The Product Safety Newsletter

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What's Inside

Chairman's Message

Annual Meeting Report

The Product Safety Technical Committee (EMC TC-8) is one of several technical committees operating under the auspices of the IEEE EMC Society. In August, the TC-8 Annual Meeting was held at the International EMC Symposium in Chicago. Among the highlights were:

Chapter Coordinator

Mike Campi has taken on a new position on the central committee as Chapter Coordinator. In this capacity, Mike will provide critical support for both existing and future chapters. Among the many responsibilities in this role will be creating a resource database (including speakers and topics), facilitating the creation of new chapters and fostering improved communication between chapters and the central committee. Mike has been in active in the Santa Clara Valley chapter for years, including serving as chairman, so he

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The Product Safety Newsletter

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Letters to the Editor

Dear Editor,

Glad to see the basics of product safety/product liability addressed again in the newsletter I enjoyed the Chairman's Message "Safe Enough" in the July August [1994 issue. It is a bit puzzling however to find at this late date, some struggle and indecision over the goal of product safety practice and how to achieve it.

It seems to me if the courts have made anything clear in the product safety/liability arena it is that designers/manufacturers are responsible for eliminating or controlling all unreasonable risk. Our products either are or are not unreasonably dangerous - "defective" or not, in legal terms. To wit, a number of us in product safety consulting have long been convincing clients of his criteria, then showing them how to define "unreasonable risk" for their product and company.

As the article well states, practically every product can present some risk, under certain conditions of use/misuse - no product can be "safe". "Safe enough" then has already been determined as something between minimal risk and unreasonably dangerous.

Since the plaintiffs bar has refused to work with us to identity the principles by which unreasonable risk can be defined (federal tort reform, etc.) broad observation of case law, plus numerous studies such as those by the Defense Research Institute, have provided more than enough criteria with which to proceed on our own.

A good definition of unreasonable risk employs five parameters for establishing sound corporate policy:

1. Voluntary Industry Safety Standards

Contribute to their creation/updating and implement a policy to comply with or surpass the intent of all applicable voluntary industry safety standards.

2. Duty-to-Warn

For safety signs and user's manuals, etc., follow well established professional examples/guidelines in their preparation (industry safety standards, etc.), distribution (dependable, dealer/customer availability), and replacement (part numbers, with dealer/distributor education/motivation).

3. Risk Analysis

Utilize a practical, recognized system with qualifies the best judgement of product safety committee members as to level of frequency, vulner-

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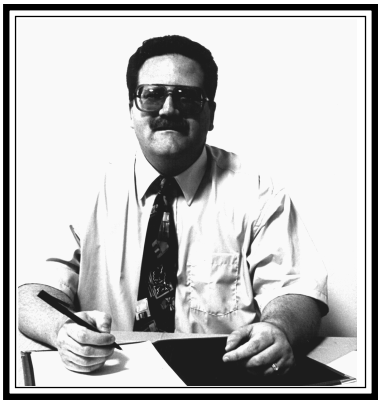
Area Activities



by John Reynolds
voice: 415-390-1344 fax: 415-962-9439
e-Mail: 73771.1225@CompuServe.com

The first meeting of the 1994/1995 season of the PSTC was held in the ROLM Cafeteria, Bldg 2 Topic: Social and Planning session. The following is a little of what went on-

The evening started off with dinner a-la Togo's famous sandwiches and drinks provided by the PSTC. Then the chapter Chairman Murlin Marks gave a short overview of the local chapter and its various activities, The idea of making it a condition for members to fill out a questionnaire to continue to receive the meeting notices, was generally supported by all. Dan Weinberg made a solicitation for volunteers to set-up and man demonstrations at the San Jose Museum of Science and Technology. "The best kind of exhibits are those that involve the attendee," Dan said, "the more interactive it is, the better."

FEBRUARY is Engineers Month. The chapter Treasurer, Mark Montrose, conveyed our financial status and encouraged us to submit worthy causes of technical/education that we could support through donations. Mr. Edward Karl, the Vice-Chair went over the upcoming year's schedule of speakers. So far the following is schedule:

October 25, 1994

Presentation on Series Rated Circuit Breakers by Bob Nguyen and Eddie Lam of Underwriters Laboratories (meeting at HP, Cupertino).

November 22, 1994

Presentation on Risk Assessment by Kathy 0-Connor of Applied Materials (meeting at HP, Cupertino).

December 14, 1994

Combined with EMC Society/PSTC meeting. presentation on Absorbents and Anechoic Chambers by Tom Ellam of Rantec (meeting at Rolm, Santa Clara).

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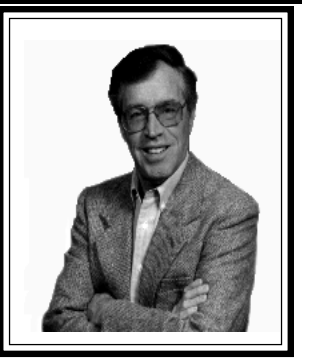
Technically Speaking



MARKINGS AND OTHER AGGRAVATIONS

Copyright 1994 by Richard Nute
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Why? why is it that one of the biggest aggravations in product safety is that of markings? For some reason, it seems that we can never get the markings right the first time. Further more, it seems that markings that have been acceptable for years will suddenly go bad.

Recently, a certification house criticized a product because of the use of "T" in the designation for a North American fuse. The use of the "T" supposedly is reserved by IEC 127 for indicating time-lag or slow-blowing characteristics of IEC 127 fuses. The certification house would not allow the use of the "T" in the designation of a North American fuse.

In a second incident, a certification house criticized a product because of a missing isolation symbol. On the one band, we have provided too much information, while on the other hand, we have provided insufficient information.

In both cases, the product is deemed not to comply with the standard and is treated to the same extent as if the product was hazardous. The implication is that the marking, or lack of marking, will cause the reader to cause a hazardous situation and, perhaps, an injury.

The first aggravation is believing that a marking error such as these, the existence of a "T" in the fuse designation, or the lack of an isolation symbol, will lead to an injury. But, we all know of famous incidents where lack of a suitable warning marking has indeed led to an injury, and the manufacturer was suitably punished. Because of these famous incidents, we feel obligated to correct the marking lest we subject our company to litigation.

The second aggravation is that changing a marking is both costly and time-consuming.

The third aggravation is justitying the change to management and other members of the organization. Since they are not familiar with the standard and do not understand the meaning of the "T' or the isolation symbol, it is both awkward and difficult to explain why the marking must be changed, especially something as apparently minor as removing the letter "T" from the fuse designation or adding the isolation symbol.

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News and Notes

by David Edmunds
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CSA NRTL

CSA has announced that the U.S. OSHA has finally approved their application to be listed as a U.S. Nationally Recognized Testing Laboratory NRTL). All Of CSA's Canadian operations, including the Pacific Region Office, are alloed to perform testing and certification for the U.S. marketplace, using UL standards.

ISO 9000

There are several U.S. organizations that can be used for obtaining ISO 9000. For further information, contact the American National Standard Institute or the American Society for Quality Control at (800) 248-1946.

UL OPEN HOUSE

On 16 September, UL held an open house for their new Camas facility. This facility is up and running and already able to do Listings (UL or ULC) and CB Certificates.

For additional information on this new office contact:

Underwriters Laboratories Inc.
2600 N.W. Lake Road
Camas, Washington 98607
Tel:(206)817-5500

SEMINAR ON MEDICAL EQUIPMENT

UL has a 2 day seminar entitled "Medical Equipment and Systems: Designing for Cornp1iance Ul 2601 and IEC 601" on 29-30 November in Chicago. This seminar will be conducted by UL engineers who are directly experienced in medical equipment standards and who work directly with European certification organizations. For additional information, contact UL Northbrook facility at (708) 272-8800 extension 43481 or FAX to (708)272-0919.

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Laser Safety Notes

Robert Weiner
Weiner Associates, Manhattan Beach, California, USA

[Permission to reprint this article has been granted by the Journal of Laser Applications. The Journal of Laser Applications is the official publication of the Laser Institute of America (LIA). and publishes both basic and applied technical papers covering all applications or laser and electro-optics. Safety and regulatory interest articles (not necessary for review) are welcome. LIA is acretariat to the ANSI Z136 Safe Use of Lasers accredited standards committee. For a sample copy of their publication, author information, or Laser Institute of America membership, please contact John R. Dyer Managing Editor 3763 Sylvan Wood Dr, Sylvania, Ohio 43560, Phone/Far: 419-841-7404.]

The Need to Certify Products to CDRH Regulations

Laser products that are sold in the United States are required to comply with the regulations published by the Center for Devices and Radiological Health (CDR) within the US Food products is straight-forward in most instances, however the applicability of the regulations is not as clear for:

- lasers sold only to Original Equipment Manufacturers (OEMs) as components for incorporation into end- use products,
- end-use products that contain lasers which have all ready been certified by their manufacturers, and
- end-use products that are being imported into the US and that already comply with international laser safety standards.

This article will discuss these applications in an attempt to clarify the need for certification by laser product manufacturers and importers. The discussion applies equally for lasers and laser systems.

OEM LASER COMPONENTS

Lasers that are sold only as components to be incorporated into an end-user product need not be certified to the CDRH regulations. However, the laser component manufacturer must register with the CDHR and advise them of the product name, model number, and laser medium or emitted wavelength(s). To avoid potential problems with CDRH inspectors, the component manufacturer should obtain a statement from each purchaser that confirms that the uncertified lasers sold to that company wilt be used in a product for resale.

The component manufacturer can also minimize potential problems for his customer by providing information on laser safety requirements. Specifically: 1) the purchaser of the OEM

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Thermal Hazards

We are grateful to the author for providing another installment condensed from his book "Product Safeness As A Design Parameter"; 2nd Edition, 1990. The text a registered copyright of Paul W. Hill & Associates, Inc. and is reproduced with permission. Details about the purchase of the book may be obtained by calling (407) 368-2538.

by Paul W. Hill & Associates

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Excessive temperature in operating equipment is a hazard to both personnel and the equipment itself. In the section on preventing fire in equipment the thermal capabilities of components was discussed with respect to the risk of fire. This section deals with the thermal suitability of components and materials as applied in the equipment. The intent is to identity excessive temperatures at accessible parts, the adequacy of structural parts when subjected to localized heating and the ability of the equipment cooling mechanism to maintain components and assemblies within thermal ratings.

Product safety standards use the following tests to establish acceptability of components and materials for their application in the equipment:

1. Temperature rise under normal equipment operating conditions.
2. Elevated temperature test to determine the mechanical properties of structural parts such as those supporting uninsulated conductors or those relied upon to maintain spacings, creepage and clearance distances.
3. Abnormal operation test in which simulated faults are introduced into the operating equipment and the ability of thermal protection devices to maintain thermal limits.

1. Temperature rise.

Temperature rise tests are conducted while operating as specified by the manufacturer with all enclosure pans in place. Various accessories and features are attached to represent a typical operational configuration or operating system. The nominal voltage rating of the equipment as specified on the rating plate, is increased 10 percent to simulate the most unfavorable

Continued

input voltage likely from mains supplies. The equipment is operated until thermal equilibrium is obtained. Thermal equilibrium is three equal consecutive temperature readings taken from 15 minutes apart. If temperature fluctuates during operation and do not stabilize to a narrow range quickly, thermal stability is considered to have been reached after 3 hours of continuous operation.

The temperature of parts and components is measured on outer surfaces with a thermocouple. Internal parts of motors and transformer coils may require the change in resistance method of determining temperatures. Standards specify various parts to be measured and the maximum temperature rise permitted.

There are four criteria for acceptance:

1. Temperature rise limits given in the standard are not exceeded for various parts and insulation materials.

2. No evidence of risk of thermal drainage or ignition of combustible parts. This includes any physical distortion of discoloration of materials.

3. No evidence if degradation to electrical insulation. This may be verified by visual inspection or by dielectric strength testing insulation suspected of thermal degradation or damage.

4. Thermal cut-out or overcurrent protective devices did not operate during the test. Protective devices are not expected to operate during acceptable operating conditions.

This test is not to be confused with other thermal measurements such as conducted in abnormal testing. This test is a test under normal operating conditions and does not simulate faults that induce temperature excursions in the equipment.

2. Elevated temperature test.

Some equipment standards require nonmetallic enclosures and barriers, guards or parts if enclosures which restrict access to a hazard be evaluated in a second temperature test. This test requires various parts to be placed in an oven at temperature 20 C above the temperature these parts experience in normal operation. Most standards require the oven temperature be at least 70 C. Some specify test temperatures to 125 C for structural parts supporting uninsulated conductors. Others require some form of mechanical loading or impact test for structural parts while at elevated temperature to determine deformation characteristics.

Acceptance is based on the ability of the part to continue to function adequately as a guard or barrier intended to restrict access to a hazard. The standard test probe and test finger is used to determine if access restrictions are maintained. Cracks, opening of seams or distortions of panels and barriers are acceptable if contact with hazards is not possible with the test probe and test finger.

3. Abnormal operation temperature tests.

The purpose of abnormal testing is to determine if thermal controls and other protective devices minimize the risk of ignition within

the equipment. These tests also consider protection from electric shock or personal injury as a consequence of thermal degradation or damage to electrical insulation. Abnormal operation tests simulate common faults conditions such as locked rotors in electric motors, failure of cooling fans, blocked ventilation openings, component failures and similar fault conditions which lead to thermal excursion within the equipment.

Faults are simulated one at a time. When a component fails it is replaced before the next fault test. In some cases component replacement is not practical and additional units of the equipment or replacement subassemblies may be necessary. The tests should be arranged in order for destructiveness so as to minimize the number of replacement parts required.

Acceptance criteria are listed in equipment standards and generally require the absence of any increased risk of ignition, personal injury or electric shock.

4. Common difficulties in temperature tests.

Difficulties with thermal tests most of ten are the results of one or more of the following:

Accessories.
Accessories are not included in the thermal load considerations in equipment design. When accessories are included, equipment with marginal thermal performances may fail to meet safety certification or listing requirements for elevated temperature and abnormal operating tests. Good design practice gives consideration of the power loading and thermal affects of accessories, add-on features or interconnection of two or more units into an operating system.

Thermal Analysts.
Thermal Analysis is a demanding engineering specialty and this skill is not always available to designers in the early stages of product development. As a consequence, many cooling and ventilation schemes for enclosure designs are forced to accommodate less than satisfactory thermal engineering approaches. Good design practice is to recognize the specification of thermal engineering and seek design guidance from thermal specialists.

Components and sub-assemblies.
Components and sub-assemblies from suppliers are not always fully qualified for thermal characteristics. Parts, drawings and sub-assembly specifications often do not address basic thermal parameters. Good design practice is to specify the thermal requirements of components to suppliers and qualify components for thermal requirements of components to suppliers and qualify components for thermal conditions expected int he equipment.

Thermal modelling and testing:
Thermal evaluations are not always conducted realistically during product development. Individual components and sub-assemblies may have acceptable thermal characteristics as stand-alone entities but behave differently when assembled into a system and confined to an enclosure. Thermal modelling should be undertaken early in product development stages. Such modelling can yield important design guidance even when in primitive form such as heat loads represented by resistors in hand built wood, plastics or paper board prototype enclosures.

News and Notes,
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INJURY RISK REDUCTION

Compaq Computers Corp... of Houston Texas has announced that its keyboards will soon display a sticker warning users that to reduce their risk of injury to hands, wrists, or other joints they should read a company supplied booklet. This booklet, originally issued in 1991, has been updated to include a more complete discussion of proper work habits and of safety and health considerations that are associated with computer use. According to a Compaq statement "no scientific studies have shown that typing at a computer keyboard caused repetitive stress injuries". However the statement continues, "there is so much uncertainty regarding the actual cause of these health concerns, we want the customers to have the best available information on workplace comfort and safety so they can make more informed decisions".

IC 825-1

Lasers are not the only type of radiation source now regulated by the International Electrotechnical Commission (IEC). Light emitting diodes (LEDs) are now subject to the same standards as lasers, This new development is as a result of the IEC amending its old standard 825 to create 825-1, "Safety of Laser Products, Part 1: Equipment Classification, Requirements and User's Guide," and 825-2, Part 2: Safety of Optical Fibre Communication Systems."

A fellow Product Safety Engineer in Raleigh, North Carolina is battling with cancer and we have been told that he could use some encouragement from our readers. Please consider sending a card or letter to Scoff Shaw at the following address:

Scoff Shaw
3049 Sky Crest Drive
Raleigh, NC 27604
(919) 878-8785

Thank you ahead of time for your thoughtfulness and compassion. - Ed

Unfortunately, measurement specifications which restrict laser output to safe levels with a reasonable safety factor over-restrict LEDs. If the present standard 825-1 becomes a European Norm through CENELEC, now scheduled, now scheduled for March of 1995, most pieces of electronic equipment using visible LEDs for indicators or infrared LED for communication will require labeling at least, or may not be saleable in their present form at all. Your LED-equipped lab instrument and your television and VCR remote controls (with infrared LEDs) would be affected. (Can you imagine having to close your eyes to change the channels?) National committees are preparing for the October meeting of IEC Technical Committee 76, at which the LED regulation will be a hot topic.

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Edward then presented the list of suggested topics from the previous survey and asked for additional topics. I won't list them all here but they ranged from Ergonomics to E-Mail and CE Marking to the Bi-National Standard.

Brian Claes of Lam Research, the National Chairman gave an inspiring speech outlining the goals of the National Product Safety Technical Committee. Brian noted that there is a group at the national IEEE level that is devoted to environmental Health and Safety issues. We as a TC should endeavor to promote product safety through them. He then enlisted our opinions on growth ideas for the PSTC. One area I have always been interested in establishing a product safety bulletin board where the safety engineers of all areas could share information, discuss issues and help each other keep up with ever changing jobs. A lot to think about and much to get involved in.

Next Meeting

Tuesday Oct. 25th.

"Avoid Heartbreak Over Breakers" by Bob Nguyen and Eddie Lam ofthe UL Santa Clara Office.

Orange County / Southern California Group

The October 4th meeting will feature a presentation on **Certification Options** by Charlie Bayhi of CPSM, David Blocksom of Certitech Corporation will conduct a talk on **Medical Regulations** for the November 1st meeting.

Meetings are held at **6:00pm at QSC Audio, 1675 Macarthur Blvd., Costa Mesa, CA**. Contact Host Hal Keeling for details (714) 754-6175.

Dinner- Join us at Columbo's for an informal discussion, dinner and refreshments after the meetings.

HELP- Would anyone like to take the responsibility for planning a Christmas Party?? We have limited flinds to help with the arrangements. If interested contact Vice-Chairman Ercell Bryant at (714) 589-0700.

Laser Safety Continued from Page 7

laser should be made aware that they must certify their end product; and 2) the product manufacturer should be advised to install OEM lasers in a manner that they cannot operate outside of the product without altering the wiring. If a laser system does not safl'sE the latter criteria, it would be considered a "removable laser system" which then must be separately certified. OEM laser systems that include power supplies can meet this requirement by removal of any line cord plugs or by wiring interlocks through the laser system.

Some manufacturers of diode lasers, HeNe's, and other components have found that certifying their OEM products assists their customers with the CDRH compliance effort on the end-use products. (For example, output power measurements would not be needed by the end product manufacturer in some applications.) The certification of a component by its manufacturer provides a service to customers which is useful in marketing the OEM product.

PRODUCTS CONTAINING CERTIFIED LASERS

Most end-user products must be certified by their manufacturers, even if they contain laser components that have already been certified to the CDRH regulations. Exceptions to this policy are discussed in this section.

For products that contain *certified lasers above Class 1* end-product certification would not be required if all of the following are satisfied:

- the laser is incorporated in a manner such that the laser safety characteristics of the emitted laser energy are not affected (e.g., there are no additional beam enclosures and no lenses in the beam path that collimate or focus the laser energy),
- the controls, indicators, and labels on the housing of the certified laser are visible and accessible for use,
- it is not feasible to enclose the laser energy and still perform the intended functions (thus the product cannot be Class 1),
- the end-use product would be exceed any CDHR requirements that apply for that specific application (e.g, the Class l1la limit for construction/alignment equipment), and
- the user information from the laser component manufacturer is provided to the purchaser.

The above exemption might apply, for example, to a visible laser pointer that has been attached to the exterior of a product housing for an alignment reference or to a bar code reader supplied with a point-of-sale checkstand.

For products that contain certified *Class 1 lasers*, the end-use product needs not be separately certified if:

- the performance or intended use has not been modified,
- the label requirements would be met when the laser is removed from the product or during service on the laser, and
- user information for the Class I laser is passed along to the purchaser.

This exemption would apply, for example, to CD players installed in automobiles, to CD ROMs installed in computers, and to Class Ibar

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code scanners mounted in clinical diagnostic instruments.

Under the exceptions discussed in this section, the end-product manufacturer acts as a distributor of the certified laser product. The only requirement would be to maintain distribution records that would permit traceability of each unit to the end user. Distributors are not required to file compliance reports or annual reports.

IMPORTED LASER PRODUCTS

All imported laser products sold in the US are subject to the same CDRH regulations as domestically-produced units, even if they comply with international [2] or regional laser safety standards or the ANSI user safety standard [3.] As such, the CDRH compliance report must be filed, the CDRH-required certification statement must be affixed on the housing, and the product must be classified in accordance with the CDRH measurement criteria and radiation class limits. Also, the product must contain the features and labels required by the CDRH for that class, and the manufacturer must comply with the record keeping and reporting requirements.

The CDRH labeling is slightly different from that specified under the IEC 825-1 laser safety standard, however, the CDRH is moving in the direction toward acceptance of the IEC labeling as an alternative. Changes which have been informally proposed to the performance requirements and product classification [4] will minimize the differences between the CDRH and the IEC standards when they are issued, likely in 1995-96. Readers can obtain updates on the laser safety regulations in future issues of *JLA* and in references 5 & 6.

ACKNOWLEDGEMENT

The author wishes to thank Jerome Dennis who beads the laser compliance branch at the CDRH for his assistance in reviewing this article.

REFERENCES

1. 21 CFR 1040, CDRH Laser Performance Standard, Center for Devices and Radiological Health, as published in the *Federal Register*, August 20, 1985. Available from CDRH (HFZ-312), 2098 Gaiter Road, Rockville, MD 20850, Telephone (301) 594-4654.

2. IEC 825-1, *Safety of Laser products- Part 1: Equipment classification requirements*, and user's guide, International Electrotechnical Commission, Geneva, 1993. Available from ANSI in New York and from International Electrotechnical Committee, 3 Rue de Varembe', CH-1 121, Geneva 20, Switzerland.

3. ANSI Z136.1-1993, ANSI Standard for the safe use of lasers, American National Standards Institute, New York, 1993. Available from ANSI in New York and from the Laser Institute of America, 12424 Research Pkwy., #125, Orlando, FL 32826, Telephone (407) 380-1553, Fax (407) 380- 5588.

4. Laser Products: Intent to Amend Performance Standard, Federal Register, Vol.58, No. 8 Monday May 10, 1993. See Reference 1 for source.

5. 'Status of Laser Safety Requirements', an article by Robert Weiner that lists the current US and international labor safety standards. Published in the 1993 edition of *Lasers & Optronics Technology and Industry Reference* (Buyers guide).

6. *Laser Safety Update*, a newsletter available at no fee to laser product manufacturers, published by: Weiner Associates, 544-23rd St., Manhattan Beach, CA 90266, Telephone (310) 545-1190, Telefax (310) 546-7490, E-mail- INTERNET: 71020.734®compuserve.com.

OSHA Office Ergonomics Checklist

by Mike Vaudreuil
Hewlett-Packard

OSHA has started work on a surveillance checklist for office and VDT jobs. It is being developed by Barbara Silverstein who had developed similar lists as part of the ANSE 2365 Cumalative Trauma Disorder standard.

The checklists divides work exposure into three time lengths- less than one hour, one to four hours, and more than four hours. It then awards points for jobs that contain different types of ergonomically suspect tasks, postures end motions. A score exceeding ten for a particular job would trigger some additional job evaluation, although OSHA is not yet specific on what would be trigerred. One assumes that the checklist could be used by OSHA compliance officers as an inspection tool.

Duration and Points		1-4 hrs		
Features/Tasks		<1 hr		>4 hrs
1.	Display screens			
	* lacks adjust ability	0	2	3
	* lacks contrast	0	1	2
	* obvious flicker	1	2	3
2.	Keyboards			
	* non-detachable	0	2	3
3.	Table/Desk			
	* surface above elbow	0	1	2
	* height/leg clearance	0	1	2
4.	Contact Stress			
	* chairs/thighs	0	1	2
	* sharp desk edges	0	1	2
5.	Chairs			
	* not height adjustable	0	1	2
	* back rest not adjustable	0	1	2
6.	Akward Postures			
	* neck/shoulder	1	2	3
	* truck (twist/bend)	1	2	3
	* hand/wrist	1	2	3
	* feet (unsupported)	1	2	3
7.	Fixed Postures			
	* cannot change position	1	2	3
8.	Environment			
	* glare	0	1	2
	* too much/little light	0	1	2
	* excessive noise	0	0	1
9.	Continuous Keyboard Use	0	2	3
10.	Lifting in excess of 50 pounds	3	3	3

As yet, OSHA has not developed any accompanying guidance materials on how to use the checklist. Also, they are looking at similar checklists used by employees, consultants, and others to improve their basic design.

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has considerable insight into chapter operations. Mike can be reached at (408) 434-4084.

Symposium Workshop

Barbara Kelkhoffwill be heading up the Product Safety Workshop at the '95 Symposium in Atlanta. Past workshops have been very well-received and we're excited about what's in store for '95 as Barbara assembles her team and makes preparations. Barbara can be reached at (708) 993-6306.

Near-Term Opportunities

TC-8 exists primarily to meet the needs of safety professionals in fulfilling their important responsibilities. Proposals from those in attendance at the meeting included:

- Create a central database for research works and other publications dealing with product-related safety. While there are large information retrieval systems that may be helpful in researching developments in product safety, the profession could benefit from a more focused system.

- Create a standards committee that leverages the national and international standards development experience within our membership to sponsor, assist and coordinate standards development in industry groups that presently don't have their own standards development infrastructure.

- Expand the focus of the committee to emphasize technology-related solutions. It was felt that a stronger technical content would make participation in TC-8 essential for many in the business.

If you are interested in further information on these or other opportunities please let me know as is the case in all volunteer organization-progress is made only when individuals jump in and devote their talents and energies to realizing goals.

Inter-Society Affiliations

One of the goals of TC-8 is to formally assume a product safety coordinator role across several IEEE societies in addition to our work within the EMC Society. While we have had the support of the EMC Society for some time to bring this about, work on the proposal is finally in the works. What's been interesting is there hasn't been as much broad-based interest within our own ranks for this as there has been among our potential affiliates. One caution is that progress in this direction could impede our ultimate development as a full IEEE Society as participating societies may fear loss of members with strong safety interests to the new Product Safety Society. We will provide routine progress updates in this newsletter.

Expand Scope

Of strategic interest is the possible expansion of our scope and charter to encompass the relatively new concept of product stewardship as primarily a safety function. Product stewardship has been a topic in local chapter meetings and there is both a real need and a logical fit for TC-8 to take this on. Product stewardship has been defined in various ways but most definitions generally fo-

Continued

Chairmants Message, Continued from page 1

cus on the total loss/cost to society associated with products throughout their entire life cycle. This necessarily includes environmental aspects related to raw materials production, energy consumption, operation and disposal. Stay tuned for periodic updates.

As always, I encourage each of you to share your opinions or suggestions on anything discussed in this column. I can be reached at (510) 659-6574.

Looking forward to hearing from you.

Brian Claes

Markings, Continued From Page 4

The fourth aggravation is that some of us may consider a marking error as a reflection on our ability to do a good job. We failed to understand the standard, and we failed to do the job right as the marking we approved was found to be in error. Management and co-workers may consider such incidents when reviewing our credibility and performance.

The fifth aggravation is that our industry, safety of electronic products, impunes a great deal of importance to markings in terms of product safety. The issue I want to address is whether such importance is justified. Can and do the markings required by standards contribute to the prevention of injury? If we can answer this question, then most of the aggravations from markings will disappear.

Consider the following REQUIREMENT for multi-voltage input markings from a popular and successful IEC standard (my emphasis in capital letters):

"The voltage range SHALL have a hyphen (-) between the minimum and maximum rated voltages. Where multiple rated voltages or rated voltage ranges are given, they SHALL be separated by a solidus (I)"

This is INCREDIBLE! The implication is that the safety of the product will somehow be impaired if a hyphen or solidus is not used as specified. The standard presumes that it is THE AUTHORITY for the very best (least confusing) method of presenting power ratings data. (Rating markings are data; as data, such markings are not directly related to safety as are warning markings.) The requirement implies that there is no other method of presenting voltage data which could be better understood.

(This is not to criticize the possible need to standardize the presentation of rating markings outside of a safety standard.)

In this example, the focus is on voltage rating markings. The question is: What is the hazard if the user or installer fails to observe the voltage rating markings? Or is confused by the lack of a properly used hyphen or solidus? If the rating marking is required for safety of the product, then failure to heed the input voltage marking implies (1) that the equipment will be connected to an incorrect voltage, i.e., a voltage other than a rated value, and (2) that connection to such a value will render the equipment hazardous.

Is this reasonable? Many safety standards require at abnormal input voltage test for equipment rated for multiple input voltages. (Such a test is implied, but not overtly required by the safety standard which requires the hyphen and solidus.) If the equipment successfully passes the abnormal input voltage test, then whether or

Continued on page 18

not the marking includes a hyphen or solidus is inconsequential to the safety of the equipment!

If a hazard should result from connection to an incorrect voltage, then a warning would be much more appropriate than reliance on the specified use of the hyphen and solidus. Yet the hyphen and solidus are required by the standard, and the certification house must require their use regardless whether the product is otherwise safe.

"If a hazard should result from connection to an incorrect voltage, then a warning would be much more appropriate than reliance on the specified use of the hyphen and solidus."

Here is another marking anomaly from the same standard. If a plug of an attached power supply cord is used as the disconnect device, then the installation instructions shall state that the socket-outlet in which the equipment is to be plugged shall be installed near the equipment and shall be easily accessible

The implication of this requirement is that, if a hazardous situation should arise, disconnection of the equipment from the supply is the means to disable the hazard and render the situation as safe. For this to be tale, personal intervention is invoked, with the presumption that someone is always present in the equipment area when it is plugged in to the socket-outlet.

This flies in the face of safety construction and safety testing. The requirement implies that a hazard is expected whenever the equipment is plugged in, and that someone should be present whenever the equipment is plugged in.

I don't know of any buyer of plug-and-socket connected equipment who, after purchasing the equipment and reading the markings would then call an electrician to move or install socket-outlet so that it was easily accessible

For the purposes of safety, we can classify safety markings into two kinds. The first kind is data, or information. The second kind is warnings, where personal intervention or personal avoidance is required as the means for assuring safety in a specific situation.

Rating markings such as fuse ratings and input voltage ratings are data. Data does not imply particular action on the part of the reader. Warning markings require a particular action, upon the event of specified conditions, for the reader either to intervene or avoid. For example, in the traditional fuse replacement warning, the condition is: " upon replacement of the fuse." The intervention is: "use only the specified rating of fuse.'

By use of the words "personal intervention" and "personal avoidance," I mean that a person must take a particular and specific action at a particular and specific time to avoid a hazard.

A good example to illustrate the concepts of personal intervention and personal avoidance in safety is that of driving a car on our public roads. We drive our cars using a set of rules of behavior, all of which allow us to predict the behavior of both ourselves and of other drivers in

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Letters to the Editors
Continued From Page 3

ability (assumption of risk), and severity. Then process their results through the protocol of: (1) failures (hardware or man/machine interface) that might be expected to lead to, (2) hazardous situation that might be expected to lead to, (3) accident that might be expected to lead to, (4) injury that might be expected to be minor, moderate, or severe.

4. State of-the-Art

"Common good practice" in our industry's product engineering, and manufacturing technology provides target guidelines for an appropriate level of attainment for every manufacturer. Included are:

- Product design technology
- Human factors/behavior criteria
- Committee consensus process on safety judgements
- Product literature/advertising
- Field modification practice for safety issues
- Warranties - express and implied
- Manufacturing technology (tolerance, deviations, etc.)
- Multilingual awareness
- Record retention
- Product audit
- Product safety training

Accident Information

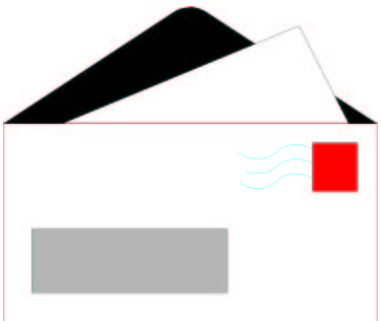
Secure/utilize (investigate as necessary) available injury accident information to drive product design, recall, and legal defense.

The article also seems somewhat confusing on the matter of voluntary industry safety standards. It suggests a "hierarchy of principles" in place of "arcane—codified tradition. "A good voluntary safety standard represents a feasibility study of engineering, economics, and human behavior parameters that is practical, that all can relate to, and that a free country (and an engineering profession) greatly relies on to buffer the myopia of government regulation or legal emasculation.

Let's not begin again to reinvent a wheel that The plaintiff's bar uses to its great selfish advantage. Alternatively, it is wise to encourage manufacturers to put into practice what we know to be sound morally, ethically, legally, and economically while we encourage and teach others the importance of reasonable behavior.

Cordially,

Keith Pfundstein
KPS Technology



Author's Response on Next Page

Response From the Author:

Thanks for the opportunity to respond to Keith Pfundstein's comments arising from my "Safe Enough" article. Most of Keith's letter describes his philosophy of sound product safety practice, reflecting the systems and approaches he encourages his client companies to adopt. While I think there are alternative paths to the same beneficial ends, what he describes is excellent. Furthermore, what I hear Keith saying is that good safety practice as he describes it is widely understood and implemented and consequently there should be no need for public rehashing or indecision.

When it comes down to it, the only major aspect of Keith's letter I take exception to is the presumption that product safety, as he describes it, is widely practiced. I see the state of practice in a less glowing light. How widespread are the practices of some of the activities specifically mentioned:

1. How many product safety professionals study tort case law and research studies done by the Defense Research Institute? [How many have even beard of the BNA Reporter or DRI?]

2. How widespread is the use of formal recognized risk assessment systems? [...and there are quite a few to choose from. How many can the average safety professional name, describe, and demonstrate evidence of prior use?]

3. How widespread is the use of product safety committees, presumably a multi-disciplinary one?

4. How often do product safety professionals expertly and fully integrate "human factors/behavior criteria", "manufacturing technology (tolerance, deviations, etc.)", reliability and other related disciplines to their practice?

5. How widespread is the implementation of systems to reliably secure and utilize information relating to accidents?

6. Are our voluntary safety standards really the result of feasibility studies of engineering, economics and human behavior? [Maybe someone should write a book on the ancestry and gestation of IEC 950 or UL 1950.]

7. In what ways do product safety professionals "encourage and teach users the importance of reasonable behavior? [How much time do product safety professionals spend with users of their products, whether teaching or learning?]

Maybe I'm out of touch with the general tenor of product safety practice, but my observations have lead me to conclude that the majority of safety practice seems to be merely compliance-oriented and that most activity is devote to:

1. determining if products conform to published standards,
2. obtaining approvals and certifications and
3. satisfying requirements of regulatory bodies or other authoritative entities.

That is to say, we seem to be predispositioned to deal with the binary rather than focusing efforts on the more difficult and important questions of comprehensive product safety risk management.

Response, Continued

One last point, and it's a minor one, is it Keith singles out product safety consultants in the second paragraph of his letter as a bastion of product risk management knowledge. I'm not sure if he's saying that it's been his experience that clients are clueless about risk management without hiring a consultant or whether he sees sound risk management as the minimum standard of professional practice for product safety professionals. I believe he intended the latter and so it should be.

Brian Claes

Markings, Continued ----------

any particular situation. For example, the rule is to drive on the right side of the street. When we all do this, we are able to predict behavior. Driving on the right side of the street will avoid oncoming vehicles, will avoid collisions and will maintain our personal safety.

Driving without injury on our public roads requires specific personal intervention and personal avoidance actions at specific times. Understanding driving rules is accomplished by XXans of driver education and a test of individual knowledge. Conformation of understanding is the awarding of a license to drive.

Enforcement of driving rules is by means of a specific authority, the police, and by means of sanctions regarding the future operation of the car. The equipment manufacturer usually has no means to educate, test, or enforce behavior of persons installing or using the equipment.

Consequently, relying on personal intervention and personal avoidance as the means for safety is not reliable. Relying on data such as the presence or absence of a "T" in a fuse rating, or the presence or absence of an isolation symbol is unlikely to prevent an injury (although it may prevent product liability).

The safety of operation an automobile relies on operator competence. The safety of plug-and-socket-connected electrical products relies on the hardware. Markings, whether data or warnings, do not make a product safe.

Your comments on this article are welcome. Please address your comments to the Product Safety Newsletter, Attention Roger Volgstadt, c/o Tandem Computers Inc., 10300 N. Tautau Avenue, MailStop 55-53, Cupertino, California 95014-0708. Or, send e-mail to VOLGSTADT_ROGER@Tandem.COM.

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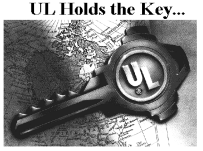

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