by the merger of two universities. Our host was Gbolahan Aiyetoro (who retrieved my headphones that I had left on the plane from Johannesburg from the lost luggage department of South Africa Airways at King Shaka (Durban) International Airport – thanks!).

On Thursday, we traveled to Cape Town on the South Atlantic Ocean near the southernmost tip of Africa. Our first workshop of the day was at the University of Cape Town, the oldest university (1829) in South Africa. UCT has a proud tradition of academic excellence and effecting social change and development through its pioneering scholarship, faculty and students. Our hostess was Valerie Chiriseri. The university is also renowned for its striking beauty, with its campus located at the foot of Table Mountain's Devil's Peak, with panoramic views of much of the western coast, the ocean, and Cape Town.

That evening, we traveled about an hour north to Stellenbosch and Stellenbosch University, located in the picturesque Jonkershoek Valley in the heart of the Western Cape Winelands. Stellenbosch University is recognised as one of the four top research universities in South Africa. Unlike the other areas we visited, in Stellenbosch Afrikaans rather than English is the predominant language. Our host was Lucas Janse van Vuuren. This workshop was different in nature than the previous ones; it was highly informal with give-and-take discussions around a table that gave us immediate feedback on our topics. Despite the small forum, this was probably our best workshop.

After the workshops Joyce Mwangama told us, "The feedback that I have received from many of those that attended was very positive; many enjoyed the events and were indeed inspired by your talks."

We wish to thank Joyce Mwangama, Brett Terespolsky, Vinu Nair, Lebogang Madise, Gbolahan Aiyetoro, Valerie Chiriseri, and Lucas Janse van Vuuren for the arrangements, their welcome, and their hospitality. The PSES also thanks the PSES and CES team, Rich, Daniel, and Elya, for their dedication and service.

Richard Nute is a Life IEEE SM and member of the PSES Board of Directors.

Photo's on page 28 and 29

Continued on Page 28

Compliance News Shorts

December, 2012

Eurasia Economic Community

Russia, Belarus and Kazakhstan are working to establish a common customs union which will be known as the Eurasian Economic Community. From February 15, 2013, a new Customs Union (CU) certificate will be the ONLY certificate that may be issued for compliance with safety and EMC technical regulations. The CU Mark must appear on all products covered by the new CU Certificates. Existing certificates for those countries will remain valid until their expiry dates or March 15, 2015, whichever is first provide there are no changes or updates, or a certificate renewal. Although CU certificates are currently available, there is some uncertainty that these certificates will be acceptable after February 15, 2013.

United Arab Emirates (UAE)

Effective immediately, only UK style power cords with a BS1363 (UK) 3 pin plug will be considered acceptable for sale in the UAE. All previously accepted types, such as the South African style power cords with the BS546 plug, are no longer allowed. 2 Pin plugs are not acceptable. For class II equipment, the ground pin on the UL 3 pin plug may be a dummy pin, but must be provided.

South Korea – Safety Regulation

KATS (Korean Agency for Technology and Standards) announced the revised rule on June 27, 2012 by Ministerial Ordinance, Ministry of Knowledge. The revised rule specifies products to be included under the safety certification, and products included under the Self-Regulation Safety confirmation rule. Enforcement date of the revised rule is July 1, 2013.

The specified products fall into three certification program categories:

1. Safety Certification
2. Self-Regulatory safety confirmation
3. Declaration of Conformity (DoC)

The KC Mark and required information must be on the product surface and on the package.

India – Safety Product Registration

The Electronics and Information Technology Goods Order, 2012 was issued by the India Department of Electronics and Information Technology of the Ministry of Communication and Information Technology. The Order brings into force a registration program for 15 electronic and IT products, listed as Controlled Goods, to comply with the specified Indian Safety standards. The Registration process is under the Bureau of Indian Standards (BIS, with in country testing required in a specified laboratory).

The effective date of the program is April 3, 2013.

Standards Roundup

STATUS OF IEC 60950-1 2nd EDITION

United States / Canada / European Union –

Mandatory implementation date for UL 60950, 2nd Ed / CSA C22.2 No. 60950-1-07 and for the EN 60950-1, 2nd Ed, which must include Amendment 1, will be March 1, 2013. All products under the scope of these standards must be evaluated and comply with these editions including Amendment 1.

Continued on Page 29

Continued from Page 25

University of Pretoria
Speakers and students

University of Pretoria
Rich, Elya and Daniel

University of Cape Town
High Voltage Laboratory
Mr. Chris Wozniak, principal technical officer in the electrical engineering department, Valerie, Daniel, and Rich

University of Witwatersrand
Elya and Daniel

PSES and CES South Africa workshop cities

Workshop announcement for University of Witwatersrand

Continued from Page 29

China –

Implementation date for the new version is December 1, 2012 for the China standard, GB4943.1-2011. This is the adapted version of the 2nd Edition of IEC 60950-1. National deviations include requirements for clearance for altitude of 5000m, and a test requirement for equipment use in tropical environments. An option provided for products not meeting either or both of these new requirements is use of specified markings, along with explanation in the user manual.

RoHS Directive 2011/65/EU

Requirement for a Technical File

Directive 2011/65/EU, EU RoHS Recast, which comes into force on January 1, 2013, includes a requirement for a Technical File per EN 50581:2012 to demonstrate compliance. The Technical File must include the following documents:

Supplier Declaration of Conformity (SDoC)
Material Declaration
Analytical test results to EN 62321
Internal RoHS compliance management processes.

Editorial Note

The Cutting Board Syndrome Strikes Again
I've written before in this space about how our trusted guide, common sense, sometimes misleads us. I refer to that situation as the "cutting board syndrome" after the first example written about here, where the U.S. Department of Agriculture banned wood cutting boards from commercial food preparation operations. The ban was based upon the reasoning (described by a USDA staffer as "common sense") that wood cutting boards are porous and therefore must harbor bacteria. Later research into the matter found that the wood boards tend to harbor less bacteria than do thoroughly washed plastic ones.

In a similar reasoning scenario, I now see that a pair of psychology professors* have looked at a couple of well-established guidelines that apparently sprang from common-sense reasoning. Consider these two statements:
— Environments rich in stimuli improve the brains of preschool children.
— Individuals learn better when they receive information in their preferred learning style, whether auditory, visual, or touchy-feely.

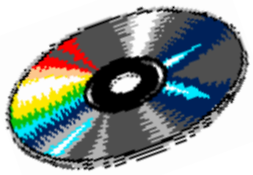
The professors tell us it turns out that neither of these two widely acknowledged principles is substantiated by scientific evidence. And they say that such research as has been done indicates that the two statements are not true.

All well and good, but what's that got to do with us? Of necessity we constantly rely on common sense. The challenge is to be on the lookout for the times when it can mislead us.

I serve on several committees that work on development of product safety standards, and in that sort of endeavor the cutting board syndrome constantly lurks in the background. Examination of product safety standards occasionally reveals requirements that were developed using flawless reasoning, but are actually invalid or irrelevant because of factors not taken into account. Such requirements can add useless cost to products.
The bottom line is that we need to be ever alert for instances when common sense misleads us (usually because there's something we haven't taken into account).

— *GW*
*Christopher Chabris, Union College, and Daniel Simons, University of Illinois

Past IEEE-PSES Symposium Records



CD Purchasing Information

SYMPOSIUM PAPERS ON CD:

The Product Safety Engineering Society continues to offer past symposium records for sale on CDs. The cost for the CD is $35 plus shipping and handling for IEEE members; $50 plus shipping and handling for non-IEEE members. At this time, check or money orders are the means for payment. Please provide the following information:

CDs to be shipped to- (Please print or type.)

Name:_____

Mailing address::_____

_____

_____

_____

IEEE member number:_____

Shipping and handling: $5 per CD

Payment: Check or money order.

Make Check or money order to: “IEEE Product Safety Society”

Quantity: ____ x $35 = _____ for IEEE members
Quantity: ____ x $50 = _____ for non-IEEE members
Specify what years you would like (2004 through 2008 are currently avalible):

_____

S&H: QTY_____ x $5 = _____

Total = _____

Send payment to:

IEEE Product Safety Engineering Society
c/o Richard Georgerian, PSES Board of Directors
7103 Sioux Court
Longmont, CO 80504
U.S.A.

Depending on stock availability allow 2 to 3 weeks for delivery.

New PSES Members

from 19 October 2012 Through 31 December 2012

Our new members are located in the following countries: Argentina, Australia, Canada, China, Denmark, France, India, Japan, Nigeria, Panama, Singapore, Sweden, Tunisia, UK, USA

Abdellatif Nzayem
Adama Ba
Bandele A Adepoju
Bill Hannah
Brett C Van Doren
Bryan R Cole
Christian Solacolu
Christopher James Wittwer
Durga Prakash K
David A Leone
Edmundo Gatti
Erik M Swonder
Edward Day
Eli Szamosi
Eric Glaude
Eric Johnson
Florent Miller
Geetha Hariharan
Gustavo Javier Wain
Iris Gonzalez
Izudin Pilavdzic
James A Cote
Jason Ngo
Jason R Venz
Keith Flowers
Keith Ng
Ken Y Goh
Louis F Bilancia
Luis Rodrigo Alvarez
Mahmood Tabaddor
Mark J Keith
Mieczyslaw Gaudyn
Neel Banerjee
Oladipo Gbemi Ogunbona
Philip Windholz
Prabakar Kuttaniseeri
Phil Mason
Poul Oestergaard Madsen
R Vasu Vasudevan Pecpe
Randall B Elliott
Raymond Chokelal
Richard L Vance
Richard Todd Humphreys
Ronald Del Aguila
Scott Smith
Shawn Oneill
Shawn Matthew Hagemeyer
Steven L Hum
Surajit Midya
Tomasz J Zielinski
Tsugio Mori
Tyge A Sopko
Yidong Yuan

The Product Safety Engineering Newsletter is published quarterly during the last month of each calendar quarter. The following deadlines are necessary in order to meet that schedule.

Closing dates for submitted articles:

1Q issue: February 1
2Q issue: May 1
3Q issue: August 1
4Q issue: November 1

Closing dates for news items:

1Q issue: February 15
2Q issue: May 15
3Q issue: August 15
4Q issue: November 15

Closing dates for advertising:

1Q issue: February 15
2Q issue: May 15
3Q issue: August 15
4Q issue: November 15

Institutional Listings

We invite applications for Institutional Listings from firms interested in the product safety field. An Institutional Listing recognizes contributions to support publication of the IEEE Product Safety Engineering Newsletter. To place ad with us, please contact Jim Bacher at j.bacher@ieee.org

Tthe Product Safety Engineering Society will accept advertisements for employment and place looking for work ads on our web page. Please contact Dan Roman for details at dan.roman@ieee.org .

The
Product Safety Engineering Newsletter

Gary Weidner
GW Technical Services Inc.
2175 Clarke Drive
Dubuque, IA 52001-4125

CHANGE SERVICE REQUESTED