

Minutes
Electrical Power Working Group
13 July 2001
Dallas/Ft. Worth Airport Marriott
Irving, Texas

Chairpersons: Ken Vannice; NSI Corporation, representing Leviton Manufacturing Co., Inc.; principal;
producer
Bob Luther; Lex Products Corp.; principal; producer

Recording secretary: Karl G. Ruling; ESTA

Members attending: Mitch Hefter; Rosco/ET, representing USITT; principal; gen. interest
Trevor Forrest; Helvar Lighting Control; principal; producer
Edwin S. Kramer; IATSE, Local 1; principal; user
Ron Dahlquist; Dadco; observer; producer
Roger Lattin; IATSE Local 728; principal; user
W. G. Krokaugger P.E.; Mole-Richardson Co.; principal; producer
William N. Masten; SMS Inc. / PGS LLC; principal; producer
Richard A. Prey; SMS Inc. / PGS LLC; alternate; producer
Joe Boardman; Bender Inc., representing Bender GmbH & Co. KG; alternate; producer
Brian Dowd; TMB Associates; principal; producer
Arnold Tang; Arnold Tang Productions; observer; gen. interest (joined at this meeting)

Visitors: Tracy Underhill; Electronics Diversified
Jimm Cash; Lex Products

1 Opening remarks

Ken Vannice called the meeting to order at 08:05

2 Attendance and membership

2.1 Introduction of those present

Vannice asked those present to introduce themselves, which they did, proceeding in a clockwise direction around the hollow-square table.

Ruling noted that Tim Cox and George Long sent their regrets for not being able to attend.

2.2 Determination of quorum

Ken Vannice asked the voting members to raise a hand. Eight did so and Vannice announced that a quorum was present.

2.3 Recognition of alternate voting members

It was noted that SMS Inc. / PGS LLC had both an alternate and principal present. They were reminded by Ruling that only one may vote.

2.4 Requirements for membership

Ken Vannice stated that the meeting is open to all who have a vested interest in the work of the group. He noted that we are concerned with having a balance of interests on the working group, and encouraged members to enlist the support of non-producers on the working group.

Vannice noted that there is an attendance requirement for voters. Representatives of a voting entity can miss no more than two consecutive meetings and maintain voting status. At the third meeting missed, the individual, or principal and alternate will be moved to observer status. This will normally be done at the beginning of the third meeting missed.

Vannice also noted that there is a voting requirement. Voting members must respond to letter ballots. Missing two ballots in a row will result in a warning. Missing a third ballot will result in a change of voting status to observer.

2.5 Processing of new membership requests

Bob Luther noted that many of the applicants were not present and that a few had requested voting status. He suggested that they be voted in as observers, since their inattendance did not suggest that they would be able to meet the attendance requirements for voting members. Luther read the applications:

Steve Terry; Electronic Theatre Controls
 Arnold Tang; Arnold Tang Productions
 Bill Kanne; Illumination Dynamics
 Kevin Stolpe; Illumination Dynamics
 Jim Holladay; Luxence
 Douglas Franz; QVC Network

Roger Lattin moved that the above applicants be accepted as observers. The motion was seconded. The motion was accepted unanimously with a show of hands.

The consensus body during the meeting was thus:

Name	Company	Representing	Voting status	Interest category
Doug Kraus	Advanced Devices, Inc.	Advanced Devices, Inc.	P	P
Bud Toly	Advanced Devices, Inc.	Advanced Devices, Inc.	A	P
Jeff deRecat	Advanced Devices, Inc.	Advanced Devices, Inc.	A	P
George Long	Aggreko Event Services	Aggreko	P	U
David Evaniew	B. I. M. Limited	B. I. M. Limited	P	P
Wolfgang Hofheinz	Bender GmbH & Co. KG	Bender GmbH & Co. KG	P	P
Joe Boardman	Bender Inc.	Bender GmbH & Co. KG	A	P
Jeffrey Measley	Crouse-Hinds Molded Products	Crouse-Hinds Molded Products Inc.	P	P
Trevor Forrest	Helvar Lighting Control	Helvar Lighting Control	P	P
Edwin S. Kramer	IATSE, Local 1	I.A.T.S.E. Local 1	P	U
R. Bruce Prochal	I.A.T.S.E. Local 728	I.A.T.S.E. Local 728	A	U
Roger Lattin	IATSE Local 728	I.A.T.S.E. Local 728	P	U
Patric J. Abaravich	IATSE Local 728	I.A.T.S.E. Local 728	A	U
Jose J. Flores	Kino Flo, Inc.	Kino Flo, Inc.	P	P
Don Gray	Kohler Event Services	Kohler Co.	P	U
Ken Vannice	NSI Corporation	Leviton Manufacturing Co., Inc.	P	P
Mitchell Stein	Leviton Manufacturing Co., Inc.	Leviton Manufacturing Co., Inc.	A	P
Tim Bachman	Leviton / Colortran	Leviton Manufacturing Co., Inc.	A	P
Bob Luther	Lex Products Corp.	Lex Products Corp.	P	P
Louis Bradfield	Louis Bradfield	Louis Bradfield	I	U
Phil Fram	Marinco	Marinco	P	P
Brian Parker	Mole-Richardson Co.	Mole-Richardson Co.	A	P
W. G. Krokaugger P.E.	Mole-Richardson Co.	Mole-Richardson Co.	P	P
Tim Cox	PLASA	PLASA	P	G
Robert Barbagallo	Proximo Inc.	Proximo Inc.	P	G
William N. Masten	SMS Inc. / PGS LLC	SMS Inc. / PGS LLC	P	P
Richard A. Prey	SMS Inc. / PGS LLC	SMS Inc. / PGS LLC	A	P
Michael Lay	Strand Lighting	Strand Lighting Ltd.	P	P
Andy Topinka	Technical Group Services, Inc.	Technical Group Services, Inc.	P	G
Colin Waters	TMB Associates	TMB Associates	A	P
Brian Dowd	TMB Associates (NJ)	TMB Associates	P	P
Richard Wolpert	Union Connector Company	Union Connector Company	P	P
Mitch Hefter	Rosco/Entertainment Technology	USITT	P	G
			23 votes	14 P 5 U 4 G

3 Approval of the minutes from the previous meeting

Ken Vannice asked for any corrections or additions to the draft minutes of the March 2001 meeting. None were offered.

Roger Lattin moved that the draft minutes of the 21 March 2001 meeting be accepted as written. The motion was seconded. There was no discussion. The motion passed unanimously with a show of hands.

4 Call for patents

The following was read by Ken Vannice:

"ESTA intends to publish no standard that contains protected intellectual property, unless that property can be licensed by anyone for a reasonable fee. ESTA uses a process of open patent disclosure to implement this intent. ESTA does not conduct patent searches and does not warrant that its standards contain no protected intellectual property.

"In keeping with the open disclosure policy, I ask if anyone present wishes to notify the working group of the existence of a patent or copyright that might protect material in a standard being developed by the working group. You need not be the holder of the patent or copyright in order to notify the working group of its existence."

Mitch Hefter reminded that group that Rosco/Entertainment Technology has a patent on the low-harm mode technology used in the company's IPS dimming system. Karl Ruling noted that we have no standards-drafting project in the working group at this time to which that patent is relevant, but that its existence is noted in case we ever do have such a project.

5 Anti-trust statement

Vannice read the following statement:

"The ESTA Board of Directors, the Technical Standards Committee, and the leadership of this working group will reject or nullify any actions that unlawfully restrain trade. Anyone who feels that such an action is being or has been taken is requested to bring that matter to the attention of the chair immediately. Anyone who feels that actions in restraint of trade have been taken and not properly annulled is requested to notify the TSC chair or ESTA president immediately.

"ESTA legal counsel has informed us that violations of the anti-trust laws can have serious consequences. Individuals engaged in certain unlawful conduct can be found criminally liable. An individual convicted of a criminal violation of the Sherman Act may be fined as much as \$100,000 and imprisoned for up to three years. An easy-to-read pamphlet describing restraint of trade issues is available from the Technical Standards Manager."

Karl Ruling waved the easy-to-read pamphlet in the air. There were no unlawful restraint of trade issues brought to the attention of the chairpersons.

6 Approval of agenda

Mitch Hefter moved that the draft agenda be accepted as written. The motion was seconded. The motion was accepted unanimously by a show of hands.

7 Old business – task group reports

7.1 Task group on a recommended practice for selection, installation, and use of portable feeder cable.

Eddie Kramer reminded people of why we are doing the power feeder survey. He complained that we have too few surveys and that they don't tell us anything we didn't know before. A discussion ensued of how to get more input.

Vannice suggested that we should

- 1) try to get more surveys
- 2) categorize the data from the surveys we have.
- 3) get more input at LDI
- 4) get input at the USITT Conference
- 5) get started on writing a recommended practice.

Roger Lattin revealed that he has started working on a rough draft of a recommended practice. Ruling read Cox's report [appended] in which Cox identifies BS 7909:1998 as a relevant standard. Kramer said that he has a copy and demonstrated this by waving it above his head.

There was also a discussion of how standards might influence voluntary behavior and government regulations. Some feel that practices in the field will not change unless the recommendations of a standard are written into regulations. Others pointed out that simply publishing a standard has strong, if not obvious, effects on practice.

Kramer moved that we develop a standard for the selection, installation, and use of portable feeder cables. The motion was seconded by Lattin. There was a further discussion of a recommended practice versus a standard in which Ruling reiterated ANSI's position that a recommended practice is a standard. The motion was approved unanimously by a show of hands. Ruling announced that this project would be BSR E1.18.

Vannice directed Kramer to review what Lattin has written, and then circulate it to the working group before the next meeting.

Kramer asked Ruling to write to the Stagecraft Mailing List to solicit more input on the power feeder survey.

7.2 Task group for a recommended practice for use of GFCI (Residual Current Devices) in entertainment applications.

Bill Masten distributed a new version of his and Boardman's proposal, 1.7, which was largely the same as the 1.6 version that was distributed to the working group before the meeting for discussion. The new version removed "public" from the sentences in the 1.6 version that said, "All public areas where persons may come in contact with electrical cables," to render them as, "All areas where persons may come in contact with electrical cables." In addition, CFR 29 1910.301 – 1910.399, Subpart S was added to the list of referenced standards.

There was some discussion of the document having been drafted with little input from the wider task group. It was confirmed that the task group includes Bill Masten, Richard Prey, Joe Boardman, Roger Lattin, Mitch Hefter, and Bob Luther.

Eddie Kramer moved that the working group thank Joe Boardman and Bill Masten for their work and that they take the document back to the entire task group for more work. Hefter seconded. Unanimous by show of hands.

Kramer moved that this project become one to draft an American National Standard entitled "Recommendations for the use of ground fault devices in the entertainment industry." Hefter seconded the motion. The motion was accepted unanimously by a show of hands, with the exception of one abstention. Ruling announced that this project would be BSR E1.19.

7.3 Task group to write a configuration standard for HMI power cables and/or head to ballast cables.

Brian Dowd showed the picture the is to accompany the draft standard and the new text that simplifies the socket description. He explained the reasons for removing the reference to the locking portion of the connector.

Ruling reminded the group that the motion was made some meetings ago to vote on sending this draft standard to first public review after an illustration was inserted showing the grounding pin.

7.4 EMC task group

Ken Vannice reported that Phase 1 of the LFEIC's research on European power quality has been completed. Its results do not support the current limits on low frequency power line emissions at the product level. The limits should be relaxed, not expanded. The next step, Phase 2, will involve measuring the identical residences for a period of one week in order to determine:

1. The validity of the general conclusions reached during the Phase 1 study, which is that harmonic distortion in low-voltage European networks is much lower than what has been predicted by some analytical studies, with all sites measuring below the 8% V_{THD} compatibility level.

2. To identify the increase in voltage distortion over a period of one year. This would also test the hypothesis that as the use of distributed nonlinear loads increases; the voltage distortion of the supply network will also increase.
3. To see the difference in voltage harmonic distortion at different times of the year due to the differences in the ratio of non-linear loads to linear loads in use at the time. Most likely the time of the year that voltage distortion measurements will be made for the Phase 2 study will be different than the Phase 1 study, thus shedding some light on the seasonal variation of harmonic voltage distortion.

If it is possible to have access to the utility low-voltage side of the network as well as the medium-voltage side of the network, then another useful activity during the Phase 2 study would be to simultaneously measure at different levels of the network and determine how network impedance affects the voltage-distortion profile across the network.

More money is being sought to support Phase 2, reported Vannice. He recommended that our money is better spent elsewhere since the work has all been for residential systems, which are not our concern. However, the LFEIC is a valuable source of information, so we should support it at some minimal level to ensure our access to the LFEIC.

Vannice also reported on some other European standards issues. One of these is that the ACEC, the Advisory Committee on Electromagnetic Compatibility of the International Electrotechnical Commission, has concluded that their management of the standards-making process is ineffectual, that too many problems are happening. They are looking for a new approach to management.

One of the problems with the IEC's standards work is that it is using horizontal committees that cover a technical issue across a variety of industries, as opposed to vertical committees that confine their work to a particular industrial sector. The IEC's EMC committee is an example of a horizontal committee in that it is making standards for all products that produce or are affected by electro-magnetic emissions. This is a very, very broad range of products, and it is impossible for representatives for all the affected industries to participate. Horizontal committees should only issue advisory documents, not ones that set mandatory requirements.

The LFEIC had circulated a document stating the opposition of US industrial groups to the way the international standards-making process works. ESTA had been asked to sign it, but the document was offered to ESTA's LFEIC contacts with an impossibly short deadline for gaining approval, so there was no signature from ESTA on it when it was published.

7.5 Task group on troubleshooting power quality problems

Andy Topinka, the task group chair, was not present and there was no formal report on the project. Bob Luther said that Topinka has made efforts to find more specific examples or entertainment application problems and solutions. Luther said that he would ask Andy Topinka to be at the LDI meeting. Eddie Kramer suggested that if he is not, that this project be omitted from the agenda.

8 New business

8.1 Expanding the USITT stage pin connector standard

Ron Dahlquist said that the USITT standard has a problem with compatibility, particularly with the high amperage connectors such as the 100 A. Male and female connectors of different manufacturers can be plugged together, forming a tight mechanical connection, but the electrical connection is faulty, which causes overheating.

Ruling pointed out that the 20 A connectors are so designed that the male and female can be connected so that the female hot feeds the male ground.

Bob Luther said that the method of using split male pins is archaic. All advanced connectors use a solid pin and a split female.

Mitch Hefter reviewed the history of the USITT pin connector standard and its relationship to UL and UL's standard for connectors. The USITT standard was written to ensure compatibility between different brands, but UL has apparently not incorporated the USITT standard into its standard. Ken Vannice suggested that perhaps this was because the USITT standard is not an ANSI standard and is thus easy to ignore. Vannice volunteered to see what UL is doing with the pin connector standard. Hefter said that if we decide to work on the USITT standard, he is fairly sure that the USITT will agree to turn over the project to ESTA.

8.1 Reasons for NEC rules

Lattin initiated a discussion of the 19-pin Socapex connector and mating problems with that. This led to a discussion of the need for an informative document to tell people how to interpret the rules of the NEC (ANSI/NFPA 70) in regard to portable cables and their particular performance situation. Vannice directed the group to consider developing such a document and who would write it. Vannice volunteered to write an article explaining some of the reasoning behind the requirements of the NEC.

9 Other business

Bob Luther stated that he was concerned about being able to continue to have a quorum present at meetings because we have a large number of voting members who do not attend. He directed Karl Ruling to remind people that there is an attendance requirement.

Ruling noted that the following parties had failed to meet the attendance requirement of not missing three meetings in a row:

- B.I.M. Ltd.
- Crouse-Hinds Molded Products
- Kino Flo
- Kohler Co.
- Marinco
- Proximo Inc.
- Union Connector

Mitch Hefter moved that the above parties have their voting status changed to observer, and that they be welcome to reapply as voting members at the next meeting they attend. The motion was seconded. The motion was approved unanimously by a show of hands.

10 Schedule for future meetings

Ruling announced that the next working group meeting is scheduled for Friday, 2 November 2001, from 19:00. to 23:00. It will be held at the Rosen Centre Hotel (9840 International Dr., Orlando, FL) near the Orange County Convention Center, which is the site of LDI 2001.

The following working group meeting will be held Wednesday, 13 February 2002, from 08:00 to 12:00 at the Hyatt Regency New Orleans at the Louisiana Superdome (500 Poydras Plaza, New Orleans, LA) in conjunction with the USITT Conference and Stage Expo. There will be no January meeting in Texas.

11 Adjournment

Roger Lattin moved that the meeting adjourn. The motion was seconded. The motion was approved by a show of hands. Vannice declared the meeting adjourned at 11:45.

Electrical Power Working Group Membership at the End of the 13 July 2001 Meeting

Name	Company	Representing	Vote status	Int. cat.
Doug Kraus	Advanced Devices, Inc.	Advanced Devices, Inc.	P	P
Bud Toly	Advanced Devices, Inc.	Advanced Devices, Inc.	A	P
Jeff deRecat	Advanced Devices, Inc.	Advanced Devices, Inc.	A	P
George Long	Aggreko Event Services	Aggreko	P	U
Arnold Tang	Arnold Tang Productions	Arnold Tang Productions	O	G
David Evaniew	B. I. M. Limited	B. I. M. Limited	O	P
Wolfgang Hofheinz	Bender GmbH & Co. KG	Bender GmbH & Co. KG	P	P
Joe Boardman	Bender Inc.	Bender GmbH & Co. KG	A	P
Lee J. Bloch	Bloch Design Group Inc.	Bloch Design Group Inc.	O	G
Jeffrey Measley	Crouse-Hinds Molded Products	Crouse-Hinds Molded Products Inc.	O	P
Ron Dahlquist	Dadco	Dadco	O	P
Steve Terry	Electronic Theatre Controls	Electronic Theatre Controls, Inc.	O	P
Trevor Forrest	Helvar Lighting Control	Helvar Lighting Control	P	P
Richard Thornton Brown	Zero 88 Ltd.	i Light Group PLC	O	P
Edwin S. Kramer	IATSE, Local 1	I.A.T.S.E. Local 1	P	U
Roger Lattin	IATSE Local 728	I.A.T.S.E. Local 728	P	U
R. Bruce Prochal	I.A.T.S.E. Local 728	I.A.T.S.E. Local 728	A	U
Patric J. Abaravich	IATSE Local 728	I.A.T.S.E. Local 728	A	U
Bill Kanne	Illumination Dynamics	Illumination Dynamics	O	U
Kevin Stolpe	Illumination Dynamics	Illumination Dynamics	O	U

Name	Company	Representing	Vote status	Int. cat.
Jose J. Flores	Kino Flo, Inc.	Kino Flo, Inc.	O	P
Don Gray	Kohler Event Services	Kohler Co.	O	U
Ken Vannice	NSI Corporation	Leviton Manufacturing Co., Inc.	P	P
Mitchell Stein	Leviton Manufacturing Co., Inc.	Leviton Manufacturing Co., Inc.	A	P
Tim Bachman	Leviton / Colortran	Leviton Manufacturing Co., Inc.	A	P
Bob Luther	Lex Products Corp.	Lex Products Corp.	P	P
Louis Bradfield	Louis Bradfield	Louis Bradfield	I	U
Jim Holladay	Luxence	Luxence	O	G
Phil Fram	Marinco	Marinco	O	P
Hiroshi Kita	Marumo Electric Co., Ltd.	Marumo Electric Co., Ltd.	O	P
W. G. Krokaugger P.E.	Mole-Richardson Co.	Mole-Richardson Co.	P	P
Brian Parker	Mole-Richardson Co.	Mole-Richardson Co.	A	P
Tim Cox	PLASA	PLASA	P	G
Mac Perkins	PNTA	PNTA Inc.	O	G
Robert Barbagallo	Proximo Inc.	Proximo Inc.	O	G
Paul F. Mardon	Pulsar Ltd.	Pulsar Ltd.	O	P
Douglas Franz	QVC Network	QVC Network	O	U
Andre Broucke	ADB - TTV Technologies	Siemens	O	P
William N. Masten	SMS Inc. / PGS LLC	SMS Inc. / PGS LLC	P	P
Richard A. Prey	SMS Inc. / PGS LLC	SMS Inc. / PGS LLC	A	P
Michael Lay	Strand Lighting	Strand Lighting Ltd.	P	P

Name	Company	Representing	Vote status	Int. cat.
Andy Topinka	Technical Group Services, Inc.	Technical Group Services, Inc.	P	G
Brian Dowd	TMB Associates (NJ)	TMB Associates	P	P
Colin Waters	TMB Associates	TMB Associates	A	P
Richard Wolpert	Union Connector Company	Union Connector Company	O	P
Mitch Hefter	Rosco/Entertainment Technology	USITT	P	G
Eckart Steffens	SOUNDLIGHT	VPLT	O	G
Bruce Whitehead	Whitehead Engineering Services	Whitehead Engineering Services	O	G
			17 voting members	10 P 4 U 3 G
			20 observer members	10 P 3 U 7 G

Voting Status

- P Principal voting representative for a company or organization
- A Alternate voting representative for a company or organization
- I Individual representing no organization other than himself or herself
- O Observer; non-voting

Interest Categories

- P Producer (manufacturer) of power distribution equipment
- U User of power distribution equipment
- G General interest in power distribution equipment

From: "Tim Cox" <tim@plasa.org>
To: <kruling@esta.org>, <bluther@lexproducts.com>, <KVannice@Leviton.com>
Subject: Power WG meeting
Date: Tue, 10 Jul 2001 18:39:20 +0100

Gentlemen,

Please accept my apologies for not being present at the Power Working Group meeting this week. I do have a couple of small contributions, which are below:

GFCIs/RCDs

I found a useful booklet which is produced by the Electrical Installation Equipment Manufacturers' Association (EIEEMA), Guide to Residual Current Devices. The booklet explains all about RCDs and their installation, but I thought it would be most useful for the references to standards - British and European standards, but also international standards. It might come in handy for the group writing the recommended practice for GFCIs in entertainment applications so I have put a copy in the post to Karl. Pass it on or use it for reference as you see fit.

Also on GFCIs, I have found no specific guidance on their use in entertainment applications in BS 7671:2001, the brand new edition of the IEE Wiring Regulations here in the UK. However, BS 7909:1998, Code of practice for design and installation of temporary distribution systems delivering a.c. electrical supplies for lighting, technical services and other entertainment related purposes, is highly relevant. I seem to remember that Karl already has a copy of this document, so I won't bother quoting great chunks about RCDs here. If you'd like me to send a copy over the pond for the task group to refer to please let me know.

Feeder cable survey/recommended practice We advertised this survey in Standards News and posted a page on our website inviting people to complete the survey. Unfortunately I have not had any completed questionnaires from PLASA members. However, I have received one comment, which I think is quite important. It came from Leon Pieters of Ampertronic, whose company makes audio frequency induction loop systems (AFILS).

Leon's concern is that the single conductor feeder cables for a circuit should always be run together. Otherwise quite high electromagnetic fields can be generated, causing interference to an induction loop system and possibly making the induction loop system unusable. I don't know how much of a problem this is in practice, but it does happen. Certainly it is good practice to run the cables as closely as possible. I am sure Leon would be able to provide more information if the group needs it.

Here again BS 7909:1998 has something to say. 7.5.1 Cables says (among other things):

"All phase, neutral and earth single core cables for each circuit should be run together with minimum separation to facilitate identification and to minimise electromagnetic field effects."

I haven't found anything in BS 7671:2001, the wiring regulations, about this topic, but that document is aimed at permanent installations (although the same problem can still exist).

Also on practices for single conductor feeder cables, BS 7909:1998 recommends other things, including the IP rating of connectors, size of neutral, labeling of cable ownership (without colours to avoid confusion with phases), and laying of cables to avoid damage and obstruction. Again, I don't want to type the whole lot out, but let me know if you don't have a copy already. I guess it would be useful for the recommended practice.

That's all for now.

Best wishes for a productive meeting.

Regards,

Tim Cox
Technical Standards Officer
Professional Lighting and Sound Association