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# ***THE PRODUCT SAFETY NEWSLETTER***

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August, 1988

Vol 1, No. 7

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## ***CHAIRMAN'S MESSAGE***

by **RICHARD PESCATORE**

***PAGE 2***

## ***TECHNICALLY SPEAKING***

by **RICH NUTE**

***PAGE 3***

## ***ASK DOCTOR Z***

by **DOCTOR Z**

***PAGE 8***

## ***AREA ACTIVITY REPORTS***

***PAGE 11***

## ***LETTERS TO THE EDITOR***

***PAGE 18***

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**CHAIRMAN'S MESSAGE**by **RICHARD PESCATORE**

Formal affiliation with the IEEE has been established.

In the last Newsletter, I mentioned two intermediate steps that would help us reach our goal of becoming an IEEE Product Safety Society. These were first, a Technical Committee of an existing IEEE Society, and second, a Technical Council of two or more IEEE Societies. Progressing through these steps in an orderly manner will provide the most efficient migration from our present unaffiliated status to an IEEE Product Safety Society.

We have taken the first of these steps. On August 1, I met with the IEEE EMC Society Board of Directors to present our history and goals, and to formally request their sponsorship of our group as a Technical Committee. Upon conclusion of my presentation, a motion was made to form a Technical Committee on Product Safety. The motion was approved and I am pleased to announce that we have successfully completed the first step toward becoming an IEEE Society.

Following the formation-of the Technical Committee on Product Safety, a motion was made to appoint me as its Chairman. This motion was unanimously accepted.

I will now be working with the EMC Society Technical Services Director, Don Heirman, to develop the details of our organizational structure. I am confident that we will maintain our focus on Product Safety and move forward toward taking the next step, affiliation with the IEEE as a Technical Council. During this process, I expect to keep in close contact with the Chairmen of our local chapters so that we can coordinate our efforts to continue our rapid and successful growth.

The only immediate change that we will experience is a change in nomenclature. We are now the Technical Committee on Product Safety, rather than the Product Safety Society or The CSA Users Group.

I would like to take this opportunity to thank Don Clark, IEEE EMC Society President, and the other members of the Board for their support. The Technical Committee on Product Safety looks forward to a mutually fruitful relationship.

Richard Pescatore  
Chairman

**TECHNICALLY SPEAKING**by **RICHARD NUTE****BEHAVIOR OF AIR AND SOLID INSULATIONS IN SERIES**

Hello from Vancouver, Washington, USA!

Last month, in the column "Ask Dr. Z", Dr. Z made the statement that "the failure was probably due to rubbing between the wire and the ground trace which scoured the coating to a thin enough layer to fail the dielectric strength test". Probably not.

Recall the situation: A common-mode inductor in a power supply was resting on a ground conductor of a printed wiring board. The only insulation between the inductor and the ground conductor was that of the coating on the inductor wire.

The insulation system had failed a 1500 Volt rms electric strength test. Dr. Z and his client presumed that the solid insulation - the coating on the inductor wire - had been scoured so that there was little or no insulation between the inductor and the ground conductor.

Dr. Z implied that many power supplies (or, at least those submitted to several certification houses) successfully passed the electric strength (hi-pot) test. How could this happen with the construction as described? That is, why did not more units incur the scouring and the reduced insulation thickness? Why did the first failure not occur until early production and AFTER completion of certification?

Have you ever tried to strip coating from magnet wire? It is tough stuff! One spec I checked

is 1350 grams to fail a single scrape. Have you ever checked the electric strength spec for magnet wire? Typically, they are very much higher than product hi-pot voltages (2400 Volts rms or more for AWG 38 up to 7000 Volts or more for AWG 18). So, we have a mechanically tough coating which, even if it could be scoured, would still have a very high electric strength.

I don't agree with Dr. Z's hypothesis that the coating failed because it was scoured thin by rubbing of the insulation against the circuit board. I believe there is another and more satisfying explanation (hypothesis) for the hi-pot failure.

Here is my hypothesis: More likely, the inductor insulation was intact, and the air broke down - between the ground trace and the inductor insulation. The heat in the arc then burned the inductor (magnet wire) insulation.

I suggest that, in those situations where the magnet wire is in intimate contact with the ground, there is no breakdown. Similarly, if there is an air gap exceeding 1 millimeter, there is no breakdown. But, if there is an air gap of less than 1 millimeter between the magnet wire and the ground, then the air gap will breakdown!

This is certainly a curious hypothesis: The system only breaks down if there is an air gap, and then only if the air gap is less than 1 millimeter. And, it does so without regard to the electric strength of the coating on the magnet wire!

How can this be? On the surface, this does not seem rational.

Technically Speaking, *Continued*

CONDITIONS FOR DIELECTRIC OR INSULATION FAILURE:

First, we need to identify the conditions for dielectric or insulation failure. Dielectric or insulation failure occurs when the applied volts/mm between conductors exceeds the withstand volts/mm of the dielectric or insulating medium between those conductors.

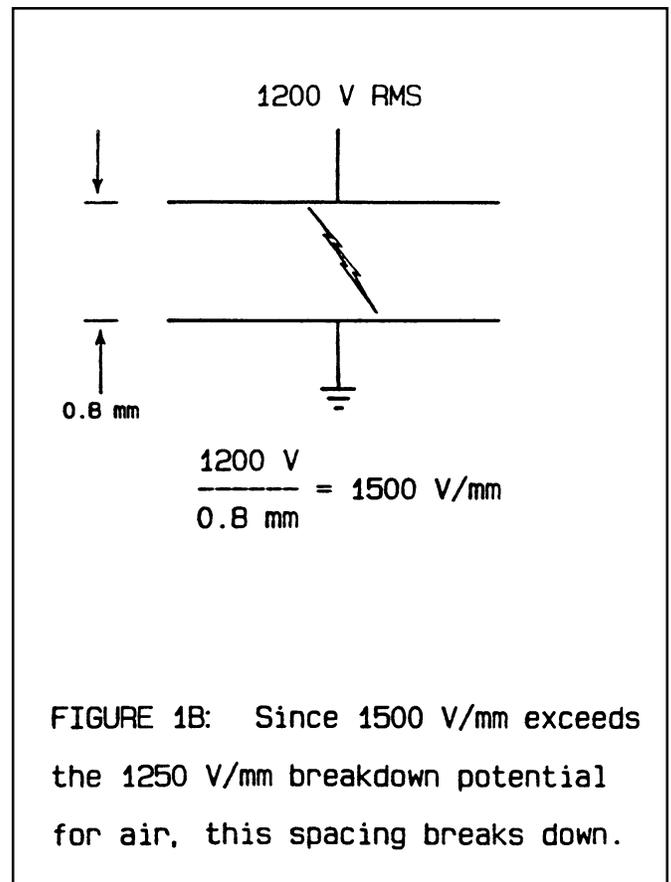
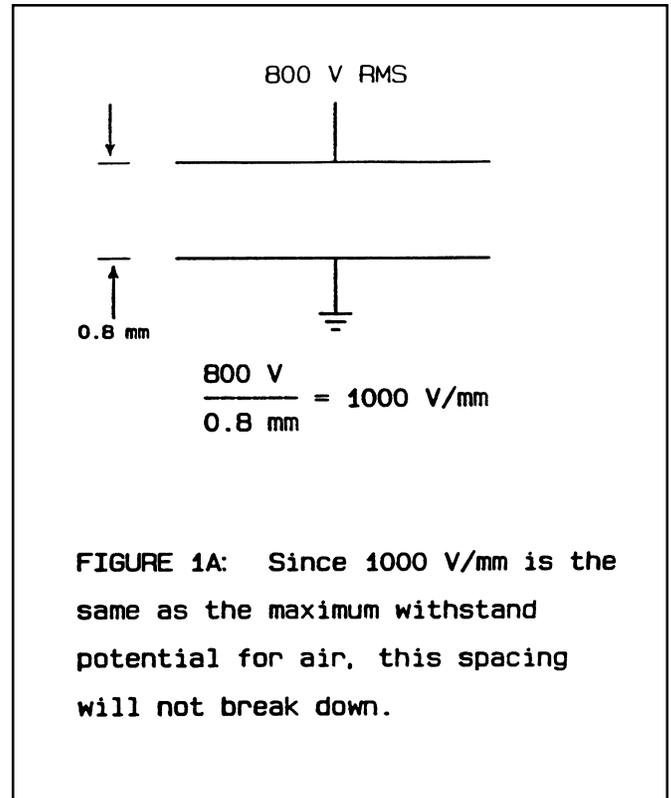
For example, Table A1 of IEC 664 gives voltage withstand values for various distances through air (an insulating medium). We find that air has an electric strength of about 1000 volts/mm for distances up to about 1 mm, decreasing to about 500 volts/mm at 10 mm.

On the other hand, Table All of IEC 664 gives voltage breakdown values for various distances through air. We find that air breaks down at about 1250 Volts/mm for distances up to about 1 mm, decreasing to about 620 volts/mm at 10 mm.

In between Tables A1 and All we have a sort of “no man’s land”. That is, we have a region where other factors such as electrode shape, variation, air pressure variation, pre-ionization, etc., influence the actual withstand and breakdown voltages.

Solid insulation behaves exactly the same way. Except that the withstand volts/mm is different for each material, and is always many times greater than the withstand volts/mm for air.

Therefore, one condition for insulation failure occurs when the applied volts/mm exceeds the withstand volts/mm of the insulation medium. See Figures 1A and 1B.



Technically Speaking, *Continued*

More specifically, a condition for insulation failure occurs when the INCREMENTAL applied volts/mm exceeds the INCREMENTAL withstand volts/mm of the insulating medium. That is, the applied volts/mm may not be uniform throughout the insulating medium.

## INSULATION IN SERIES

Next, let us examine the behavior of two different insulating media in series. Two conductors separated by an insulating medium constitute a capacitor. Two insulators in series behave as two conductors in series. This is true even though no conductor exists at the interface of the two insulating media because the dielectric media hold the charge, not the conductive plates of the capacitor.

When two capacitors are in series, voltage divides inversely proportional to the capacitance. That is, the smaller capacitor has the larger voltage drop across it.

With this physical law in mind, if we know the value of the two capacitors, we can determine how much voltage is dropped across each capacitor, and whether the volts/mm exceeds the breakdown value for each insulating medium.

Capacitance is directly proportional to the dielectric constant of the insulating medium. The dielectric constant of air is 1. The dielectric constants of solid insulating media are usually several times that of air. So, the greater the value of dielectric constant, the greater the value of capacitance. In general, given the same area and distance between conductors, the use of a solid insulation results in capacitance several times the value with air insulation.

Capacitance is inversely proportional to the distance between the conductors.

Given two insulators in series, and therefore two capacitors in series, the voltage across each insulation is inversely proportional to the dielectric constant, and directly proportional to the thickness of each insulator.

Now consider the insulation system Dr. Z was dealing with: a series system comprised of a very thin, high dielectric constant solid insulation (the magnet wire), and a relatively thick, low dielectric constant air insulation.

The very thin, high dielectric constant has relatively little voltage across it, while the thick, low dielectric constant air has most of the voltage across it!

Now, we need only determine whether the volts/mm in air exceeds the breakdown voltage for air. (We can ignore the solid insulation as its withstand voltage exceeds the test voltage.)

Next, some equations:

$$C = k \frac{A}{d}$$

Where C is Capacitance, k is the dielectric constant, A is the area of the plates and d is the distance between the plates.

For two capacitors in series, we will assume that the area, A, of the plates is the same.

The voltage across anyone insulation within the capacitor is:

$$V = \frac{d}{k}$$

Technically Speaking, *Continued*

The total voltage is the sum of the voltages across each individual insulation. The percent voltage across the air in a series construction of air and solid insulation is:

$$\%V = \frac{d(\text{air})}{1} / \frac{d(\text{solid})}{k} + \frac{d(\text{air})}{1} \times 100$$

The voltage distribution of a series construction of air and solid insulation for various values of dielectric constant, k, are shown in Figure 2.

In a series system of air and solid insulations, and where the dielectric constant of the solid insulation is quite high, it may be necessary to also meet minimum spacing requirements in air to prevent exceeding the breakdown potential of air.

CAPACITANCE

One final factor needs to be considered: the value of capacitance. Conduction in a gas has four distinct forms: corona, glow discharge, spark, and arc. IEC 664 states:

“One form may give place to another in quick succession depending on attendant conditions. Arc formation depends upon the presence of an electric field which tends to strip electrons from the positively charged nuclei of the atoms of the gas between the electrodes. Under the right conditions, these electrons collide with other electrons and release them from their atomic bonds in a cascading fashion. The net result is a flow of electrons, i.e., electric current and arc discharge.”

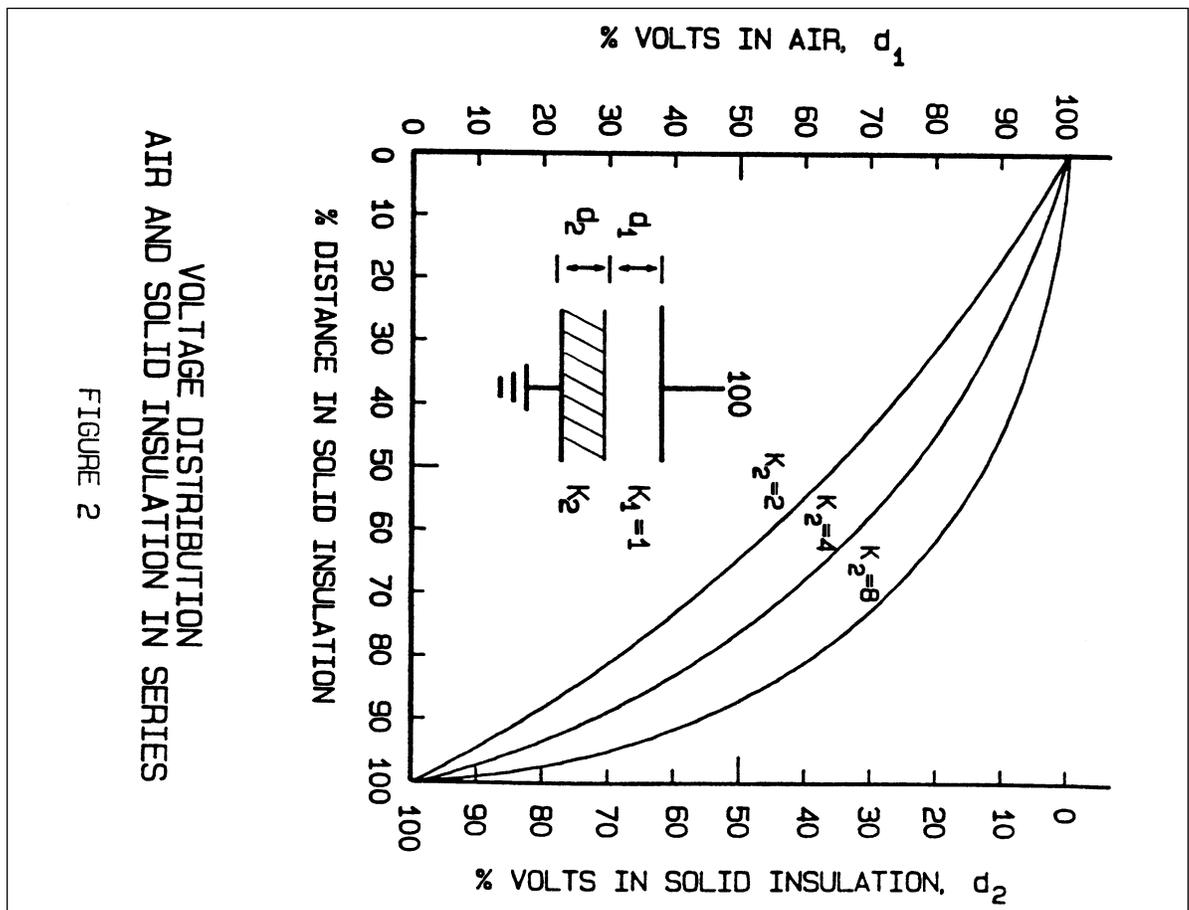


FIGURE 2

*Technically Speaking, Continued*

Note the condition of electric current. The magnitude of the current is a function of the value of capacitance. If the capacitance is very small, the current magnitude will be very small, and the succession of forms of conduction ( corona, glow discharge, spark, and arc ), will be limited such that a full breakdown as evidenced by an arc may not occur.

Therefore, for this process to occur, capacitance of the solid portion of the air-solid insulation system must be large enough to provide the current necessary to sustain an arc.

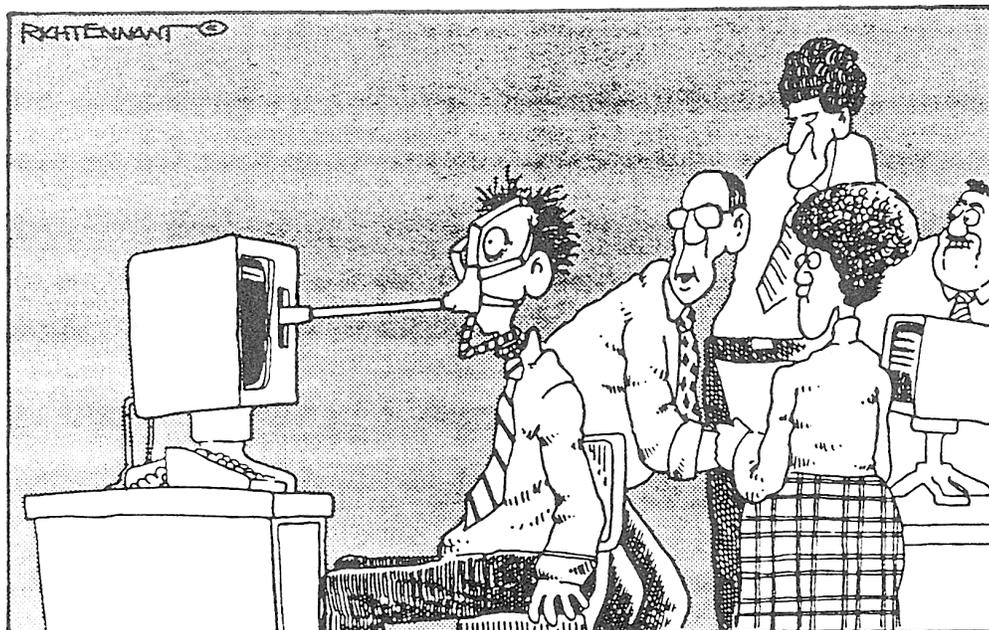
Fortunately, in most constructions, the value of capacitance is so small as to limit conduction in a gas to corona during the hi-pot test.

**CONCLUSION**

Don't ask Dr. Z.

In any construction where two insulations are in series, the voltage gradient between conductors is not likely to be linear. Care must be taken such that voltage gradients (volts/mm) do not exceed the breakdown values for each insulation. This is especially true where one insulation is air and the distance in air is less than the distance needed for air alone (as was the case for Dr. Z's client).

Obviously, in this case we don't know whether or not the insulation was scoured or the air was subject to breakdown conditions. But, Dr. Z's example gave me a good excuse to describe a phenomenon that I have experienced on many occasions. Perhaps you, too, have had this experience; if so, I hope this explanation fits the facts of your situation.



**The 5th Wave**

"ALRIGHT, STEADY EVERYONE. MARGO, GO OVER TO TOMS COMPUTER AND PRESS 'ESCAPE',...VERY CAREFULLY!"

**ASK DOCTOR Z**by **DOCTOR Z**

At least one person read the "Ask Dr. Z" column in the July, 1988 Product Safety Society Newsletter. That same individual also provided a letter in response to the comments made in the column! As the Chairman of the PSS (now a Technical Committee of the IEEE EMC Society) is not responsible for Dr. Z's opinion, the letter was forwarded to Dr. Z. The thoughtful letter from Michael Tam is reprinted here:

**Dear Richard (Pescatore):**

With reference to our telephone discussion on July 19, 1988 regarding the subject newsletter, following is my comment regarding Dr. Z's reply to Mr. Frustrated:

- (a) A product certified by agencies such as Canadian Standards Association does comply with the applicable standards. When manufacturers display the CSA Mark on their products, they are telling consumers their products comply with CSA standards' requirements after the products have been evaluated under a formal system, which includes examination, testing and inspection.
- (b) CSA Standards are information documents that stipulate the technical requirements for the safety and/ or performance of products, processes and services. An equipment standard such as the C22.2 No. 125-M1984 is mainly dealing with the safety issues and performance of electromedical equipment.

CSA Standards are developed, monitored and updated by volunteer committee members, many of whom are the product safety engineers from the industries. Any equipment which bears the CSA Mark should be in compliance with the applicable standards, and considered to be safe for users.

Human beings are not perfect. It might be the case that all three different test agencies have overlooked the common mode choke with insufficient clearance to ground for the power supply unit. It also might be the case that the prototype units submitted by the vendor were not the same as the production units.

I would like to suggest that Mr. Frustrated should bring this case to the attention of the Product Safety Engineer at his company. It should be the Product Safety Engineer's responsibility to contact the three test agencies accordingly.

In conclusion, I hope your members would agree with me that all product safety engineers and certification agency engineers are trying to achieve a common goal - test, examine and evaluate a product to be safe for the user.

Very truly yours,

**Michael Tam, P. Eng.**  
**Senior Engineer**  
**Canadian Standards Association**  
**Pacific Region**

**Dear Michael,**

Dr. Z is sure your letter echoes the thoughts of many, so it is important your comments be explored further.

In your sub-paragraph (a), you make two statements. The first statement asserts that a certified product does comply with the applicable standards. Dr. Z offers as contrast the letter from "Frustrated in Manufacturing" which clearly shows the product with the certification mark did not meet the standard. Later on in your letter, in the second and third paragraphs, you recognize this fact and offer opinions on how this situation could exist. The bottom line is that a certified product is still only a certified product.

The second statement you made regards what a manufacturer is attempting to tell the consumer of a certified product Dr. Z suspects most manufacturers intend the certification mark to mean the product is certified. This means simply meeting the certifiers criteria to get approval to use the certification mark and meeting the certifiers ongoing criteria presented at subsequent inspections. Product literature and specs many times list the certifications obtained. The value of the certification is left for the consumer to determine.

Ask Dr. Z, *Continued*

Dr. Z is fairly confident that a certification mark means different things to different people. These meanings result from experience, advertising, gossip (this column, for instance), and desires. Safety mayor may not be an expectation. How many certified components are used in applications that have nothing to do with real safety, so the sole contribution of the certification mark is to make certification of the product easier???

Sub paragraph (b) of your letter defines what a standard is. Dr. Z agrees, and suggests an even shorter definition! A standard is a statement of an acceptable performance. Acceptable performance may be related to many topics, but in our case safety takes center court

In your next to last paragraph, a suggestion of what to do is provided to "Frustrated" (no suggestions were made by Dr. Z at the time). There are a number of steps that a practicing safety engineer would follow in resolving the problem, including working with the vendor to see the source of the defect was eliminated. Dr. Z is at a loss to understand why the situation should be reported to the certifying body, as only the owner of the design and manufacturing process can improve it to eliminate defects. The certifying body does not own the process, so cannot change it to eliminate the source of the defect

Dr. Z agrees with your comment that product safety engineers and certification agency engineers believe they are in the business to deliver a safe product to the customer. Dr. Z is concerned with the confusion that exist over how this is done. As "Frustrated" discovered, certification does not make a product safe or even compliant. That responsibility is that of the R&D engineer. The certification agency simply evaluates the R&D engineers performance by testing the product to the statement of acceptable performance.

Yours with a slightly different perspective,

Dr. Z

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*FOR YOUR INFORMATION:*

**CERTIFICATION AGENCIES, PART II**

The following is the second in a series of articles meant to aid you in your work with the various agencies. It is important to be able to contact the right person at the right Certification Agency (defined here as a company that supports its own certification mark, rather than obtains a mark on behalf of a client). We will be including different agencies in the coming months, as space and time permit. Please let us know if you find this article useful, what improvements could be made, and which agencies you would like to see included.

(Continued on Next Page)

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ETL Testing Laboratories, Inc. is an American company that tests and issues its own ETL Mark according to UL Standards. It can test to other Standards as requested.

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## ***CHAPTER ACTIVITY REPORTS***

### **SANTA CLARA VALLEY AREA REPORT**

The July meeting of the Product Safety Society meeting started with much anticipation for the nights topic. But first, Rich Pescatore opened the meeting by reviewing old and new business. Scott Barrows of the Membership Committee reported that the Product Safety Society is busy getting ready to issue membership cards to those members who have turned in their "Membership Application and Questionnaire". If you have not yet turned yours in, please send it to Scott as soon as possible (see elsewhere in this Newsletter for a copy of the Questionnaire - ed).

The nights topic was "Harmonization of UL 478 with IEC 950". The guest speaker was Mr. Mike DeMartini, Managing Engineer at Underwriters Laboratories Inc., and chairman of the UL 478 standards writing committee. Mike began the topic by giving a brief history of the IEC, UL and CSA standards for Data Processing and Office Appliances. He described the evolution of the standards, and the on-going work to combine all three into one standard for this class of products.

Due to the need for manufacturers to become more competitive and make manufacturing less expensive, UL suspended the effective date of UL 478, 5th edition and began work on a new edition of the standard. The goal of the new standard is to accept the requirements of IEC 950 unless there is sufficient rationale for not accepting it. There were basically three areas in which deviations were found to be necessary. First, US based electrical codes; second, US requirements not addressed by IEC 950; and third, component requirement conflicts.

The next meeting will be August 23, 1988 at 7:00 pm at Apple Computer in Cupertino, 20525 Mariani Ave., on the corner of DeAnza Blvd. (just South of HWY 280). The topic for the next meeting will be Practical System Safety Analysis Techniques by Brian Claes.

### **COLORADO AREA REPORT**

Steve Tarket is still the local contact for people in the Denver area who are interested in starting their own meetings. So give Steve a call or fax today!

Contact: Steve Tarket (M/S 65), c/o Hewlett Packard  
3404 E. Harmony Rd., Ft. Collins, CO 80525  
Telephone: 303-229-2481; Fax: 303-229-2692

## **UPSTATE NEW YORK AREA-REPORT**

Dave Edmunds is a new volunteer as a local contact to pass on information about our group. If you are in the upstate New York area, please call Dave about getting together.

Contact: Dave Edmunds (M/S 843 ), c/ o Xerox Corporation  
800 Phillips Rd.,  
Webster, NY 14580  
Telephone: 716-422-2380; Fax: 716-422-7841.

## **FLORIDA AREA REPORT**

Michael Hatch is the latest person to join our list of local contacts. Please pass the word to colleagues in the Tampa area to call Mike if they are interested in meeting locally.

Contact: Michael Hatch, c/ o Innovative Industries, Inc.  
5909-C Hampton Oaks Pkwy., Tampa, FL 33610  
Telephone: 813-621- 7855; Fax: 813-623- 2229

## **SOUTHERN CALIFORNIA AREA REPORT**

Charlie Bayhi reports that their August 1, 1988 meeting included a presentation by Frank Campia on the CSA Power Supply Committee, its organization and function. There was also a discussion about the impact of the NEC paragraph 725-38 requirement for building cables (additional flammability requirements). Very few knew about the new requirements and the NFPA's rejection of the request for extension (see Product Safety News - Ed). Finally, there was an election of officers. The results of the election are as follows:

Chairman: Charlie Bayhi  
Vice Chairman: Rolf Burckhardt  
Program Chairman: Ersell Bryant

The next meeting will be October 3, 1988 and will feature Dr. Rosenboro from the FDA. Dr. Rosenboro will discuss Laser Safety. The time and place of the meeting are to be determined.

Contact: Charlie Bayhi, c/ o MAI Basic Four, Tustin, CA  
Telephone: 714-730-2556; Fax: 714-730-3185

## **NORTHWEST AREA REPORT**

There was no meeting last month, but that doesn't mean there wasn't any activity. The EMC Symposium was held in Seattle August 2nd through the 4th and the NWC of the PSS was there manning a booth to spread the word about our new Society. Volunteers- Walt Hart, Bill Picatti, Bijan Nafea, Gary Victorine, Joe Patterson, Pat Coles, and myself handed out flyers to a very interested crowd. The flyers detailed our different regional societies, our strategies, charter, and our applications.

Members should be cautioned not to be surprised to get an members joining from Beijing, China or from Belgium as the symposium was very well attended and many of the engineers there were also product safety engineers. I personally talked with the director for another EMC symposium in Denver and he said he would be contacting Steve Tarket to set up something similar to our booth.

The next meeting will be held on October 18,1988 , ~ October 19,1988 as originally planned. Pete Perkins of Tektonix in Beaverton, Oregon is hosting an all afternoon PSS meeting which will conclude with dinner. The topic for discussion will be "International Power Line Configurations and Components". Representatives from Japan, England, and the Netherlands will be there to discuss the differences and consequences in grounding, leakage current, 50 Hz vs. 60 Hz, ring circuits vs. branch circuits, attachment plug caps, and much more. An additional speaker from a US manufacturer or expert in this area is being sought for the meeting.

Al Van Houdt

Product Safety Engineer

Contact:

Al Van Houdt, c/o Spacelabs, Inc.  
206-882-3700, ext. 4006

## **NORTHEASTERN AREA REPORT**

Our last meeting was held on July 27,1988 at DS&G facilities, with over 40 attending. Initial business included a discussion of the proposed affiliation with the EMC Society as a Technical Committee. The majority of attendees at this meeting were doubtful about the affiliation because of several serious concerns. First, will we be able to maintain our focus on our goals as expressed in our charter? Second, will we still have any initiative or independence of action as a Technical Committee? Third, will we be abandoning our pursuit of becoming a separate IEEE Society? The consensus seemed to be that becoming a Technical Committee of an IEEE Society might be more a "dead end than a "step toward Society status".

**Northeastern Area Report, *Continued***

Three presentations were conducted during the course of the evening meeting: Jeff Tuttle from PRIME Corp. led a discussion of the NFPA revised standards concerning premises wiring. Nancy Araway from DATA GENERAL CORP. led a discussion concerning recent ECMA activities. And, Bruce Langmuir presented a video and led a discussion on Safety of Power Cords, Extension Cords, and Branch Circuit Breakers. This presentation was a real eye opener and one that we feel should be shown to other Chapters of the Product Safety Society around the USA and again to key persons at NFPA and UL.

Briefly, the CPSC feels the solution to many power extension cord fires is to require them to use 16 AWG wire, thus theoretically making the breaker more likely to open and the power cord not get so hot when it is shorted. Thus, for about the last couple of years, the Code requirements are now for 16 AWG wire extension cords in the USA. However, extensive testing has shown that the North American branch circuit breakers, such as the 15 A and 20 A variety, frequently do NOT prevent short duration electrical fault conditions which can easily cause fires. Short duration current spikes can occur when power cords are shorted. These short duration 200 A peak to 500 A peak current spikes will not cause the breakers to open when cords are shorted. Fire conditions can be created with a short duration high current spike with a breaker which essentially never opens, whereas a fuse will usually open and prevent the fire condition. We will be submitting a more extensive article on this issue for future publication in the Product Safety Newsletter.

Our next meeting will be held on August 24, 1988 at 7:00 pm. The place of the meeting and the topics are still under consideration - but will be sent to the Northeastern members within the next week.

Jim Norgaard  
Chairman, Northeastern Area  
Product Safety Society  
Contact: Jim Norgaard  
617-263-2662

**A SPECIAL RESPONSE FROM OUR SECRETARY-TREASURER**

The members of the Northeastern Chapter are understandably concerned about the affiliation of the Product Safety Society with the IEEE EMC Society. Although our status as a Technical Committee on Product Safety is described as "interim" - only a step on the way to achieving full IEEE Society status - will we lose our focus on product safety and control of our own destiny?

**Special Response, Continued**

The answer to this question must be a resounding “NO!”. The only way that we could lose our focus would be if our members lost their interest. And in that case, there would be no point in continuing anyway!

I look at the concern of the members as a very favorable sign. These people really care about the future of the Product Safety Society! Because they do care, I ask them to spend a little of their time each month helping to build their local group into a stronger, more useful organization. To be fair, one or two people cannot be expected to assume all the responsibility when everyone benefits. We are all busy professionals, with work that often can take all our spare time and more, but I think you will find that a few hours a month can provide a lot of satisfaction and can accomplish a lot of good for product safety.

Let me assure our members that the officers also care about the future of the Product Safety Society. The chairman’s message this month describes our first formal affiliation with the IEEE and reaffirms our determination to continue working towards our goals. The text of two of the slides that Rich Pescatore used in his presentation to the EMC Society Board of Directors is reprinted below. Note that many of our members were surveyed and agreed that an interim affiliation with the EMC Society would be the best approach to achieving IEEE Society status.

Finally, if you have opinions about this or other issues, please write to the Newsletter editor, so that discussion and debate can take place. That is, after all, one of the functions of a professional society.

John McBain  
Secretary- Treasurer

### Background

Fall, 1985	CSA liaison group formed by a few Silicon Valley product safety professionals.
Spring, 1987	CSA liaison group expanded to San Francisco Bay Area CSA users group.
Oct., 1987	CSA Users Group evolved into Product Safety Society; an organization for product safety professionals
Dec., 1987	First Technical Meeting of the Product Safety Society in Cupertino, CA
Feb., 1988	First Issue of the Product Safety Society Newsletter; Second chapter formed in the Northwestern United States.
July, 1988	Newsletter circulation exceeds 600; Four chapters active nationwide.

A Special Response, *Continued*

## ORGANIZATIONAL OBJECTIVES

- \* Maintain Focus on Chapter Objectives
- \* Affiliate with the IEEE EMC Society as a Technical Committee for Product Safety.
- \* Migrate to status as a Technical Council
- \* Continue quest for status as an IEEE Product Safety Society.

### Santa Clara Valley Program Chairman's Report

by Brian Claes

For the past two months, we have been evaluating the meeting topic preferences submitted as part of the membership applications. The following tabulation ranks the responses in order of preference (highest preference first).

#### PRODUCT SAFETY TOPIC INTEREST SURVEY

SUBJECT	VOTES IN EACH RANKING LEVEL									
	10	9	8	7	6	5	4	3	2	1
System Safety										
Analysis Techniques	16	13	14	9	8	7	4	3	4	4
UL 478/IEC 950										
Harmonization	27	5	7	11	7	6	3	2	8	2
Product Liability	24	8	7	10	6	7	3	5	5	5
Product Safety Mgmt.	14	7	13	13	9	4	3	5	2	4
Hazard Accessibility	11	6	15	6	7	14	5	5	2	1
CSA Presentation	15	6	11	5	6	9	5	3	10	3
Quantitative Risk										
Assessment	11	6	13	5	11	11	2	6	6	4
Electrical Fire Hazards	14	8	3	10	3	12	10	7	3	3
Human Factors	7	7	12	6	2	9	11	10	5	4
Thermocouple Methods	10	5	5	8	7	7	8	2	11	10
Software Safety	12	5	1	5	3	5	5	8	4	20

NOTE: Two criteria were used to rank the topics in decreasing preference (most to least) from top to bottom:

- 1) The number of votes ranked 8,9, and 10 for each topic and
- 2) The sum of the products of the number of votes in each rank and the rank number in all ten ranks for each topic.

**Program Chairman's Report, *Continued***

The first three topics, system safety, UL478/IEC950 harmonization and product liability were decidedly the most preferred topics and formed their own tier of importance. Additionally, there were more than twenty "write-in" topics half of which covered international requirements and approvals.

Recent meeting topics, have included a system safety overview and the harmonization of UL 478 and IEC 950. Over the next three months we are scheduling presentations covering European product liability and another on practical system safety analysis techniques; additionally, a panel discussion is being planned as a possible afternoon meeting.

In past months, we've had excellent technical presentations on dielectric strength testing, warning labels and human response to leakage current. However, we continue to have a need to locate people with knowledge and experience in safety-critical technical areas who can share the results of their expertise with the society. Our membership can be of great help in this area in particular by bringing such people to our attention.

We are always eager to hear from you on how you feel about our programs and especially how you feel the programs can be improved. To do this, simply drop me a line or give me a call at the following:

Brian Claes, M/S 1-03  
Tandem Computers, Inc.  
19333 Vallco Parkway  
Cupertino, CA 95014

Phone: (408) 725-5173  
Fax: (408) 748-2137

## ***LETTERS TO THE EDITOR***

*The following letters were received since our last edition of the Product Safety News. The editor reserves the right to edit letters to fit the available space.*

In your search for IEEE Societies to affiliate with, do not overlook the Industry Applications Society (IAS). They are already involved in safety standards, reviews of standards, etc. I'm not sure of their approach to this, but it seems their interests are closer to PSS than some of the societies mentioned in the Newsletter.

If I can provide more information, please let me know.

Regards,

**S.G. Roll**  
**Vice President and Chief Engineer**  
**Electrical Division**  
**Underwriters Laboratories Inc.**

I am in favor of pursuing the sanction of the CSA User's Group/Product Safety Society by the IEEE.

I also agree with your message in the Product Safety Newsletter (July) in which you state the possibility of becoming a "Technical Committee", within an existing Society. I believe that such an affiliation will provide us with the time needed to organize, and position ourselves for eventual "Society" status. It may be too premature to pursue full Society status at this time for the reasons stated in your "Chairman's Message".

The EMC Society seems suitable for our group at this time. Many Product Safety Engineers are also EMC Engineers, and this would certainly help in keeping up the interest level in Product Safety.

I believe a sanction of the CSA User's Group by a professional association would greatly benefit the CSA User's Group. Other organizations would recognize the CSA User's Group as a professional organization, for the benefit of its' members.

In addition, Apple Computer Inc. is more than happy to volunteer our facilities for meetings of the CSA User's Group/Product Safety Society.

Should you have any questions or comments, please feel free to contact me.

Regards,

**Mario H. Gomez**  
**Manager, Product Safety**  
**Apple Computer**

*(The editor wishes to extend his appreciation on behalf of the Product Safety Society to Mario and Apple for their support of the Santa Clara Valley Chapter.)*

It was a pleasure talking to you today about the Product Safety Society. As discussed, we are interested in exploring the Tampa area to determine the level of interest for a South East Chapter. Please feel free to put my name on the next Newsletter as a contact for those who may be interested.

Enclosed please find a list of names of potential interested parties for the Newsletter. If possible, please forward more information to me regarding society membership, dues, etc.

Once again, it was a pleasure talking with you and I look forward to keeping in touch.

Sincerely,

**Michael L. Hatch**  
**President, Innovative Industries**

I was surprised and disappointed to see no letters or comments regarding my criticism of the CSA 220 subcommittee. You will recall that, in my column in the May issue of the PSSN, I criticized the Sub-committee for their lack of study of their requirement to limit the stored energy at the prongs of a power plug. (continued on next page)

**Letters, Continued**

I expected some comments regarding the technical veracity of my analysis. I expected some defense of the subcommittee. I expected some personal criticism. But nothing! Oh, I did get two phone calls. Mostly Clarification.

Being very blunt, I invite your letters to the PSSN on the following diatribe: ,

Safety standards are largely comprised of BOGSAT (\*) requirements. There is little or no logic, engineering, or scientific method applied to safety requirements contained within standards.

Here is an anecdote of a recent committee meeting. Industry members could not or would not reach agreement on an issue. It was resolved by the meeting secretary (non-technical) stating he would write the requirement in a particular manner to his own satisfaction. There was no engineering judgment or rationale applied to the situation. Nevertheless, there were a number of registered professional engineers present and participating. No one, not even the chairman, assumed responsibility for the requirement.

Rarely does anyone have test data to back a proposal. After a proposal is made, rarely is it tested on representative equipment. Rarely is the hazard defined for which the requirement precludes. Even more rarely are the conditions for the hazard to exist defined.

As an example, see UL 478, 5th edition, para 37 A1 and 37 A2. Depending on how the short is made, almost any shield can be made to either pass or fail. For another example, see the same standard, para 5.17 and 5.19. Materials rated VI by definition do not drop flaming drops. So, if you are willing, you can do the "unless ..." test and have no limitations on bottom openings. So, why does UL have both paragraphs? Because we let it happen! No one on the IAG assumed a responsibility for verifying and validating the overall set of requirements and their objective.

We have crummy standards because of the quality of work of the standards committees. We have no systematic process for evaluating the efficacy of proposals and requirements. We have crummy standards because of our own crummy participation in the standards process. We have no one to blame but ourselves. The standards process is

BOGSAT, but it should not be so. Safety is an engineering discipline, not an art. As such, we must use our hard-won training and education to its utmost. Thus far, we have not even opened an engineering text to verify even the simplest of requirements. Most of our engineering is only sophomore level, yet we don't apply it. Consider the continuing furor over the value of the current sampling resistor in measuring leakage current; for all practical purposes, when we measure leakage current, we are measuring the current of a current source; the value of the resistor is inconsequential to the measurement! Yet I know of no engineer who has bothered to apply sophomore level engineering Thevenin's Law to this issue!

With the exception of those who hold some kind of ownership for the output of a committee, the vast majority of committee attendees are not held responsible for, and do not assume any responsibility whatsoever for, the output of a committee.

Why does this happen? I submit that it happens because committee membership is not part of the job of committee members. Most people explain that attending a committee meeting is not part of their job - that they must make up all the work they missed during the committee meeting.

I attribute this lack of responsibility to the managers of the people who are sent to attend committee meetings. They place no performance expectations on contributors of the committee member to the committee. They evaluate each trip to a committee meeting as an individual trip, not as one of the objectives of their organization.

(\*BOGSAT: I am indebted to my friend and colleague, Fred Kalbach, for this term BOGSAT = Bunch of Guys Sitting Around Talking).

**Richard Nute**  
**Hewlett Packard**  
**Author, Technically Speaking**

*(The above letter contained guidelines in making committee attendance productive. Those guidelines will be included in next month's Letters to the Editor column.)*





Product Safety Newsletter  
c/o Tandem Computers Incorporated  
10300 North Tantau Avenue, Loc 55-53  
Cupertino, CA 95014  
Attn: Roger Volgstadt

## ***The Calendar of the Product-Safety Society***

### **August 1988**

**Tuesday, August 23**

**Santa Clara Valley Chapter**

Subject: System Safety Analysis

Speaker: Brian Claes

Time: 7:00 pm

Location: Apple Computer  
20525 Mariani Ave.  
Cupertino, CA

**Wednesday, August 24**

**Northeastern Chapter Meeting**

Subject: tbd

Speaker: tbd

Time: 7:00 pm

Location: tbd

**October 1988**

**October 3**

**Southern California Chapter:**

Subject: Laser Safety

Speaker: Dr. Rosenboro, FDA

Time: tbd

Location: tbd

**October 18**

**Northwest Chapter**

Subject: International Power Info

Speaker: Various

Time: tbd

Location: Tektronix, Beaverton. OR

AUGUST, 1988 VOL. 1, NO.7

**THE PRODUCT SAFETY  
NEWSLETTER**