

# PROTOCOL

THE JOURNAL OF THE ENTERTAINMENT TECHNOLOGY INDUSTRY

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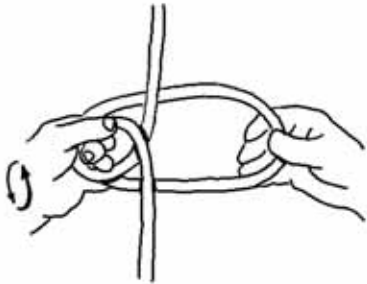
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*Protocol* is now available free for the iPhone, iPad, and now Android devices—check it out!

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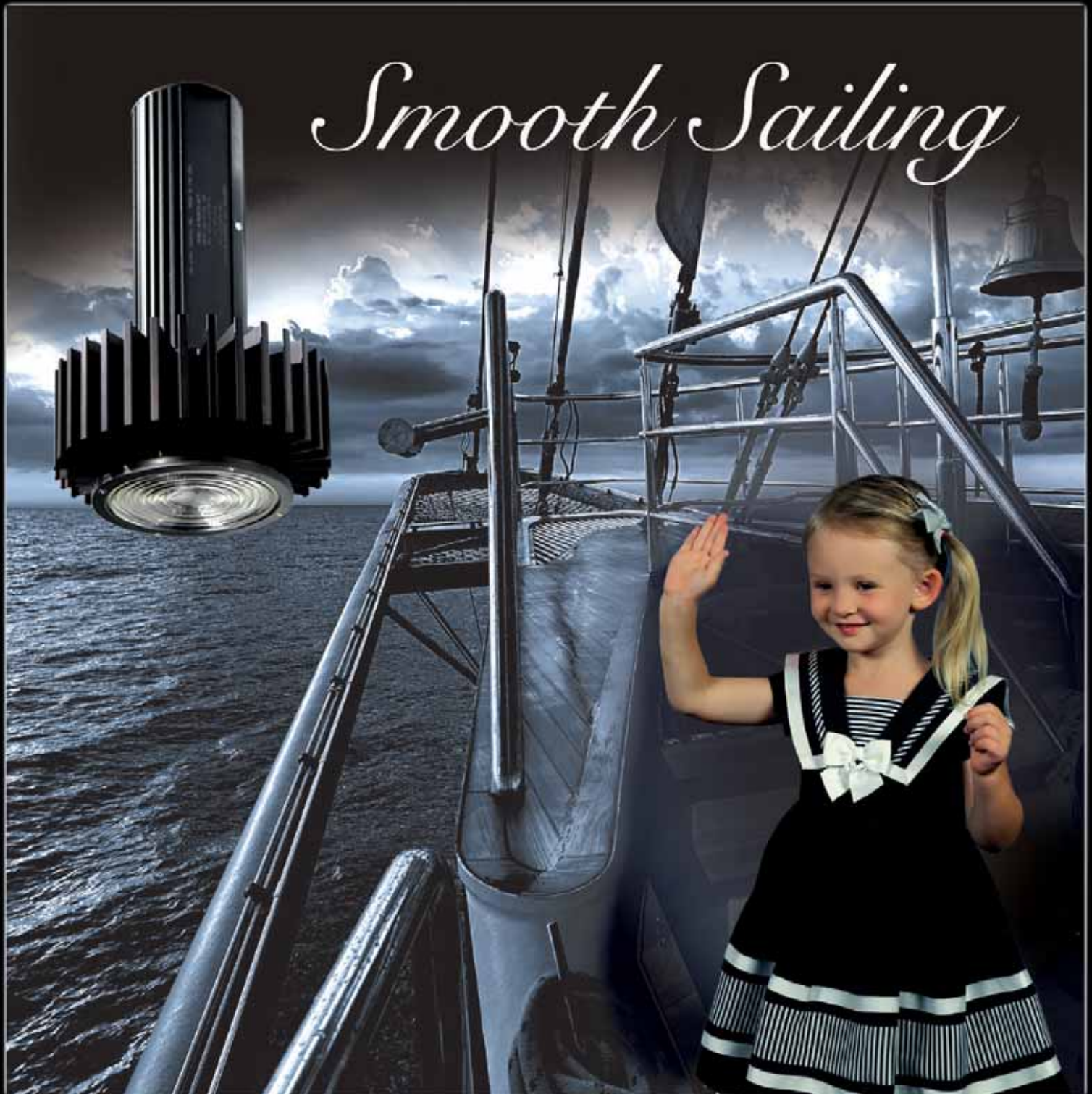
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ESTA, the Entertainment Services and Technology Association, is a non-profit trade association based in North America with members around the world. ESTA's members are responsible for creating some of the most important programs in our industry including the Technical Standards Program, Entertainment Technician Certification Program, and Rental Guard. By joining ESTA you are investing in the future of the entertainment technology industry. Membership in ESTA supports: Increasing safety through the development of standards and certifications; educating members and providing business resources to increase profitability; representing the interests of the industry to government, regulatory bodies, and related industries; and raising the bar for ethical and professional behavior.

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## Editor's Note



Welcome to longer days, live events, in-person gatherings, and your Summer *Protocol*. We are thrilled to share the news of ESTA's PERG Equitable Workforce Initiative, sponsored by Netflix, in our cover article by Harry Box. We introduce a new column, Knot the Point, by Andy Schmitz demonstrating essential industry knots.

Michael Matthews and Alan Rowe discuss "the Safety Dance;" Jesse Adams explains *BSR E1.71 Powered Curtain Machines*; R. Duncan MacKenzie describes stage wagons; Todd Spencer talks corporate culture with Josh Greenberg; and we recap the New World Rigging Symposium, The NAMM Show, Prolight + Sound, and ESTA's Happy Hour for BTS. Plus, Richard Cadena, Eddie Raymond, Ed Leahy, Ron Kuszmar, Karl Ruling, Richard Nix, Laura Hoepker, and Lori Rubinstein keep you updated on industry news.

We are grateful for our valued advertisers that allow ESTA to share *Protocol* with you. Please thank our advertisers for their generous support and include their products and services for your business when you can. We appreciate our advertisers' support of ESTA's many initiatives including the Technical Standards Program, ETCP, PERG, Rental Guard, and journal *Protocol*.

Be well, stay safe, and take care of each other,

Beverly Inglesby, Editor  
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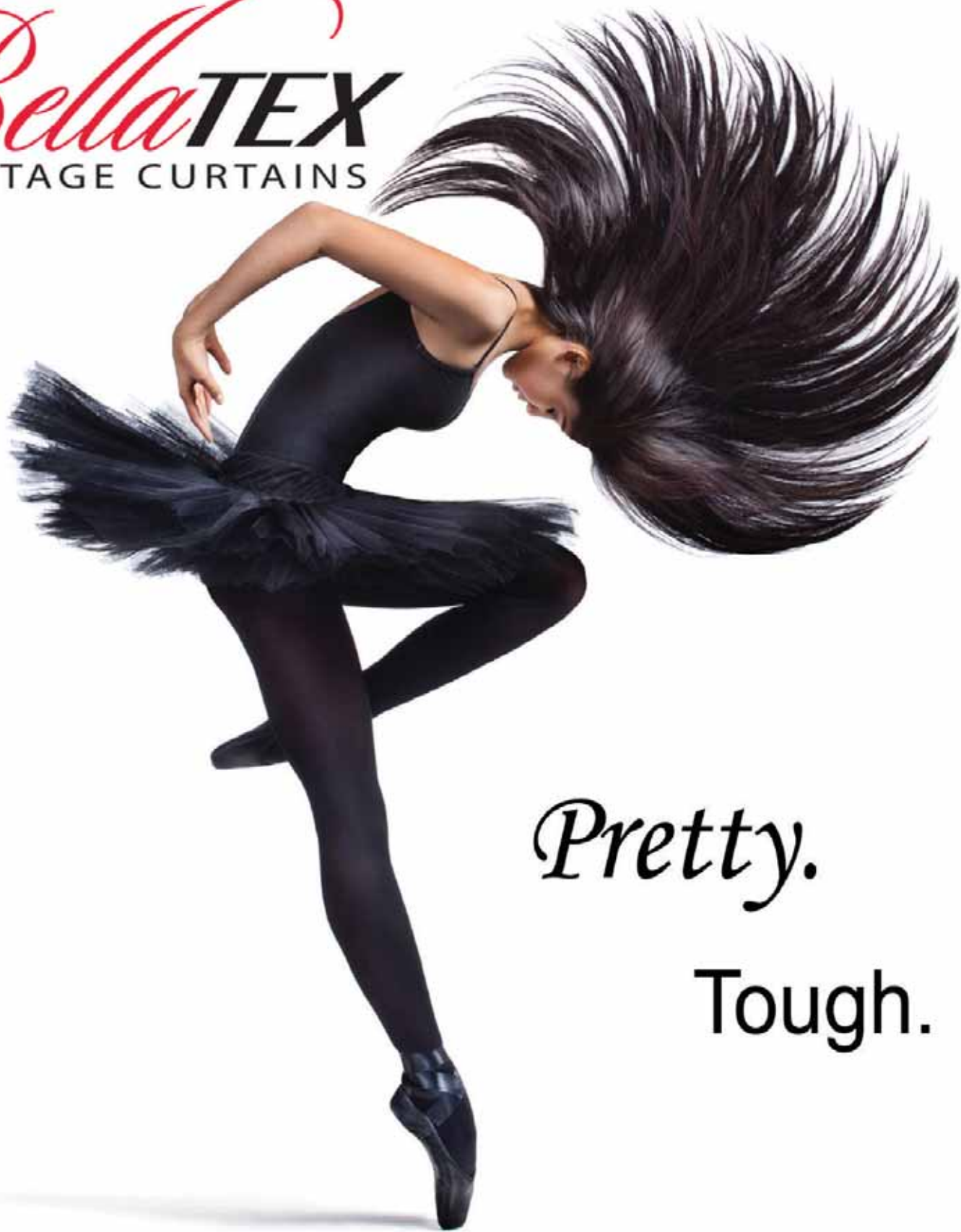
### PUBLISHER'S NOTE

It was great to see folks at The NAMM Show in Anaheim. Exhilarating and exhausting at the same time. Congratulations to the entire ESTA team on another busy NAMM partnership year with the ESTA Happy Hour for Behind the Scenes, Members Choice Awards, and ESTA curated education sessions. Looking ahead, mark your calendars for PLASA Show in September, LDI in November, along with other industry events in between and beyond.

As Beverly says, please do support the advertisers in this *Protocol* edition and throughout the year and do consider joining as an advertiser yourself! In the meantime, see you at the theatre and at the next trade show. Be well and take good care.

Jackie Tien  
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## ESTA – investing in the future of members, networking events, and partnerships

THIS YEAR HAS SEEN A RESURGENCE of growth in the events and entertainment industry and ESTA is investing heavily in the inclusion, diversity, innovation, and future success of its members and programs.

Following on the heels of the NATEAC acquisition, which will serve to provide wider networking opportunities for venues, architects, engineers, and member companies, ESTA is focused on increasing value and support to its membership and programs.

“ESTA is focused on increasing value and support to its membership and programs.”

To that, it's my privilege to announce two major, recent additions to the ESTA team.

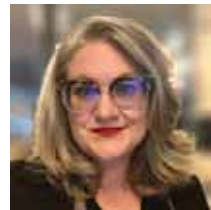
Welcome to Laura Hoepker, who took over full leadership of ESTA's Membership and Events program at the start of 2022, and is focused on increasing member value by delivering services and networking opportunities that meet members' evolving needs. In partnership with the NAMM Show this June, Laura coordinated a team to present the ESTA Happy Hour for Behind the Scenes, which has become a favorite networking event at the NAMM Show for many within the live event space over the



Laura Hoepker

past few years. Laura comes to ESTA with a wealth of industry experience, previously with ETC and PLASA in sales and marketing roles, and more recently a consultant to NAMM to expand the entertainment technology sector. Laura can be reached for all membership and events support at [laura.hoepker@esta.org](mailto:laura.hoepker@esta.org).

Welcome also to Christina Smith, who joined ESTA this May to lead the ETCP program. Christina brings with her a depth of experience, including arts management and leadership in higher education environments. Her expertise and connection with numerous trade organizations and events, such as USITT and the Long Reach Long Riders, have kept her connected and vibrant in the events and entertainment space. Christina holds credentials in mass communication and theatre, with a specialty in high-touch networking and relationship building for non-profits and education.



Christina Smith

Christina noted, "I have long respected ESTA's work to drive safety in the industry," regarding her desire to join the ESTA team. Christina may be reached at [christina.smith@esta.org](mailto:christina.smith@esta.org) for all ETCP matters.

ESTA's Production Equipment Rental Group (PERG) has also been making praiseworthy progress. Through PERG's collective and long-standing relationships, in addition to the PERG Council's

innovative thinking and PERG Council Manager Harry Box's leadership, another exciting industry first has come to life.



Harry Box

ESTA is proud to announce that Netflix is now an official partner on the PERG Equitable Workforce Initiative. The Equitable Workplace Initiative (EWI) aims to create a pipeline for individuals from historically underrepresented groups into the motion picture and television industry. This will be accomplished by improving equity and diversity in the workforce, developing well-trained workers, and increasing representation over time within rental company management.

“ESTA is proud to announce that Netflix is now an official partner on the PERG Equitable Workforce Initiative.”



Launching later this summer, EWI will provide grants to eligible members of PERG to cover costs for the first six months of employment for entry-level new hires. PERG members include professional rental companies from every media market sector,



**Directions |**  
ESTA – investing in the future

from large international brands to local boutique companies.

The program is a part of Netflix's Fund for Creative Equity <https://about.netflix.com/en/programs> and will be administered by ESTA with oversight by the PERG Council. For information on the EWI Program, please visit [https://esta.org/perg\\_ewi](https://esta.org/perg_ewi). Email may be directed to [EWI@ESTA.org](mailto:EWI@ESTA.org).

Finally, ESTA is committed to supporting and sponsoring the initiatives of partner organizations and recently provided sponsorship to Filmscape Chicago, the Midwest's largest education-focused film and television trade show for all in the lighting, camera, audio, and grip industry. In the near future, ESTA will also be sponsoring the attendee bags at the World Stage Design 2022 and CITT/ICTS Rendez-vous in Calgary, in solidarity with our Canadian partners (with special thanks to Syracuse Scenery & Stage Lighting).

As the ESTA family continues to grow and include ever more diverse voices and innovations, we all benefit. I look forward to hearing your ideas and innovations as we evolve and expand our industry together! ■

**Todd Spencer** is President of Ventana Capital, a specialty consulting firm serving event industry companies. He is credited with building over \$1B in new revenue for general event, rigging, and AV companies with an established track record of success in strategic plan development, operational optimization, new program design, and business acquisitions and sales. Todd partners with event companies to achieve their growth vision and supporting executives, entrepreneurs, and ownership groups to maximize the value and output of their current business.

Previously, Todd led operations and strategic planning as Vice President of Global Rigging Services for PSAV's worldwide portfolio, encompassing 1,100 venues across 11 countries.

Todd is honored to be serving as ESTA's President and believes strongly in the value of the Association, its community, and the many members who help to create a thriving future for our industry. He can be reached at [tspencer@ventana-capital.com](mailto:tspencer@ventana-capital.com).

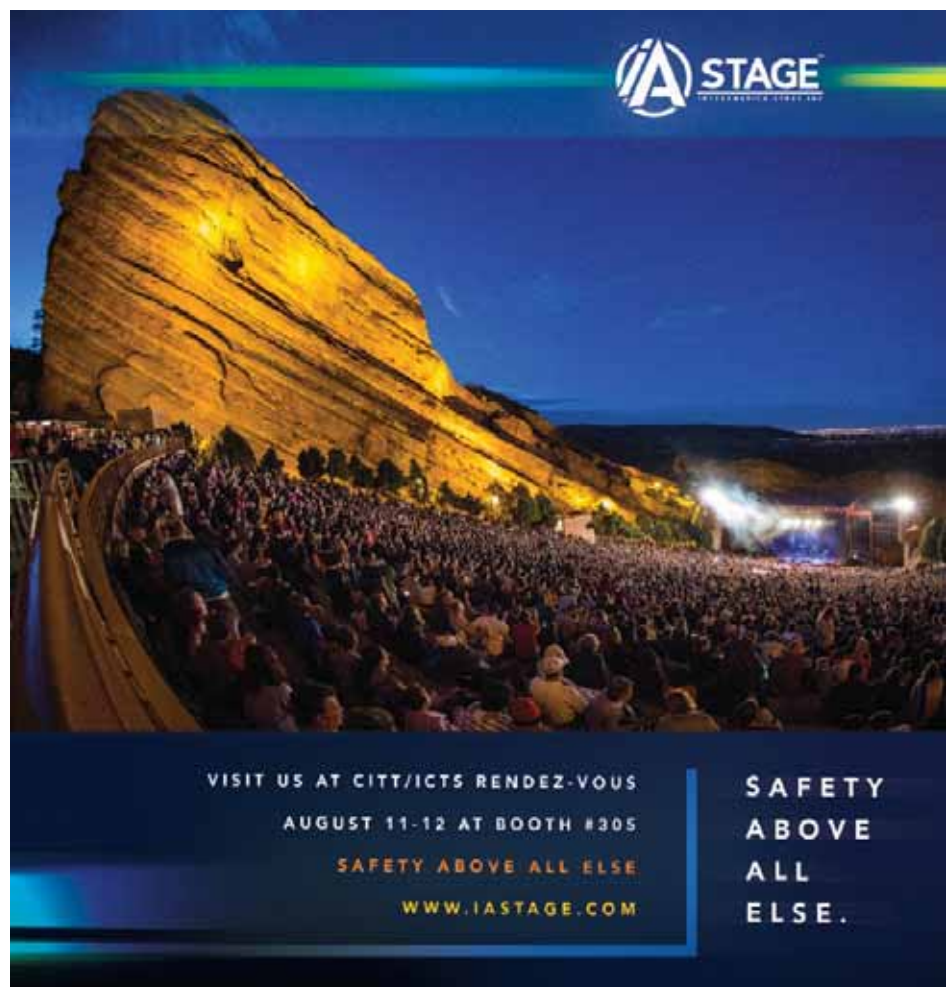


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## Upcoming industry events

### At a Glance



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[www.citt.org/World\\_Stage\\_Design.html](http://www.citt.org/World_Stage_Design.html)



CITT/ICTS Rendez-vous 2022  
August 11 – 13 | Calgary, AB  
[www.citt.org/annual\\_conference.html](http://www.citt.org/annual_conference.html)



PLASA Show  
September 4 – 6 | London, UK  
[www.plasashow.com](http://www.plasashow.com)



LDI Show 2022  
November 14 – 20 | Las Vegas, NV  
[www.ldishow.com/](http://www.ldishow.com/)



USITT Conference & Stage Expo 2023  
March 16 – 18 | St. Louis, MO  
[www.usittshow.com](http://www.usittshow.com)



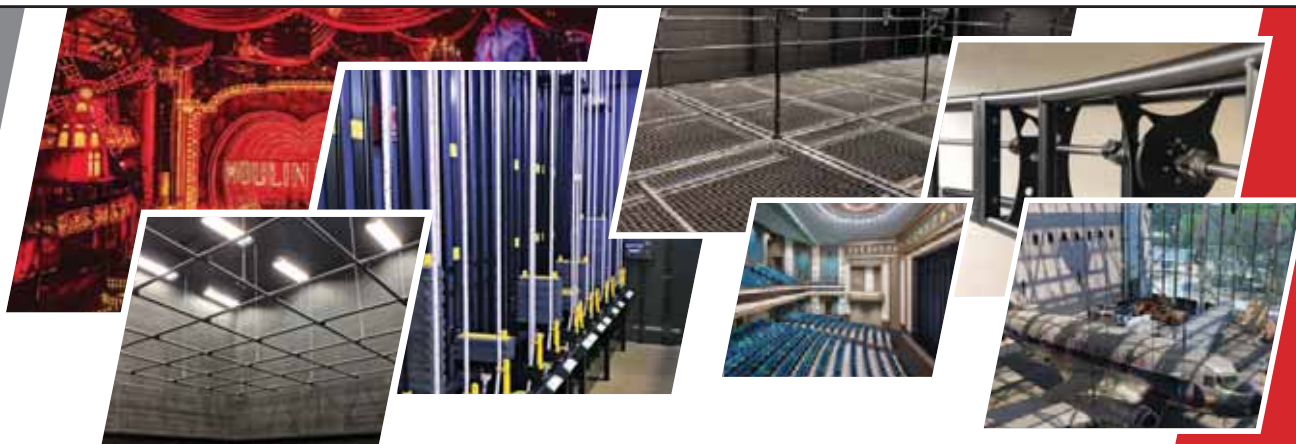
CITT/ICTS EXPO-SCÈNE 2023  
April 13 – 14 | Montréal, QC  
[www.citt.org/ExpoScene](http://www.citt.org/ExpoScene)



The 2023 NAMM Show  
April 13 – 15 | Anaheim, CA  
[www.namm.org/thenammshow/](http://www.namm.org/thenammshow/)



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## Letter to the Editor



(I'm not knocking *Protocol* or the wonderful people doing good through ESTA.)

I recently read this article about the “wonderful” coming world of the metaverse . . . and personally, I'm disgusted. Of all of the things that we don't need is the furthering of make believe worlds and fake relationships. I understand technology and use it as required. Software to draw. Lighting consoles to control lights. Audio consoles to mix sound. Yup. That works. But, seriously, virtual worlds with avatars, make believe versions of ourselves, is a world of which I want no part.

If this is the world that we are, as the author believes and cheers, moving towards, then I don't want any part of it. Unfortunately, I believe I'm now being lumped into the dinosaur category of people who don't believe in the supposed veracity of “social media” (and the metaverse that it has helped to spawn) whose very definition defies the actuality of the word social—which requires real-time corporeal involvement.

It seems that some just don't know how to draw the line and say, “This is far enough. We have no right or business going further down this road where technology will lead us.” Seriously, everyone wearing glasses that will bring our fake world into contact with our real world? Come on. Someone needs to be brave enough to say, “Stop.” And I for one am saying just that. Some days even my cellphone would be better off in the bottom of the bay.

How about we publish articles that discuss rejecting some of this crap instead of deifying technology and the things that it can “do” for us?

I, for one, never want to live in a world where the most meaningful things in my life aren't those physical persons whom I can talk to over dinner, or touch with reassurance and hug when they are sad. To reserve any place in my life for virtual events and worlds is one of the most abhorrent things that I can imagine. It's even difficult for me to participate in required Zoom meetings.

Thanks for the magazine. Thanks for the articles that help inform. Wish some of these other articles never saw the light of the virtual day . . .

~ Stanley Jordan, AVL Designs, Inc.

Thank you for your kind words about *Protocol*. ESTA's journal covers topics that affect our readers' industry. We do appreciate your time and willingness to share your thoughts. ~ The Editor

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# PERG announces the Equitable Workforce Initiative

BY HARRY C. BOX

Creating new opportunities for entry into the motion picture industry

ON APRIL 25TH, at PERG's General Membership Meeting at NAB, ESTA Executive Director, Erin Grabe, announced a major new ESTA program, the PERG Equitable Workforce Initiative (EWI) in partnership with Netflix. The program offers exciting new opportunities for job

seekers from underrepresented groups looking to enter the motion picture/television industry and for PERG member rental companies.

The goal of the initiative is to create opportunities for equity by building new talent pipelines and interpersonal

networks within the rental community while providing training that prepares employees for a career in equipment rental and production generally. Participating rental companies will provide trainees with a broad industry perspective, documented training, and mentorship intended to

inspire long-term interest and spark a career. The long-term objective is to develop exceptional employees who can become candidates for advancement as companies grow, seeding the next generation of management and leadership.

## Finding and keeping great employees is an ongoing challenge for employers.

During the first 12 months of the program, EWI will fund eight grants to eligible PERG-member rental companies that are ready to hire full-time, entry-level employees. The grants cover all costs of employment—salary and benefits—for new hires for their first six months of employment. The program will be administered by ESTA with oversight by the PERG Council and is currently sponsored entirely by Netflix. PERG member companies hiring under the EWI Program fall under a plan that conforms to US Equal Employment Opportunity Commission Section CM 607 guidelines and follows the corresponding labor regulations.

Under the program, employers hiring from underrepresented groups do not violate Title VII. Interested rental companies can find an informational document, *EWI Guidelines for Rental Companies*, on the EWI website at [https://esta.org/perg\\_ewi](https://esta.org/perg_ewi).

Finding and keeping great employees is an ongoing challenge for employers. That's why the EWI will be a valuable resource for PERG members. The initiative will create a new pool of job seekers by forging partnerships with industry organizations, guilds, local community organizations, colleges, and universities. EWI will engage these potential employees and promote available jobs directly to them.

The program offers unique opportunities for job seekers. A rental company's mission is to support episodic television shows, feature films, commercials, and other productions with state-of-the-art equipment. Professional rental companies take pride in the excellence of the equipment they provide, their customer support, facilities, and employees—there is no better place for a person to be properly trained while earning a paycheck. The program is looking for enthusiastic, reliable, full-time job applicants with an interest in professional camera/lighting equipment who want to join the fast-paced, excellence-oriented rental industry. Applicants who pursue a career in the rental industry can



Todd Spencer, ESTA President; Erin Grabe, ESTA Executive Director; and Peter Griese, Netflix Production Strategy and Partnerships at the PERG General Membership Meeting at NAB 2022.



At PERG's General Membership Meeting held during NAB, ESTA's Executive Director Erin Grabe announced the PERG Equitable Workforce Initiative in partnership with Netflix.

look forward to long-term employment, solid pay, benefits, reasonable work hours, and opportunities for advancement, while those who ultimately end up working in production will have gained the

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The EWI will create a new pool of job seekers while providing training that prepares participants for a career in equipment rental and production.



Trainees will learn how to process camera/lighting packages for rental.

PHOTO COURTESY OF MATT GROMLEY AND KOERNER CAMERA SYSTEMS, INC.

professionalism and depth of knowledge that is sought after by camera and lighting crews.

As part of the program, new hires will

receive guided, hands-on training on how to operate and handle equipment correctly and safely, how to process camera/lighting packages for rental, and how to interface

with camera, grip, and lighting production crews. The training includes all aspects of day-to-day rental operations, including business training. The trainee will be assigned an EWI mentor to coordinate, monitor, and document successful training. The EWI program will host a series of online discussions, designed to be eye-opening for entry level staff, featuring industry experts, cinematographers, business leaders, and senior staff from rental companies that are participating in the program. The sessions, which are available to all PERG members, cover big-picture topics like the role of professional rental companies in the entertainment industry, the evolution of technology in cinematography, and workplace safety. Participating rental companies and the EWI Program Coordinator will work with production companies to arrange on-set observation for trainees of professional productions.

PHOTO ABOVE COURTESY OF HIGH OUTPUT, INC.



PHOTO COURTESY OF HIGH OUTPUT, INC.

Safely and efficiently packing equipment for rental and loading the truck require skill and teamwork.



PHOTO COURTESY OF MATT GROMLEY AND KOERNER CAMERA SYSTEMS, INC.

Trainees will receive guided instruction on how to handle equipment correctly and safely.



PHOTO COURTESY OF BRIAN WELLS AND HAMMER LIGHTING & GRIP

EWI new hires will receive hands-on training including how to interface with camera, grip, and lighting production crews.



PHOTO COURTESY OF CANDACE FIELDS AND KOERNER CAMERA SYSTEMS, INC.

EWI is looking for enthusiastic, reliable, full-time applicants with an interest in professional lighting/camera equipment in the excellence-oriented rental industry.

PERG urges job seekers, educators, and other potential industry partner organizations to go to the EWI website and fill out the short contact-information

form so they can receive notifications and information about the program as it gears up over the summer.

The tentative timeline is to launch a pilot

program placing the first three candidates by the end of July and launch the full program by the end of September. Currently ESTA staff is conducting outreach to rental

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EWI trainees who ultimately pursue careers in production will have gained the professionalism and depth of knowledge that is sought after by camera and lighting crews.



Professional rental companies take pride in the excellence of equipment they provide, customer support, their facilities, and employees—and offers a great place to learn.



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EWI's long-term objective is to develop exceptional employees who can become candidates for advancement as companies grow.



Participating rental companies will provide training on how to operate and handle equipment safely in the fast-paced rental industry.

## Professional rental companies . . . there is no better place for a person to be properly trained while earning a paycheck.

companies and industry partners and hiring the EWI Program Coordinator (the job description is available on ESTA website).

As reported in the Spring 2022 *Protocol*, the EWI is the result of more than a year of work by the PERG Council and Netflix. In

late 2020, Peter Griese of Netflix's Strategy and Partnerships group reached out to PERG, initiating a dialogue about workplace equity within the rental community. The PERG Council formed a task group to develop a proposal. Underrepresentation

has long been an issue in the entertainment industry, including among rental companies. Underrepresented groups within our industry include people of color, LGBTQIA+, people with disabilities, women, and others. The proposal was accepted by Netflix in early 2022, with a commitment to sponsor the program.

Since this is a new program, there are bound to be questions and administrative decisions to iron out. On June 7th PERG held the first in a series of Zoom calls. The meetings provide members a chance to hear more about the program and an



informal opportunity to ask questions and discuss details. Input from the meetings will help inform how the established program goals and requirements can be achieved with consideration for normal rental operations. Comments from rental company representatives during the initial meeting suggested new ideas on how EWI can connect employers with employees. As has happened with other PERG initiatives, after taking the first step we are able to see additional ways our platform could benefit our members and the industry.

Working together, we can make the EWI program a success and foster long-term, sustainable change for our industry.

The success of the PERG EWI will require a collaborative effort between all parties—rental companies, the EWI Program Coordinator, and job applicants. The program will rely on PERG members to carry it through and make it their own. Working together, we can make the EWI program a success and foster long-term, sustainable change for our industry. ■



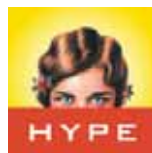
**Harry C. Box** has been working in the motion picture and television industry since 1989 specializing in cinematography, camera, and lighting. Harry is a member of the Cinematography Guild and

the Society of Camera Operators. The fifth edition of Harry's book, *The Set Lighting Technician's Handbook*, is now available. He serves as Council Manager for the ESTA Production Equipment Rental Group. Harry can be reached at [harry.box@esta.org](mailto:harry.box@esta.org).



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## Is my meter lying to me?

CHANCES ARE that if your meter, whether it's a voltmeter, an amp meter, or a multimeter, isn't labeled "true RMS," then it's probably an average-reading meter. That means it assumes the AC waveforms it reads are sine waves, and it bases all of its measurements on that assumption. The problem with average-reading meters is that they are only accurate if the AC waveform it is reading is a pure sine wave. If there is any waveform distortion, then an average-reading meter will yield errors, and the greater the distortion, the greater the reading error.

A true RMS reading digital meter, on the other hand, samples the waveform several hundred times per cycle and calculates the RMS value. So, assuming it's calibrated, it will be accurate for any waveform regardless of the distortion or harmonic content.

“ If there is any waveform distortion, then an average-reading meter will yield errors, and the greater the distortion, the greater the reading error. ”

We should know whether our meter is an average-reading meter or a true RMS reading meter because of the possibility of error. Typically, but not always, meters are marked somewhere on the front if they are true RMS. Lacking that, it's probably an average-reading meter. I have only seen one instance where it was not marked, and the specs said it was a true RMS meter. So, if it does not say true RMS on the meter, check the specs. I've also never seen a meter that says "average-reading" or anything similar, but if it's not a true RMS meter then it's an average-reading meter.

According to *Digital Multimeter Principles* by Glen A. Mazur (American Technical Publishers), an average responding meter will read about 40% low if the load draws current through a diode rectifier, which is how switch-mode power supplies (SMPS) work. In that case, for every 100 A of load we will read only 60 A, according to Mazur. Almost everything we use today in live event production, like LEDs, moving lights, digital amplifiers, projectors, etc., have switch-mode power supplies, and there is almost always some degree of current distortion in a system. Many SMPSs, but not all, correct that distortion, and if it is power factor corrected, then the current is drawn in almost a pure sine wave.

Without power factor correction, the current is drawn through the power supply in pulses, which are caused by the interaction between filtering capacitors and the voltage applied to them. Some of these pulses can be very sharp and peaked. The resulting distorted waveform contains harmonics, which can cause several issues of concern, including high neutral feeder current even in a balanced 3-phase system. Since the neutral feeder conductor is not protected by a circuit breaker or fuse, it's critical to ensure that it not overloaded, so it should be closely monitored any time a power distribution system is heavily loaded. How do we monitor it? With a meter, of course. But what if that meter yields inaccurate information? That's the dilemma we face using an average-reading meter.



If your meter isn't marked "True RMS," it's likely an average-reading meter.

How do we know if we have harmonics? (Hint: We probably do.) The only way to know for sure, as far as I know, is to use a power quality meter, which is very expensive and very rare for the average stage electrician to have. The next best option is to gather clues and piece them together to make an educated guess about the harmonic content in a power distribution system.

The first clue that we might have harmonics is to look at the equipment schedule. If we have LEDs, moving lights, computers or devices with computer chips, like consoles, variable speed motors, or dimmers, then we likely have some degree of harmonic

distortion. (If you read that last sentence and thought to yourself, “That’s pretty much everything I ever use on a show,” then you’re on to something.) Typically, it’s not a matter of whether we have harmonics but how much harmonic distortion you have compared to the overall load.

If we have a balanced 3-phase load, then the second clue is that there is a lot of current on the neutral feeder conductor. In a balanced 3-phase system with no harmonics there will be no current in the neutral feeder conductor. In an unbalanced 3-phase system, the neutral conductor will carry the unbalanced return current. It may seem like an easy matter to meter the neutral to find out, except for one thing; an average-reading meter will read incorrectly if there is high harmonic content. According to Mazur, an average responding meter will read 5% to 30% low for 3-phase diode rectified loads, which is what the neutral feeder conductor carries when harmonics are present in the system. So, whatever reading we get with the average-reading meter, multiplying it by about 1.43 will give you a rough estimate of worst-case scenario.

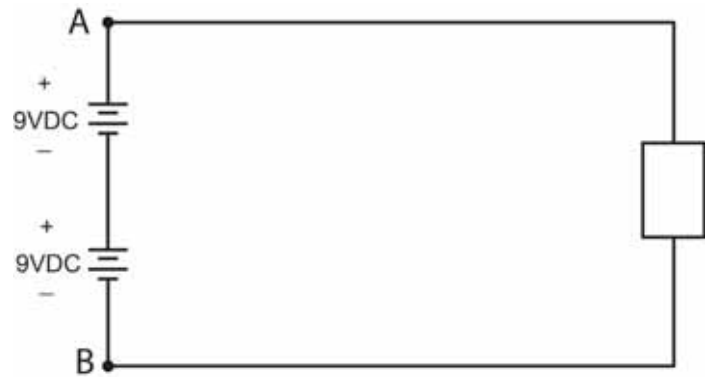
☾ If we have reason to believe there is high harmonic content, then we would be wise to question the readings of an average-responding meter. ☽

Another clue that there is high harmonic content is that the components of our power distribution system seem to run hotter than normal. If we use an infrared camera, like a Flir One, then it’s easy to measure the surface temperature of conductors, connectors, circuit breakers, dimmers, and more, and it’s easy to see hot spots that could potentially be a problem. (See Michael Matthews’ article “Looking for Some Hot Stuff, Baby!” in the Summer 2020 *Protocol*.) Also, if circuit breakers seem to be tripping for no good reason, that could be caused by harmonics.

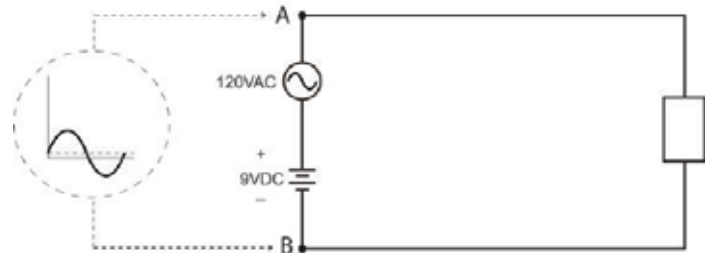
If we have reason to believe there is high harmonic content, then we would be wise to question the readings of an average-responding meter. In the long run, we’re better served by replacing that meter with a true RMS meter. There are some that are reasonably priced, and we are only as good as the tools we use. ■



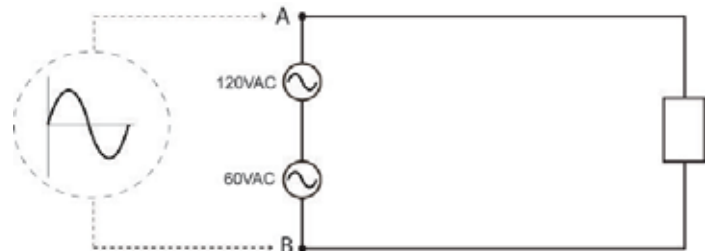
**Richard Cadena** has worked as a production electrician, lighting designer, and lighting consultant for more than 33 years in theatre, concert/touring, television, corporate events, sporting events, houses of worship, and more. He is the author of *Electricity for the Entertainment Electrician & Technician* (Second Edition, Focal Press, 2015) and *Automated Lighting: The Art and Science of Moving and Color-Changing Light* (Third Edition, Focal Press, 2018). Richard is also an ETCP Certified Entertainment Electrician and an ETCP Recognized Trainer. His websites include [www.rcad.me](http://www.rcad.me), [www.automatedlighting.pro](http://www.automatedlighting.pro), [www.electrics.tech](http://www.electrics.tech), and [www.APTXL.com](http://www.APTXL.com).



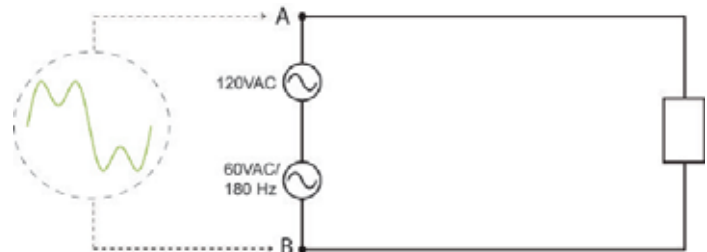
Two power supplies in series sum across the load. In this case, two 9VDC batteries apply 18VDC to the load.



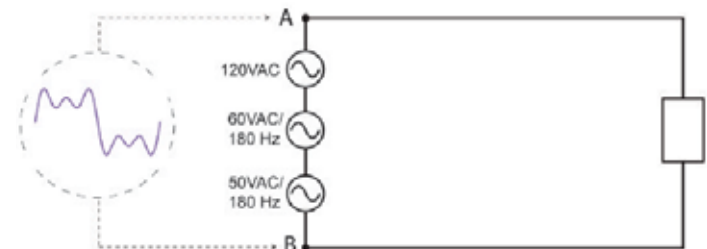
If one of the supplies is AC and the other DC, then the sum is a sine wave with a DC offset. In this case, the 120 VAC sine wave has a 9 VDC offset.



Two AC power supplies with the same frequency but different amplitudes result in the RMS sum. In this case, a 120 VAC sine wave combines with a 60 VAC sine wave to produce a 180 VAC sine wave.



If one of the supplies is 120 VAC at 60 Hz and the other is 60 VAC at 180 Hz, the sum is a distorted waveform (not a sine wave) as shown in the inset. This complex waveform contains both the 60 Hz fundamental frequency and the third harmonic (180 Hz).



The more harmonics added to the system, the more distorted the resulting waveform. Conversely, a more distorted current waveform contains more harmonics.

## Harmonics

Suppose we had two DC power supplies, like two 9-volt batteries, and we wired them in series as shown in the illustration. If we measured the voltage from point A to point B, the meter will read 18 V.

Now suppose we pressed a magic button on one of the supplies and it turned into a 120-volt AC supply with a frequency of 60 Hz. If the meter is still connected to the same two terminals, then the voltages will sum and the result will be a 120 V sine wave with an offset of 9 V, as shown in the second illustration.

If we could press another button and turn the second supply into a 60-volt AC supply with a frequency of 60 Hz, then the voltage across the same two terminals would be 180 V<sub>RMS</sub>. Since the two sines are in phase, we're just summing them, resulting in a single sine wave of greater amplitude than either of the two. The amplitude is the sum of the RMS values, which in this case is 180 V.

Now let's change the frequency of the second power supply. Instead of 60 Hz, we'll make it a whole number multiple of 60, like 180 Hz ( $3 \times 60 = 180$ ). The two sine waves will still sum when we look across the terminals, but the result is no longer a sine wave; it's starting to resemble a square wave with big dips in the positive and negative halves as shown in the next illustration. If we add a third AC supply with a lower amplitude and a frequency of 300 Hz ( $5 \times 60$ ), then the sum of the three sine waves would be even more distorted. The second and third power supplies are generating harmonics of the 60 Hz fundamental frequency, and the more harmonics we add, the more distorted the resulting waveform.

By the same token, if we start with a distorted waveform, we can filter out the pure sine waves that make up that particular waveform. The frequencies of those sine waves will be whole number multiples of the fundamental frequency and the amplitudes will be gradually decreasing with the increasing frequencies. When we add sine waves together to form a distorted waveform, that's wave synthesis, and when we filter them out of a distorted waveform, that's the Fourier analysis, which is a mathematical method of analyzing complex waveforms.

When a non-linear load, like a non-power factor corrected LED fixture is connected to a supply and it draws current in a distorted waveform, that current contains all of those pure sinewaves of different frequencies and amplitudes. Those are harmonics and they can cause the neutral conductor of a 3-phase system to carry more current than any of the 3-phase conductors, which can lead to overloading. They also produce more heat than the fundamental current because of the skin effect, which is the principle that higher frequency currents tend to travel along the skin of a conductor rather than through the center of the conductor. That means there is less copper conducting, which translates to higher resistance and higher heat for the same amount of current. And more to the point of this article, average-reading meters only read the fundamental frequency and not the harmonics, leading to reading errors; the greater the harmonic distortion, the greater the reading error.

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# The safety dance

BY MICHAEL MATTHEWS AND ALAN M. ROWE

## Forward and backwards steps to safety

HOW SAFE IS SAFETY? When is safety “unsafe?” These are questions we find ourselves asking more and more as we continue our careers as trainers, consultants, and safety professionals working the field of entertainment technology. Safety is a hard sell. It is difficult to prove that you avoided catastrophe with something that has never happened before because of implementing safety protocols. Yet, ensuring that our workplaces are safe is extremely important, especially in entertainment, where our job is to do what others consider impossible on a daily basis. Human beings don’t fly, yet we fly them every day. People don’t fall off of buildings without getting injured or killed, yet stunt performers do it safely all the time. In the commercial electrical world, it is considered impossible to put a 20,000 W light outside of a second floor window, yet we can do it in less than an hour. Doing the impossible has impacts on safety and we have to look at the total picture to ensure that what might normally be done in the name of safety doesn’t create a greater hazard than the one we are working to mitigate. Before we get to that, let’s take a look at safety in entertainment.

In general, nobody likes the safety person. Attitudes from both management and workers often look at safety standards as burdensome and unnecessary. From a management standpoint proper safety equipment and developing and implementing preventative safety protocols present an expense that is often a challenge to justify on a budget sheet. Quite simply, it’s hard to see how much money you save by accidents that you are not having. This is why safety measures are often reactive as opposed to proactive. When an accident happens, safety becomes foremost on

everyone’s minds with swift policy changes that managers, and managers of managers can point to and show that something is indeed being done. Implementing safety from this perspective requires that someone is injured before taking sudden and often rash measures to fix the problem. This benefits no one, least of all the worker who was injured or killed.

The premise of this article is . . . to look rationally at how we approach safety to understand what actually works, and what doesn’t.

On the other side, workers are often resistant to safety measures. Having to change the way of doing something when those patterns have been set can be difficult. In addition, elements of safety protocols can be uncomfortable or not conducive to efficient work. Personal protective equipment (PPE) is a good example. We have had numerous discussions with workers on the benefits and necessity for proper use of PPE, one of the foremost being hard hats. It is astonishing at how persistently we see pushback to the idea of wearing something to protect your brain from traumatic injury. This pushback only feeds into the reactive management

approach with companies who are reluctant to set a solid PPE policy because they don’t want to have to fight with workers to enforce it.

Larger companies that have been around longer often have a better understanding of the benefits of a safety culture as they have enough data over time to show that safety is beneficial to the bottom line. In addition to that, larger companies are more likely to be scrutinized by Authorities Having Jurisdiction (AHJ) who enforce safety regulations on a more regular basis, or at the very least they are scrutinized by their insurance companies. These larger companies will often focus on certain safety elements that they feel they can implement and enforce in a reasonable way. This leads us back to the original question, How safe is safety?

What we have found is there are some hot button topics that companies, large and small, will tend to focus on. These might be because of recent accidents in the industry, recent changes in certain codes or standards, or reticence towards correcting misunderstanding or misinterpretations of codes or standards. These safety measures do not always lead to safer environments and at times can even go so far as to create less safe situations.

Pause for a moment right here, and READ THIS! The premise of this article is not to say that safety is not safe, nor that the rules and regulations do not apply to our industry. It is to look rationally at how we approach safety to understand what actually works, and what doesn’t. We all need to continue to develop approaches to work that improve the safety of the workplace for the benefit of ourselves, others around us, and our families that depend on us. We owe

that to each other.

What is actually safe, versus what is simply the appearance of being safe? Top down, hot button focused safety practice can often lead to a “checklist safety” mentality. This approach, while well intentioned, can get caught in a “code over context” trap. Adhering, or attempting to adhere, to a particular element of control without understanding the full context of the scenario can lead to the false assumption that a situation has been made safer, when it only appears to be safer.

An example in fall protection that we regularly see regards lanyard use. The entertainment industry presents so many challenging situations for access that it can be easy to get it wrong. Without the in-depth knowledge of the situation and equipment, a manager, AHJ, or worker can look at someone who is wearing a harness that is clipped off to a point, and mistake the situation for safe when it only appears to be safe. It could be that the point,

lanyard, or connection to the harness is not appropriate to the situation. Unless you are familiar with the set, venue, and work pattern, you may not know what is appropriate and what is not. Add to this the major problem that some venues where work at height is being done in our industry do not have an appropriate rescue plan due to show specific scenery, specific rigging, lighting, or other impediments to rescue. This puts a worker who falls at great risk of suffering the effects of suspension trauma. We see this often in Group B aerial lifts.

Supervisors focused on making sure workers are clipped off, but mistaking the proper lanyard for the situation<sup>1</sup>. Blanket safety mandates such as these checklist approaches often undermine the general goals. Safety requirements regardless of the presence of a hazard or context can create cumbersome impediments to work that drive resistance in workers to safety measures. It is very hard to get worker buy-in and compliance, when the measures are not reasonably justified.

Another issue where an attempt to be safe leads to situations that are more unsafe

**... use checklists as a means to ensure that you have evaluated every possible hazard and not ... to ensure your workplace is safe without thinking about the larger picture.**

**We listen.**

We are proud to be a member of PERG, who together with Netflix, is taking steps to help dismantle institutional barriers that impact the well-being, stability, and success of families, our teams, and the community.

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in our industry happens when “checklist safety” is employed at the expense of hazard analysis. Checklist safety is a move towards safety being reduced to checklists so safety plans are determined by a preconceived set of situations. The use of ground fault circuit interrupters (GFCIs) in our industry is somewhere where we see this happen. GFCIs are a valuable and essential tool for creating a safe work environment. However, when the risk of losing power is greater than the risk of shock or fire by ground fault, another method must be used to ensure the electrical distribution system is safe. This is why GFCIs are not allowed on circuits providing emergency egress lighting in buildings. The same holds true for us: If a performer is doing an action that would result in injury if the power were to fail, then that circuit becomes life critical and should never be protected by a GFCI. Take for example a high fall into an airbag. The airbag is kept inflated by a fan with a dedicated generator. If a water

effect is integrated into the stunt, the circuit is now exposed to water and we have seen people insist that every circuit exposed to a water hazard must be protected by a GFCI regardless of the equipment or process being supplied by the generator. In this scenario, what is the greater hazard? Electrical shock/fire or the failure of the airbag due to the GFCI working as designed? Again, this article is not to say that GFCIs should not be used, and a vast majority of the time, the use of a GFCI to protect against a water hazard is the right call. All we are saying is to use checklists as a means to ensure that you have evaluated every possible hazard and not as a means to ensure your workplace is safe without thinking about the larger picture.

## Safety measures affect worker behavior.

Safety measures affect worker behavior. By feeling more safe, one can begin to act more recklessly and forget about the hazard. This is something known as risk compensation, and often referred to as “The Peltzman Effect” after Sam Peltzman a professor of economics at the University of Chicago School of Business who published an article in the *Journal of Political Economy* in 1975 entitled “The Effects of Automobile Safety Regulation”<sup>2</sup>. The idea Peltzman presented is that people will adjust their behavior in response to the perceived level of risk. Applying this to our industry what we can find is that when people don certain safety equipment, they feel more emboldened and often act more recklessly. A worker wearing a harness might reach further out creating a greater risk than they would without the PPE even though the risk is the same. IATSE Safety Committee Chair Kent Jorgensen tells a great anecdote of a factory floor that had workers suffering foot injuries at a high rate.



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Management and workers tried all sorts of safety measures before finding a surprising solution that actually worked to reduce injuries. The workers simply removed their shoes and basically wore socks on their feet. When the workers no longer had the perceived perception of safety they adjusted their work patterns. Again, our premise is not to remove safety measures, only to look at these things under a critical lens so that we can understand what effect they have. Workers and managers alike need to understand the concept of risk compensation so that we can monitor our own behavior and make sure we can curb the tendencies toward riskier behavior. It should be noted that Peltzman's original thesis in regards to highway deaths has been

challenged and shown to be problematic<sup>3</sup>. Further data has proven that automobile safety devices do decrease deaths overall even with the counterproductive elements of risk compensation, a fact that speaks in support of safety devices. That being said, his theory of risk compensation is valuable in understanding human behavior in response to risk.

The entertainment industry is extremely high profile; we have to get safety right. When an accident happens on one of our sets or stages, it is big news and everyone hears about it. The results of an accident can be tragic and no one in any industry should give their lives or wellbeing for any production, any job, anywhere, at anytime. The show must go on, but it must go on *safely*. ■



**Michael Matthews**, MFA, has worked on all things technical in the entertainment industry for more than 20 years. Michael is ETCP Certified in all four disciplines along with being an ETCP Recognized trainer for

renewal credits and an OSHA authorized outreach trainer for General Industry. An IATSE member of Local 500 in South Florida, he recently moved to the Atlanta area joining the Georgia Stage team in sales, inspections, and training. When not working, Michael enjoys disc golf, hiking, paddling, chess, and watching anything with wheels race. You can reach him at michael@georgiastage.com.



**Alan M. Rowe** is the Safety & Training Director for IATSE Local 728, Studio Lighting Technicians in Burbank, CA; seated on Code Making Panel 15 of the *National Electrical Code*; former Chair of the IATSE Crafts Advancement

Program; Co-Chair of the ETCP Entertainment Electrician Certifications Subject Matter Experts; a member of the ESTA Board of Directors; and on the ESTA Technical Standards Council.

## Endnotes:

<sup>1</sup> <https://www.genielift.com/en/aerialpros/clearing-up-the-confusion>

<sup>2</sup> Peltzman, Sam "The Effects of Automobile Safety Regulation" in the *Journal of Political Economy* 1975

<sup>3</sup> [http://www.law.harvard.edu/programs/olin\\_center/papers/pdf/341.pdf](http://www.law.harvard.edu/programs/olin_center/papers/pdf/341.pdf)

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## A telegram from Excelsior, NJ

I SAW A REMARKABLE PLAY 12 May at the Lincoln Center Theater: *The Skin of Our Teeth*. It was a Pulitzer Prize winner in 1942, but is not often revived. I read it for a design class in college and wondered how on stage anyone could pull off an ice age, the slow disintegration of the Antrobus home in a mythical Excelsior, NJ, a Genesis-scale flood wiping out Atlantic City, and a war that further wrecks the Antrobus home? How do you put a mammoth and a dinosaur on stage as living characters? This was all accomplished beautifully on the immense Vivian Beaumont Theater stage in a production directed by Lileana Blain-Cruz, with scenery by Adam Rigg, lighting by Yi Zhao, costumes by Montana Levi Blanco, sound by Palmer Hefferan, and projections by Hannah Wasileski—giving us massive images of glaciers slowly pressing down on Excelsior—and the dinosaur was a giant puppet. The penultimate scene is one of the most beautiful I have ever seen on stage: A hillside upstage, with people walking slowly through the grass and flowers, toward a warm, low side-light.

You don't revive an 80-year-old play unless it has something to say about today. This one offers climate change, floods, hungry refugees, war, and a mysterious illness that strikes seven of the cast. Sound familiar? David Barbour calls *The Skin of Our Teeth* a “cosmic domestic comedy” in his *LSA* review. In comedies, life wins; part of the pleasure of watching a comedy is being reminded that life wins, and what treasures we have in life. Mr. Antrobus is the inventor of basic tools, including the wheel and the lever. A telegram messenger arrives to tell Mrs. Antrobus that Mr. Antrobus says he's been busy at the office and will be late coming home, but he's managed to separate en from em in the alphabet, and found that ten tens is a hundred. The messenger asks Mrs. Antrobus if she can spare a needle. The maid Sabina shrieks that they only have two needles, but Mrs. Antrobus gives one to the messenger. Watching the scene, I was struck by importance of needles. What you can do with a needle!



PHOTO COURTESY OF JULIETA CERVANTES

In Lincoln Center Theater's *The Skin of Our Teeth*, Mr. and Mrs. Antrobus sit together in the ruins of their home as the world recovers from war, and a procession of humanity walks slowly into the light.

And, lacking one, all that you can't do.

The final act is the world reviving after a war. There's devastation, but people go on. Sabina tells the audience, “The end of this play isn't written yet. Mr. and Mrs. Antrobus! Their heads are full of plans and they're as confident as the first day they began—and they told me to tell you: good night.”

The end of this play isn't written yet. The people in ESTA's Technical Standards Program have heads full of plans too, and are putting them into motion. What follows is an update on some of the standards—not as simple as a sewing needle, but useful.

### Four new ESTA standards

Four ESTA standards have been approved and published since the Spring *Protocol* installment of TSP News. One is a new standard, one is a revision, and two are reaffirmations of existing standards. They are available for download at no cost to you from

<http://estalink.us/freestandards> or you may buy them for \$40 each from ANSI and IHS. The recently published standards are:

**ANSI E1.22 – 2022, Entertainment Technology – Fire Safety Curtain Systems**, is a revision of ANSI E1.22, the standard for the design, materials, fabrication, installation, operation, testing, and maintenance of fire safety curtain systems used for proscenium opening protection in theatres. Chapter 20 of NFPA 80, Standard for Fire Doors and Other Opening Protectives, covers fabric fire safety curtains, too. ANSI E1.22 is written to be consistent with it, since the local fire marshal or building inspector is likely to be using NFPA 80 as a reference. However, NFPA 80 costs you \$76 and gives 4,270 words of “shall” requirements. ANSI E1.22 gives you 6,935 words of requirements and advice and costs \$40 from ANSI or IHS, or nothing from the TSP website. Your choice.

**ANSI E1.26 – 2006 (R2022), Entertainment Technology – Recommended Testing Methods and Values for Shock Absorption of Floors Used in Live Performance Venues**, is a reaffirmation of the 2006 document. It describes a method for measuring the stiffness of a performance floor. It suggests, but does not mandate, some ranges that have been found to be acceptable—neither too stiff nor too springy and certainly not soft.

**ANSI E1.36 – 2007 (R2022), Model Procedure for Permitting the Use of Tungsten-Halogen Incandescent Lamps and Stage and Studio Luminaires in Vendor Exhibit Booths in Convention and Trade Show Exhibition Halls**, is a reaffirmation of the 2007 document offering a model set of procedures that can be used by convention center and trade show exhibition hall staff to mitigate the risks perceived to be associated with the use of tungsten-halogen lamps and stage and studio luminaires. This policy applies to all luminaires that use tungsten-halogen lamps and to all stage and studio luminaires being used by vendors to provide illumination or to create effects with light in exhibit booths at convention centers or trade shows. The standard was written to address problems some ESTA members had in lighting trade show booths, specifically house-rule bans against using equipment such as tungsten-halogen cyclights. This American National Standard gives the house staff a reason to say “Okay” without worry, and it requires simple, good practice applicable to any luminaire that is a heat source. Tungsten-halogen luminaires are not state of the art now, but the good advice still applies.

**ANSI E1.69 – 2022, Reporting the Dimming Performance of Entertainment Luminaires Using LED Sources**, is a totally new standard. It describes a way of showing the end-user or equipment specifier the dimming performance of LED luminaires, when the luminaire output level is set by a control signal slowly varying from 100% to 50% and then from 50% to black-out. It’s a very simple standard, but it makes a procedure specified by some theatre consultants and found to be useful be an American National Standard, squelching push-back such as, “Nobody ever asked for that before. That’s a waste of time. You don’t need that information.”

## ESTA docs recently in public review

Five documents were available for public review through May 23 on the ESTA TSP website. I’m writing this on the day after the reviews closed. Some received comments, some didn’t. This summary gives you an idea of some of the active projects.

**BSR E1.68, Recommended Practice for Compliance and Interoperability in DMX512-A Systems**, is a new draft standard, a recommended practice for evaluating DMX512-A (ANSI E1.11) equipment interoperability, to help minimize problems in the field associated with violations of critical elements of the standard. The recommended practice does not attempt to assure 100% compliance with all requirements in the ANSI E1.11 standard; it will focus on those that have been proven to make interoperability unlikely or unreliable.

The draft standard received a number of comments. Some said it would be better if . . . Others said it was unacceptable because it expands the warning in clause 1.5 of ANSI E1.11 that it “is not an appropriate control protocol for hazardous applications” into a prohibition in BSR E1.68 against its use in emergency lighting systems. This takes the scope of BSR E1.68 from equipment interoperability into the realm of application approval. There are many products for emergency lighting systems that use DMX512 and are acceptable per NFPA 70 and UL 924. A safe bet is that the draft will be revised—but this is not unusual. Almost no draft

## A call for members

You can become part of the team of people working to make the entertainment industry simpler, safer, and more profitable by joining a working group. At this time, the following working groups are looking for new voting members in these particular interest categories to help balance the interests in the working group.

- **Control Protocols:** General interest, designers, dealer/rental companies—not manufacturers.
- **Electrical Power:** Custom-market producers, designers, dealer/rental companies—anybody but users.
- **Event Safety:** Equipment providers, performing artists.
- **Floors:** Designers, dealer/rental companies.
- **Fog and Smoke:** Dealer/rental companies and fog equipment manufacturers.
- **Followspot Position:** Producers of any type, dealer/rental companies.
- **Photometrics:** Dealer/rental companies.
- **Rigging:** Designer. The working group is well balanced, but designers are the fewest.
- **Stage Machinery:** Users.

“Interest” means how the work of the group affects your livelihood or your health, and not that you find it way-cool and something to impress your friends. The interest categories are relative to how you are affected by the subject matter of the working groups. Definitions for the interest categories can be found on the second page of the working group application forms, which are available at <http://estalink.us/evt6b>. If you see any working groups that fit your interests and expertise, and you are in one of the under-represented categories, please join.

standard is found universally acceptable in its first public review.

**BSR E1.76, Wire Rope Tension Grids**, is a new draft standard for wire rope tension grids covering design and application criteria, including the loading, self-weight considerations, transitions between levels, and suspension from structure. It provides deflection criteria for structural elements and the woven mesh. The standard offers guidance on openings, including trap doors and bays similar to loft-wells. It provides requirements for handrails and step units, and considerations for other accessories.

It has not gotten a lot of public review comments, but the few it has received are from theatre engineering consultants and manufacturers of tension grids. The draft will probably be revised, but the comments are reasonable and specific.

**E1.32, Guide for the Inspection of Entertainment Industry Incandescent Lamp Luminaires**. *ANSI E1.32* is being considered for reaffirmation. The document provides guidance in the inspection of stage and studio luminaires that use incandescent sources and are used in the entertainment industry. The inspection is to evaluate their safety and any needed maintenance. The information contained in this document is intended to supplement the information

contained in manufacturer's maintenance instructions. The standard received no public review comments, so it will probably be reaffirmed.

**E1.37-1, Additional Message Sets for ANSI E1.20 (RDM) – Part 1, Dimmer Message Sets**. *ANSI E1.37-1* is being considered for reaffirmation. It provides additional get/set parameter messages (PIDs). Most of the messages in this document are intended for use with entertainment lighting dimming systems. These additional messages allow access to configuration parameters commonly found in many theatrical dimming systems.

As of today, the standard has 35 Yes votes for reaffirmation in the working group out of a possible 38 (three ballots were not returned), but one public review commenter—the **one** commenter—submitted 16 comments saying the existing standard is deficient on some points. The CPWG voters will need to decide if the comments are good reasons to not reaffirm the standard and revise it instead.

**E1.58, Electrical Safety Standard for Portable Stage and Studio Equipment Used Outdoors**, identifies hazards associated with the outdoor use of portable stage and studio lighting equipment and portable power distribution equipment that is not identified

(listed) for outdoor use. It recommends practices for qualified personnel to use to mitigate the identified hazards at outdoor entertainment events and media production sites in the United States. The existing standard is being considered for reaffirmation.

The *E1.58* standard received no public review comments and all the working group votes were some version of Yes, but one was a Yes with comments vote noting that the existing standard references the 2017 edition of the *National Electrical Code* and perhaps we will want to wait and revise the standard to reference the 2023 *NEC* edition coming soon. That comment has triggered a lengthening of the ballot period to let people think about it, pushing the final vote results to days after I have to turn in this story. As Sabina says, “The end of this play isn’t written yet.”

Do any of these standards projects interest you? You can join a working group (see the “Call for Members” sidebar) or visit a meeting. The meeting schedule is available at <http://estalink.us/meetings>. The times shown are for local time zone where the face-to-face meetings will be held, but our meetings also are accessible by WebEx. The WebEx log-in information is part of the meeting agenda sent to each working group member or pending member. If you want to visit a meeting via WebEx, send an email to [standards@esta.org](mailto:standards@esta.org), and the agenda with log-in information will be sent to you. (We don’t publish the log-in information on the website to avoid a WebEx version of Zoom-bombing.) If you find a meeting interesting, perhaps you will want to join. Of course, you can always comment on a document in public review at <http://estalink.us/pr>. ■




**Karl G. Ruling** is ESTA's Senior Technical Standards Manager. He also serves as *Protocol's* Technical Editor. Karl can be reached at [karl.ruling@esta.org](mailto:karl.ruling@esta.org).

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# ESTA's Plugfest returns!

BY MICHAEL LAY

Plugfest offers a unique opportunity to seek out and resolve manufacturer-to-manufacturer interoperability challenges in-person in a safe space before the customer's final tech rehearsal.

*"Time is precious. Make sure you spend it with the right people."*  
~ Anonymous

WHEN THE ESTA PLUGFEST volunteers were cleaning up at the end of our 2019 event none of us imagined that we would be on hiatus for the next 1,153 days. The COVID-19 pandemic and its horrific effects on our families, friends, colleagues, and our beloved entertainment industry have not just been disruptive—they've been extraordinarily painful.

And while a few canceled Plugfests were certainly at the bottom of the list of our problems during the pandemic, we are glad to be part of the push to restore some normalcy by announcing our next Plugfest event which will take place from September 16 – 18, 2022 at the D/FW Marriott Solana in Westlake, TX.

For those of you unfamiliar with our Plugfest event, volunteers from the Control Protocols Working Group (CPWG) provide this



Danilo Oliveira, Chauvet Professional; Larry Dew, Benjamin Electric; and Peter Willis, Howard Eaton Lighting Ltd.



Robert Goddard, Goddard Design; Eric Johnson, Cisco; Doug Johnson, The Black Tank; and Sam Kearney, ETC



Milton Davis, Doug Fleenor Design, and Wayne Howell, Artistic Licence; in the background Simon Newton, Open Lighting Project

unique opportunity for manufacturers to gather together in person, in a non-judgmental space, to test their products for compliance to the latest ESTA American National Standards Institute (ANSI) accredited control protocols standards. Attendees bring controllers, intelligent lights, control protocol analyzers, and printed circuit board prototypes in an effort to seek out and resolve manufacturer-to-manufacturer interoperability challenges, instead of waiting for their users to be surprised by them during a final technical rehearsal.

And the best part—the CPWG Plugfest is a free event sponsored by the ESTA Technical Standards Program (TSP). Your only expenses are to cover your own travel, meals, and lodging. ESTA provides a group room rate for the hotel that offers an excellent discount. Attendees are encouraged (but not required) to become a member of the ESTA Control Protocols Working Group. Plugfest attendees can also join us for our year-end CPWG meeting to be updated about control protocols standards projects that are in development or revision.

To round out the weekend, the fall ESTA conference provides a great window through which to view other Technical Standards efforts as well. Working group meetings are scheduled for Electrical Power, Event Safety, Floors, Fog & Smoke, Followspot Positions,

Photometrics, Rigging, and Stage Machinery. And there is a possibility that we may have a new working group focusing on Weapons Safety in Entertainment established by then.

Visitors are always welcome to attend any of our meetings and use this opportunity to meet and network with the ESTA volunteers who write our ANSI standards.

Nothing says “we’re back” better than showing up and making stuff work—why not add a trip to your schedule this September to visit us at the ESTA conference in Westlake, TX? I guarantee you will be spending time with the right people.

*For additional information on attending this year’s Plugfest, or on just dropping by as a conference visitor, please email [plugfest@esta.org](mailto:plugfest@esta.org), or visit us on the web at <http://tsp.esta.org/tsp/news/plugfest.html>. ■*



**Michael Lay** is a Systems Designer with Candela Controls. A 38-year veteran of the entertainment industry, Michael is the co-chair of the ESTA Control Protocols Working Group, as well as an ESTA Technical Standards Council member. Michael can be reached at [mlay@candelacontrols.com](mailto:mlay@candelacontrols.com).



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## Difficult conversations: Tools to learn and use



IN MY LAST COLUMN I wrote about the importance of talking to people, particularly when there are differences of opinion. These are often difficult conversations and, like in most things, we need tools to overcome the obstacles and achieve the results we are after.

Over the years, I have read a number of books and articles on leadership and communication looking for “golden nuggets” I could latch on to and use both in my life and in the classes I have taught on the subject. I have referred to many of them here in the past. So, in an effort not to reinvent the wheel, let me share with you some wisdom from Kwame Christian, founder and CEO of The American Negotiation Institute. The following can be found on the LinkedIn business learning site; I have changed some of it slightly, but all credit goes to Christian.

“Before you start any difficult conversation, you need to be crystal clear on your goals.”

Before you start any difficult conversation, you need to be crystal clear on your goals. Ask yourself three questions:

- What kinds of conversations are appropriate in this environment?
- Considering what is appropriate, what is a realistic goal for this conversation?
- What do you want your relationship with the other person to be like after this conversation ends?

Based on his experience working in conflict resolution, the vast majority of people who find themselves in these political discussions, tell him that their goals

are usually to exit the conversation without giving or receiving damage. That may be maintaining a workable relationship with your colleagues or keeping things civil with a family member when you’re sitting at the dinner table.

The following strategies will help you have the conversations in a way that makes that possible.

### Seek to understand, not persuade

When it comes to communication in general and difficult conversations, there are two levels of communication:

- “Level one communication”—seeking to *understand*.
- “Level two communication”—seeking to *persuade*.

Odds are you can guess which one is most effective for maintaining the peace . . . Level one communication for the win!

The danger of level two communication is that you’re trying to change behaviors or beliefs, and that can trigger defensiveness. People stop listening and they’re more likely to shut down, disengage, or become combative.

When your goal is to maintain or strengthen the relationship and preserve group cohesion, stick with level one communication. To help you stay on track, hold yourself to these three rules:

- Don’t teach. Learn.
- Don’t preach. Share.
- Be respectful despite differences.

### Use compassionate curiosity

Compassionate curiosity is a simple three part framework from Christian’s book, *Finding Confidence in Conflict: How to Negotiate Anything and Live Your Best Life*. It’s designed to help you resolve your most challenging conflicts, both at work and at home. The steps are to acknowledge and validate emotions, get curious with compassion, and use joint problem solving.

#### 1) Acknowledge and validate emotions

As soon as you realize that you’re dealing with a potentially problematic emotion during the conversation, switch to “mirroring” mode, where you will mirror back what you’re hearing. This will let the other person know that their emotion makes sense. Use the phrases “It sounds like . . .” or “It seems like . . .” to label the emotion:

- “It sounds like this is a really important issue for you.”
- “It sounds like you care about making sure that those in need receive support.”
- “It seems like maintaining order is something you care about.”
- “It seems like you want to make sure that people are treated fairly.”

When you acknowledge the emotion, it makes the other person feel validated, heard, and understood. If you’re able to give that to them, they’ll be more open, and if things are heated, it will help to cool things down.

Keep in mind that empathy doesn’t



mean endorsement. You're not necessarily agreeing with them. You're letting them know that, based on their perspective, you can understand where they're coming from. This is a skill that *takes practice* and it requires humility. In order for us to listen and learn in a way that generates true understanding, we need to genuinely believe that we don't have all the right answers—because we don't; nobody does.

“Your most powerful tool in any difficult conversation is genuine curiosity.”

### 2) Get curious with compassion

Your most powerful tool in any difficult conversation is genuine curiosity. Ask great questions and you'll be able to move the conversation forward and make it more likely that you'll get what you want. In this case, you want peace. That's it. Especially when the conversation has underlying emotional tension, questions that start with "Why..." can often trigger defensiveness. Instead, use questions that start with "Who," "What," "Where," "When," and "How," like these:

- In your opinion, what are the most important issues?
- What do you think could be done about this particular issue?
- What do you think the best way forward is?

### 3) Engage in joint problem solving

When it comes to difficult conversations about politics, one of the most challenging steps can be bringing the discussion to a logical conclusion.

Start this wind-down process by saying: "I appreciate you participating in this conversation and I hope that we can continue to interact in a positive way." Especially if you're in a situation where there was previous tension, this can be a powerful olive branch. In the vast majority of cases, this one comment can lead the other person

to reciprocate with a similarly positive statement.

Then focus on what your relationship will look like moving forward. Ask: "What should we do next time something like this comes up?"

By asking a question, you invite them in and make them feel like they're a part of determining the next steps. Use this as an opportunity to set some ground rules and boundaries for the relationship so it can continue to function from a positive place.

When you use these strategies and model how to act with civility, empathy, and understanding, it's more likely that other people will reciprocate in a meaningful way. One conversation, one relationship at a time, we can move towards a place where everyone is sharing information, listening, and learning from each other.

For more insight on having difficult conversations about politics, including how to mediate political conflict among employees, listen to the full course available on LinkedIn Learning at <http://estalink.us/difficultconversations>.

And above all else, be willing to forgive yourself when you try but fail with these

conversations. These are skills that must be learned through practice, and it's hard to learn when you decide yourself for not getting it right. Remember, learning to run starts by learning to walk . . . and falling down a few times. ■

“One conversation, one relationship at a time, we can move towards a place where everyone is sharing information, listening, and learning from each other.”



**Eddie Raymond** is a Past President of ESTA and the retired Vice President/ Training Director of IATSE Local 16 in San Francisco. Eddie recently retired as a founding member of the IATSE's Craft Advancement Program and still teaches the OSHA 10 and 30 General Industry Safety curriculum.

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# Stage wagons: An overview, current systems, emergent trends, and resources

BY R. DUNCAN MACKENZIE

STAGE WAGONS HAVE EXISTED ever since the Greeks used the *ekkyklêma* to transport bodies killed offstage out of the *skênê* into the view of the audience.<sup>1</sup> Since that time there has always been a need to quickly and efficiently move scenery and personnel horizontally within the stage house to effect a change of scene or a *vista* effect. As scenery became more three dimensional and heavier in the late nineteenth and early twentieth centuries the advent of the modern stage wagon began in the German opera houses and theatres.<sup>2</sup>

Today, there are several methods of moving stage wagons. Many stagehands are familiar with deck cable drive systems. Basically, a winch drum is used to spool wire rope both on and off to a closed loop arrangement attached to the stage wagon. The power to drive the winch drum can be manual, electric, or hydraulic. I believe the manually driven winch drive used to move the Inner Below Slip Stage at the Oregon Shakespeare Festival Elizabethan Theatre may still be in use today. This manually powered drive system, based on the grinder pedestal used aboard racing sailboats, offered inexpensive, reliable, positive motion. The use of electric motors with either DC or Variable Voltage Variable Frequency drives affords control of speed and acceleration and deceleration of the load. While some systems may employ hydraulic motors and proportional valves to drive the winch, the cost may only be justified under certain conditions. Found in Alan Hendrickson's *Mechanical Design for the Stage*<sup>3</sup> on pages 408 through 422 are several examples of rigging, guide knives, and deck tracks. Additional examples can be found on pages 96 and 97 of Toshiro Ogawa's *Theatre Engineering and Stage Machinery*<sup>4</sup>.

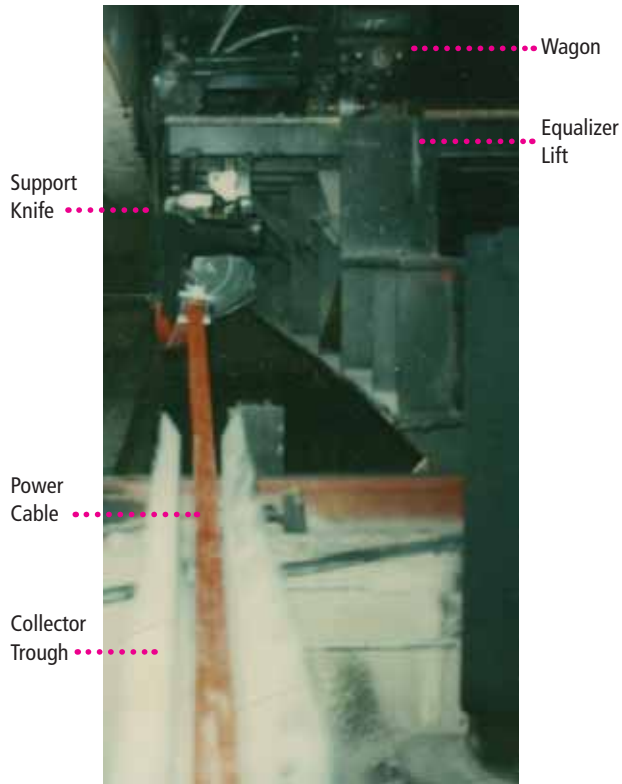
While cable systems offer a relatively low-cost solution, there are aspects which may preclude their use in certain instances, particularly when stage wagon paths must cross in two directions. Powered wagons with electrically driven rollers contacting the stage floor or track offer a means to move wagons on perpendicular paths. Examples of such units exist at the former MGM Grand Las Vegas Ziegfeld Showroom (now Bally's Hotel and Casino), MGM Grand Reno Showroom (now Grand Sierra Resort and Casino), Indiana

University Opera House, and the Metropolitan Opera House in New York City. The primary issue is one of power cable management. As the wagon is returned to its offstage position some means of storing or retracting the cables must be provided. Spring loaded reel retractors are prone to mechanical issues and at times can foul.

In the instance of the MGM Reno system, a steel knife attached to the upstage side of the wagon and running in the slot between wagon units supports a subfloor junction box to which a flat electric supply cable is attached. This cable is constrained by a fixed trough at whose offstage terminus a fixed junction box, connected to the control system, is placed. Wagon position is monitored by lever arm limit switches mounted to the associated equalizer lift and crossover bridge. Please refer to the adjacent photos showing the trough and cable arrangement. A more detailed view of the similar stage at the MGM Grand Las Vegas can be found in George Izenour's *Theatre Technology*<sup>5</sup> on pages 273 through 276.

... there has been a recent trend for stage wagons to employ the mecanum wheel form.

The renovated stage wagon system at the Met is powered by multiple round cables which are retracted by means of compound reeved counterweights and sheaves located offstage.<sup>6</sup> When the side stage wagons are moved offstage, the upstage wagon with turntable is free to travel downstage without interference. Interesting and innovative aspects of the renovated Met wagon system are its modular element design, allowing for quick interchange of drive units, roller units, and slave wagon clamp units as well as a compliant framing design allowing all rollers to remain in full contact with stage deck. To provide for positive wagon position feedback without the error that might be attendant on the slippage of drive rollers on the



Figures 1 and 2 – MGM Reno side stage wagon showing cable trough arrangement

stage deck, an offstage encoder driven by a roller chain secured adjacent to the power cables is used. An informative YouTube video of the renovated MET stage wagon system can be found at [https://www.youtube.com/watch?v=94bo\\_eTTvBU](https://www.youtube.com/watch?v=94bo_eTTvBU).

To address the problems occasioned by drive wheel slippage either occasioned by overloading or stage floor unevenness, there have been a few designs which seek more positive methods of off board stage wagon propulsion.

Among these is the Clarke Chapman engineering firm design for the Royal Opera Covent Garden stage wagon system. Each wagon is driven by multiple gear motors mounted on the edges of the surrounding fixed floor sections in both the onstage/offstage and upstage/down stage directions. The gear motor drives a short section of an endless toothed belt which engages a matching toothed belt attached to the sides of the wagon. A photo of this arrangement can be seen in Ogawa's *Theatre Engineering and Stage Machinery* as Figure 3 – 83 on page 98. In the video found at <https://www.youtube.com/watch?v=CmvPGtCLMXQ>, one can see at 1:00 the two drive units stage right and the two drive units down stage. At 1:25 the drive belt on the down stage face of the moving wagon can be seen. The omnidirectional caster arrangement for this design is not known.

Installed at the Copenhagen Opera House by the Austrian firm Waagner-Biro Stage Systems are 160 motor-driven gears which are raised as needed from beneath the stage floor to engage gear racks attached to the underside of the stage wagons. YouTube video of this system can be

found at <https://www.youtube.com/watch?v=WWRDRggPdTE>.

Omnidirectional stage wagon propulsion by means of specialty roller chain has been around since the renovation of the Bayerische Staatsoper [National Theatre] in Munich completed in 1963.

The photograph shows the downstage right upstage/downstage drive chain cassette. The roller chain runs in track that is flush



Figure 3 – Bayerische Staatsoper stage right wagon drive chain cassette

mounted to the stage with the wagon connected to the chain by a drop-in dog for the desired direction. Two sets of casters are either raised or lowered for the desired direction of movement. The arrangement of the stage is three 20 m x 6 m wagons upstage, and three 20 m x 6 m wagons at stage right. There is a service area upstage right with sound doors that close off the upstage area and the stage right side stage so that scenery erection on the wagons can be performed. Also, offstage right in the service area is the loading dock where entire sets on container pallets can be received from the storage and scene shop facility on the outskirts of Munich. Please refer to Ogawa's *Theatre Engineering and Stage Machinery* Figure 3 – 70 on page 87.

Serapid rigid roller chain has been used to drive stage wagons in several instances. Since the chain is stored in an offstage cassette, tracks can cross one another to afford orthogonal movement. An example of a Serapid system is stage wagon drive system installed by Waagner-Biro at the Gran Liceu Opera House done after the devastating fire in 1994. It is not known the manner in which the casters operate nor if there are coupling clutches between drive units to synchronize movement. YouTube has video of this system in operation <https://www.youtube.com/watch?v=X2CTHIHrjnA>.

Beginning approximately in 2014, there has been a recent trend for stage wagons to employ the mecanum wheel form. Invented by Bengt Ilon in the early 1970's and patented in 1975, *US Patent*

3,876,255 describes a unique wheel construction which can provide for omnidirectional movement. This device solves a number of the issues raised during the previous discussions of tracked and guided stage wagons. The sketch shown below as Figure 4 depicts the various movement directions possible through the selective energization and rotational direction of a stage wagon so equipped.

A number of European vendors now offer modular drive units which either singularly or in combination can move scenery to within +/- 1 mm of the desired position. Noted below are several firms and associated YouTube URL's which offer modular, omnidirectional assemblies. If one is interested in exploring this subject further, might I suggest a YouTube search on the subject Bühnenwagen. (Yes, the umlaut is needed for without it the search comes back with garbage hits.)

#### Groß Funk Mecanum Drive

<https://grossfunk.de/en/products/stage-wagon/mecanum-drive-eng/>  
<https://www.youtube.com/watch?v=kNugleoDy20>

#### HOAC® Schweisstechnik GmbH

<https://www.hoac.com/stage-wagon/>  
<https://www.youtube.com/watch?v=ZBpNyKeEe1Y>  
<https://www.youtube.com/watch?v=qY4PpqbUsHc>

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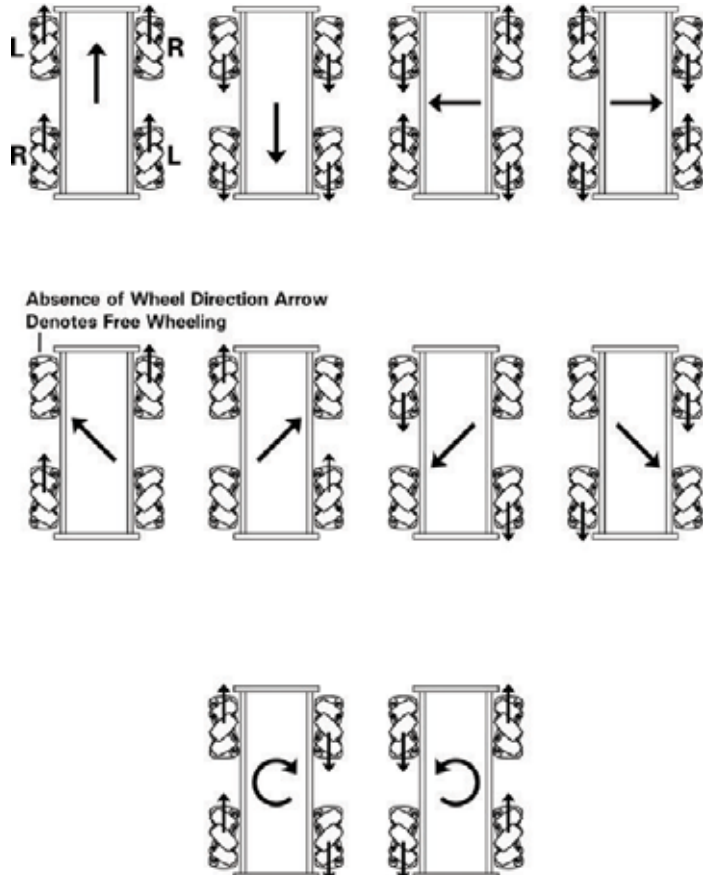


Figure 4 – Basic mecanum wheel movement diagram

## Kuka AG

Note: The Omnimover system is more a heavy material handling based entity and its 415 mm height makes it somewhat taller than what is normal for the stage. However, the incorporation of synchronized lifting jacks to raise the load is an interesting feature.

<http://estalink.us/kukamobilityplatformskukaomnimove>  
[https://www.youtube.com/watch?v=0IHltWN\\_RgY](https://www.youtube.com/watch?v=0IHltWN_RgY)

## Ventum-S Mecanum Drive

<https://www.youtube.com/watch?v=hQkTvBKwtbw>

Finally, the problem of equalizer lifts has always been an expensive and troubling issue. In order to render a safe and flat stage whether populated with stage wagons or not, equalizer lifts on the side stages and upstage areas have been used in upscale facilities. A recent installation by Sansei Technologies, Inc. of Japan at Biwako Hall manages to solve the problem by introducing an upstage lift in each side stage upon which the wagons are stored one atop one another. Using what appears to be mecanum wheels in the stage wagons, the wagons are brought to the stage as needed and then moved to the positions required. YouTube video of this unique system can be found at <http://estalink.us/sanseitechnologies>. ■



**R. Duncan MacKenzie** is the founder and principal of the specialized industrial design firm Prosenion Design, LLC. While now semi-retired he does support his former clients and projects on a limited basis. When inspiration strikes, he continues to create new products and systems for the entertainment industry. Duncan was the recipient of the ESTA 2022 Lifetime Technical Achievement Award.

## Endnotes:

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3. Alan Hendrickson, *Mechanical Design for the Stage* (Burlington: Focal Press/Elsevier, Inc., 2008)
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6. Sööt, Olaf, P.E. (Principal, Olaf Sööt Design, LLC) in phone conversation with the author. May 2022

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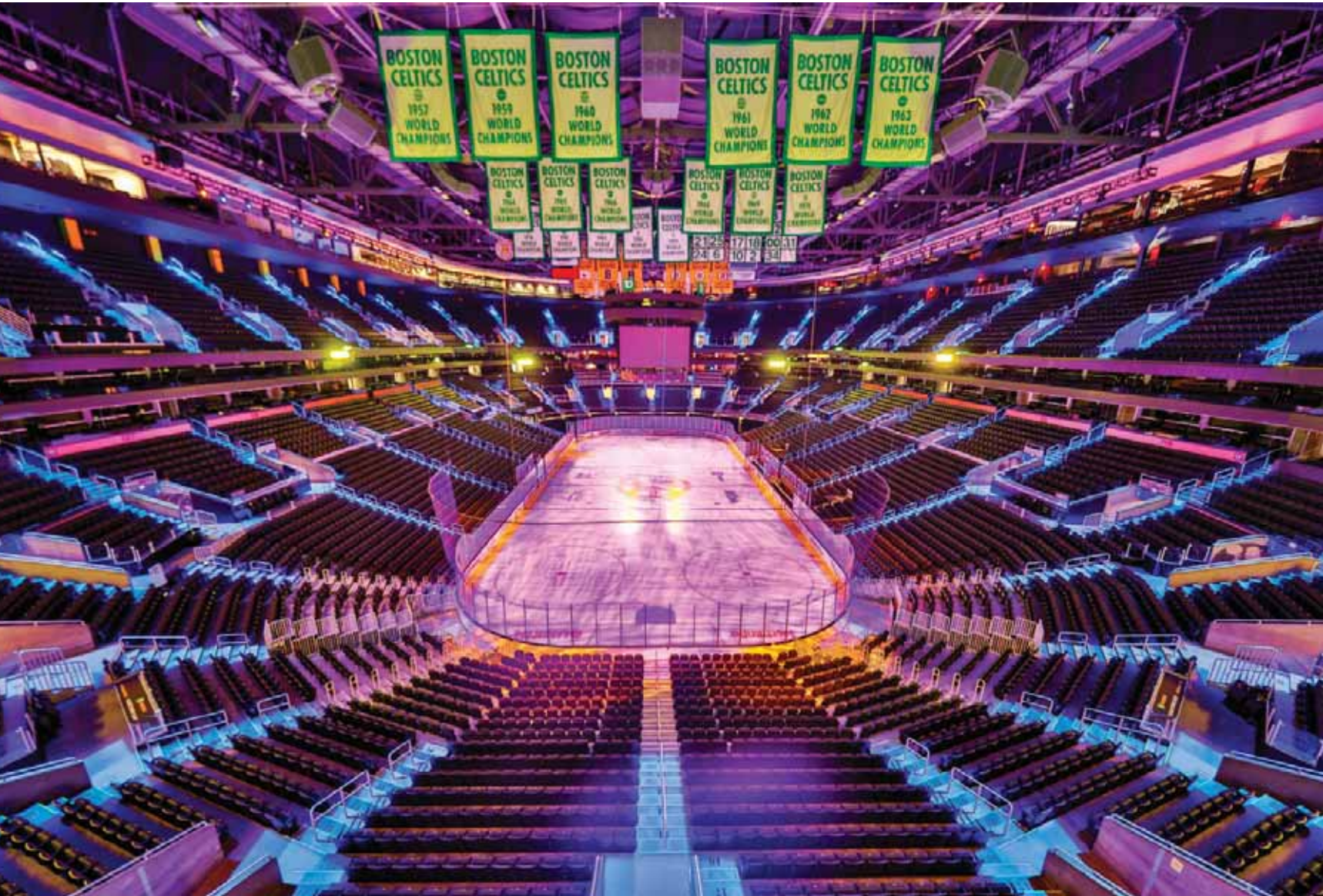
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## More than just a certificate on the wall

EARNING AN ETCP CERTIFICATION means so much more than just a certificate on the wall. ETCP certifications offer a level of credibility to peers and contractors, but more importantly, they are an unwavering commitment to safety. ETCP certified technicians help to create a culture of safety in their peer circles and within their organizations, theatres, jobsites, and teams. Everyone who has been in the entertainment industry long enough has come

across a situation they felt was unsafe, hazardous, and potentially dangerous. The difference is how the individual or organization deals with that situation. Young and inexperienced technicians may not be aware of the hazard and others may simply look the other way saying, “we have done it that way before.” ETCP technicians are expected to step in and say something. It could be your first day with a new employer, but as a certified technician, you must

PHOTO COURTESY OF MATT TEUTEN



Home to the Boston Celtics and Bruins, the TD Garden renovation completed in 2019, included a comprehensive color-changing aisle lighting upgrade.

take steps to correct the situation. Increasingly, organizations are placing an emphasis on creating a culture of safety that provides a platform for all voices to be heard without fear of retaliation. With tons of equipment hanging overhead of performers, audiences, and crew, safety in the entertainment industry is more important than ever. ETCP technicians are the loudest advocates for safety. Having certified technicians on your staff is one of the best decisions you can make.

“ETCP certifications offer a level of credibility to peers and contractors, but more importantly, they are an unwavering commitment to safety.”

Starting out as a young project manager for Port, just north of Boston, on the systems installation team, I quickly realized I needed additional training, support, and resources. I found all of that and more within the ETCP program. The extent of the training resources that offered ETCP credits was overwhelming when looking at both Theatre – Rigging and Entertainment Electrician certifications. I knew that I needed to earn my certifications to not only prove to myself that I possessed the knowledge, but also to continue the culture of safety that Port has created. As a young project manager, I was often questioned and criticized onsite by contractors and architects. Earning my certification instantly helped me on those jobsites as my certification provided a level of knowledge and training that were required to complete the project.

I will be the first to admit that I do not know everything and that is part of the reason I choose to work with such an incredible team of talented individuals. Having such a strong team at Port to share thoughts and ideas with is invaluable. As I began my journey to prepare for my Theatre – Rigging certificate, I quickly realized the wealth of the resources that are available to the industry through the ETCP program. As individuals and trainers, ETCP certified technicians are all committed to passing on their knowledge, skills, and advocating for safety at every turn. This became clearer than ever when I stepped foot into my first LDI training with Jay O.



ETC Prodigy Hoists installed at Phillips Exeter Academy's Goel Center for Theater and Dance.



A temporary installation outside the TD Garden for the 2022 NBA finals included hanging signage and luminaires 95' over the crowd.

Glerum in 2011 for his Stage Rigging Fundamentals class. Coming from a mainly production background, I knew there was plenty to be learned about theatrical rigging practices. Jay was an incredible teacher with a wealth of knowledge, and he did not mind taking extra time after class or during breaks to work with someone or answer their questions. Jay's class, resources, *Stage Rigging Handbook*, and course materials were a huge part of my study guide and success in passing the ETCP Theatre – Rigging exam. Jay's class and personal commitment to safety have played a crucial role not only in my own work and journey through the industry, but also in how I have shaped my own teaching materials and practices. Even



Façade lighting for One Financial Center in Boston, MA.

PHOTO COURTESY OF MATT TEUTEN

today, 11 years later, I still use my notes and Jay’s materials when I teach rigging classes to students and my peers.

After earning my Theatre – Rigging certification, I set my eyes on the ETCP Entertainment Electrician certification. As an authorized service provider and technician for multiple manufacturers, it was important to me to know I had all the additional resources and training at my disposal to be sure my projects, system startups, and service jobs were as safe as possible. As a production electrician for many years in the Boston area, I felt very comfortable with the knowledge I possessed, but I learned over the previous few years that not everything I was taught was necessarily correct or proper. Having a standardized certification process not only tests your knowledge and skills, but it reinforces that the skills you have learned are the bona fide and accurate methods to use. As part of my final preparation for my exam, I made a point to take

Richard Cadena’s Entertainment Electricity, Power Distribution, and Controls Training ETCP prep course. After such an amazing experience with Jay O. Glerum in 2011, I just knew that Richard’s class was going to be just as entertaining, fun, knowledge-packed, and challenging. Richard did not disappoint! His three-day class covered everything you could need to prep for the exam, and once again proved that not everything I had learned in the field was truly acceptable. I have sat through Richards’s class twice now, and each time I have learned something new. He has reinforced the skills and knowledge I need and use every day.

Having the Entertainment Electrician certification has been beneficial. It often has provided me the reinforcement I needed when talking with contractors and engineers. On more than one occasion, I have had to correct or have a polite disagreement with an engineer over their calculations. When you can converse together and show them all of the math while sitting at the jobsite conference table, they tend to be very open to the feedback and implementing the required adjustments. There have been many times since those conversations, where the same engineers have called me prior to meetings to check in, discuss the needs of the project, and make sure it is all coordinated correctly. This level of trust all started because I was committed to safety and honing my craft. To me, that is a huge part of what the ETCP program is all about. While there is a significant emphasis on safety, ETCP certifications and continuing education classes are all about making us the best technicians, peers, leaders, designers, consultants, teachers, and trainers that we can be.

“ The requirement for ETCP certified staff can be found in all of our design and specification work as my team and I understand the vital role that certified technicians play in the successful and safe completion of every project, inspection, repair, and upgrade. ”



Held at Port in 2019, Richard Cadena leads an Entertainment Electricity, Power Distribution, and Controls course that included the Port team and was also open to other area technicians.

Having now maintained my Theatre – Rigging certification for 10 years and my Entertainment Electrician for eight years, not a day goes by where I have not benefited from the ETCP training, certifications, and continuing education. As theatrical and architectural systems designers, integrators, and installers, our team at Port is challenged and tasked daily to help build new facilities, upgrade and restore older facilities, and more importantly, make sure existing systems and all staff, performers, technicians, and patrons are safe. Having four ETCP certified technicians on staff has played an integral role in the projects that we have been awarded. As the requirement for ETCP certified technicians has grown over the years in theatrical rigging and lighting bid specifications, it has become a vital part of not only how we write our own specifications but also in the staff that we hire and the crew that we choose to work with on jobsites. The requirement for ETCP certified staff can be found in all of our design and specification work as my team and I understand the vital role that certified technicians play in the successful and safe completion of every project, inspection, repair, and upgrade.





Renovation of the Colonial Theatre in Laconia, NH was completed in 2021 and is now a destination for national touring artists, home to a nonprofit resident theatre company, and various civic events.

## ETCP News | More than just a certificate on the wall

sharing of knowledge with others. It is a personal commitment to always do things the correct way, even if it takes more time and money. It carries a duty to teach others the proper method to do things, so everyone goes home safely at the end of the day. It is more than just a certificate on the wall, it is a gold standard to make you and your organization be the best that you can be. ■



**Ron Kuszmar** is VP of Architectural and Theatrical Lighting at Port in Seabrook, NH. A professional lighting designer for nearly 20 years, Ron oversees Port's Architectural and Theatrical Lighting Design and Installation departments, as well as the Lighting Control Systems and Equipment Sales teams. At age 16, Ron's lifelong love of the arts drew him to work in community theatre, where he discovered the magic of lighting. Captured by the limitless, distinct-yet-nuanced ambiances created by combinations of color, shadow, and gradients of white light, Ron met his destined career path. Though Ron works nationwide with Port, notable recent local projects include underpass installations for Lynn Beyond Walls; Boston's One Financial Center façade; continuous special presentation lighting for the Boston Bruins and Boston Celtics; and an ongoing array of projects for TD Garden, encompassing game lighting and controls, special arena effects, building-wide controls, a comprehensive color-changing aisle lighting upgrade installation, and exterior color-changing lighting. An ETCP Certified Entertainment Electrician and Theatre – Rigger, ETC-Certified Field Technician, and Hoist Installer (certified by multiple manufacturers), Ron lives north of Boston with his wife and young daughters.

“[ETCP certification] is an unwavering commitment to your peers, and to our industry that you hold yourself to a higher standard.”

I am proud to display my ETCP certified logo on my emails and letterhead to show my continued support for safety in our industry. However, earning an ETCP certification is so much more than just a certificate on the wall or logo in an email. It is an unwavering commitment to your peers, and to our industry that you hold yourself to a higher standard. It is a vow to always interject when needed and be sure that things are done safely. It comes with an understanding of the importance of lifelong learning and the

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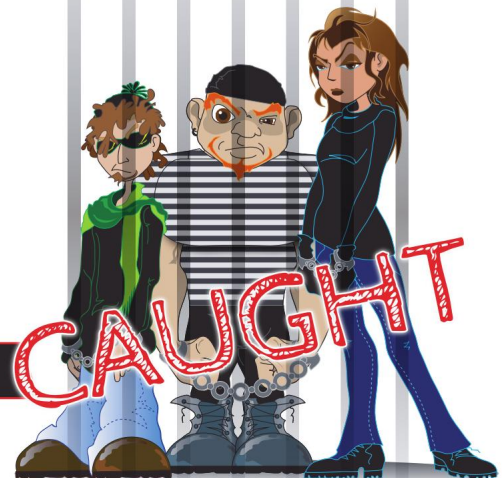
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*Protocol* introduces a new column, written and designed by Andy Schmitz, demonstrating essential knots used in the entertainment technology industry.

## The Alpine Butterfly Knot

LIKE MOST USEFUL KNOTS, the Alpine Butterfly is simple, strong, and beautiful. It may be tied without requiring an end of the line (“tied in the bight”). It can be loaded tail to tail, either tail to loop, or both tails and the loop. Testing shows it be strong and stable when loading the loop with multiple loads in different directions (“ring loading”).

These illustrations show tying the knot in a vertically hanging rope, but this method can easily be adapted to a horizontal or a slack rope. Each step is shown for clarity, but **Figures** (2) and (3), (4) and (5), and (6) and (7) are easily combined. In fact, with a little practice, you can move from (3) into (7) in one smooth motion by rotating the loop up, around, and behind the standing part using only one’s left hand! (See **Figure** (10).)

For temporary isolation of a damaged section of rope the Alpine Butterfly is the superior choice. (See **Figure** 12) And if one now imagines this damaged section of rope in the loop as a full cut through the rope, one can see that this knot also functions as a bend, a knot that joins two ropes. (See **Figure** 13) By committing this knot to memory, you’ve actually learned two knots! Here is a link to a YouTube video of this method: <http://tinyurl.com/quickbutterfly>. ■



**Andy Schmitz** is the Rigging and Inspection Manager with Entertainment Project Services. He has been in the entertainment technology industry for more than 25 years, the last 13 of which he has specialized in circus and acrobatic rigging. Andy can be reached at [andrew.james.schmitz@gmail.com](mailto:andrew.james.schmitz@gmail.com).

① Begin with palms facing away and thumbs facing each other



② Form an underhand loop with right hand



③ Grasp loop with left hand



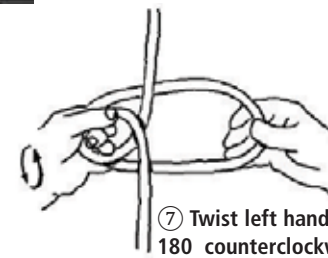
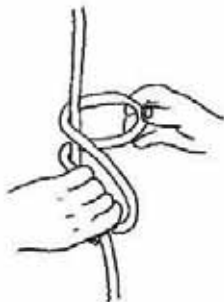
④ Pass loop over the standing part



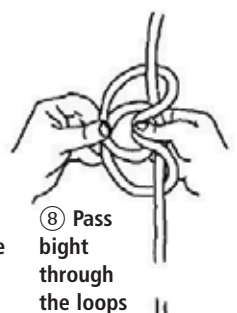
⑤ Grasp loop behind standing part



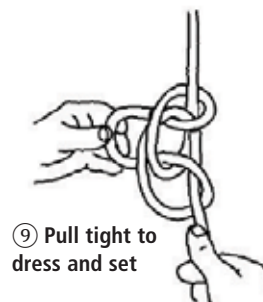
⑥ Pull loop behind standing part



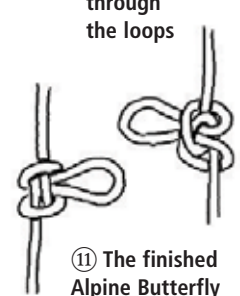
⑦ Twist left hand 180° counterclockwise



⑧ Pass bight through the loops



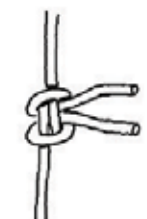
⑨ Pull tight to dress and set



⑩ The finished Alpine Butterfly



⑪ Isolation of damaged rope



⑫ The Alpine Butterfly Bend



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Installation at Mackintosh Academy, Littleton, Colorado

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Small hoists for the individual lift lines allow the curtain to be drawn up to make one or more openings with different contours.

# *BSR E1.71, Powered Curtain Machines, explained*

BY JESSE ADAMS

POWERED CURTAIN MACHINES have been around for a century or more. They are used in exhibits, movie theatres, professional venues, and cafeteriums / gymnasium the world over! They have (mostly) worked fine for decades and require very little maintenance. Press a button and they run to their limits. Why do we need a standard for these workhorses?

As the world changes, technology and the scale of projects and installations expand. Even in the world of curtains, cues move faster, loads get heavier, and new layouts and designs are being implemented. How can we ensure these machines are being properly designed and used?

As liability continues to be a concern, we find a growing need for defining safety and documenting common practices. A written

industry standard is one of the best methods for establishing these safe working practices. Standards can also help clarify the intended use of a particular piece of equipment.

*BSR E1.71, Powered Curtain Machines*, is a project in ESTA's Technical Standards Program Stage Machinery Working Group to draft a standard to address one of the most common stage machines found in our industry: powered curtain machines. Currently, there are no published entertainment standards to address any machines outside of rigging equipment and orchestra pit lifts. In the realm of entertainment, there is a myriad of other machines that don't even come close to fitting into these categories. It is important to have applicable standards for curtain machines, so they are not being compared to their second or even third cousins.

This is a draft curtain machine standard, not intended to be a scenery standard. Using a curtain machine to move hard scenery, whether traveling horizontally or flown, is outside the scope of this document. Flown scenery still falls under the requirement of *ANSI E1.6-1, Entertainment Technology – Powered Hoist Systems*. Horizontally moving scenery falls into the area of a planned future standard.

## It is important to understand the difference between the designed purpose and the actual use of the machine in the field.

In many cases, it would be cost-prohibitive and not practical to build a lift curtain machine to the requirements for a general utility hoist. However, there may be cases in which a curtain machine should conform to powered hoist standards. The separation of one from the other can be a fine line, and that is where a curtain machine standard comes into play. This draft standard attempts to

define the operational parameters of these machines based on the intended curtain movement.

This document uses a risk assessment and risk reduction (RA/RR) approach. RA levels are defined based on operational envelope, curtain design, operating speed, and method of control. Users of this standard should be able to gauge the requirements of a machine by its characteristics and then find the requirements that are applicable to its design and use.

Many curtain machines are used in remote or secluded locations such as acoustic chambers or technical spaces in which no personnel are present as the curtains are moving. The risk assessment (RA) level 1 category is written with these machines in mind. When very little risk is present, a world of options is open in machine design. There is more freedom in both controls and mechanical design when access to the operational envelope is restricted.

RA level 2 is written to cover many common installations. These are the typical curtain machines used in most stage environments. This includes most schools, houses of worship, and even many production-based systems. Most travelers, projection screen/roll drum, and many lift curtain installations are level 2. Control of these systems can be very simple because the risk is low.

The machines in RA level 3 are large or special-purpose production machines. These machines have characteristics that have elevated risk. Curtains in this category may move faster, have



An Austrian curtain has horizontal and vertical fullness, and gathers toward the top batten as it is lifted.



The multiple curtains in this production would be difficult to run manually. Automated curtain machinery simplifies the operation.

heavier bottom pipes, or other elements that increase risk. Control requirements are increased for this category. The most notable requirement is the ability to manually stop the machine if it is activated remotely by an external control system.

RA level 4 is reserved for the most complex of machines. These machines are typically purpose-built machines that pose high risk to personnel or property. Curtain effects used in museums, themed environments, and high-risk production-based machines fall into this category. This is the only level in which safety interlocks or other special provisions may be required.

This powered curtain machines standard is intended to be used by designers, specifiers, manufacturers, and installers of curtain systems. With it, curtain users also can gain understanding and guidance in the safe use and operation of their installed equipment.

It is important to note that certain aspects of curtain systems are not covered by this standard. Common components such as track, carriers, and guide hardware are specifically excluded. These parts may be covered under future standards. While it can be argued that the track becomes a structural component of some curtain systems, they are not considered to be part of the machine.

The current draft standard only covers the machine and components directly attached to its powertrain, operating media, or components in the tension load path. On a traditional horizontal traverse track, this means that the operating media, carrier or load attachment(s) to the line, and any required pulleys would be included.

It is important to understand the difference between the designed purpose and the actual use of the machine in the field. If a lift curtain machine is used to raise and lower a batten with lighting equipment, it is no longer considered a curtain machine and, therefore, must be considered a hoist. Additionally, just because a curtain is hung on a utility hoist does not make that hoist a curtain machine. One must consider many factors when determining the classification of equipment and apply the appropriate standards.

Users of this document will see many familiar requirements for lift curtain machines. In most cases, a powered hoist complying with the requirements of *ANSI E1.6-1* would meet the requirements of a lift curtain machine, but a curtain machine is not likely to meet all the requirements of a powered hoist and should not be used as a utility hoist. Elements of *ANSI E1.6-1* are used as the basis for vertical travel systems in higher risk assessment categories. These sections of the standard follow much of what is considered standard industry practice in entertainment rigging. Most of the deviations for powered curtain machines from hoist requirements are found in the controls section.

Most vertical travel curtains operate by lifting the bottom of the curtain and stacking it toward the top. Examples of these would be Austrian, Venetian, and Roman curtains. These systems usually have little or no rigidity to the panel and are almost entirely flexible. The loads on these systems are fixed and their movement is largely obvious to persons in or near the operational envelope. In most cases, these systems pose minimal risk to personnel or property.

Because of this, control can be simplified.

Other vertical travel curtains operate as a straight lift. The curtain does not gather at all; the top support moves with the curtain. These systems also have fixed loads and obvious movement. Most will incorporate some type of bottom pipe or fixed weights, but the top pipe typically does not travel into direct contact with personnel or property. This reduces risk and allows most controls to be simplified.

The highest level of risk for curtain machines comes when aspects of the system are outside of the average installation. These systems may incorporate high speeds, abnormally heavy curtains, larger rigid components, or the element of surprise. Many times, these will be curtains operating in the vicinity of the unassuming public. Special provisions must be made for machines operating outside of typical conditions.

The current draft does not dive deeply into controls details beyond basic system functions. This allows designers and manufacturers the flexibility to be creative and design systems tailored to specific curtain effects. In the future, this section may even be replaced by a controls standard that is currently in

development in the Stage Machinery Working Group.

The draft standard gently reminds designers and specifiers that future access is important to the design of the system. Curtain machines tend to get designed into impossible locations. Not only does this create a problem for most installers, but once the machine is in use, it may be very difficult to inspect and maintain the machine and its attached components. Manufacturers are also required to design machines in a way that allows for maintenance and inspection.

While powered curtain machines may not be the most problematic or dangerous machines in entertainment, they are certainly one of the most common. The design and use of these workhorses is almost as diverse and numerous as there are designers and fabricators to dream up and build them. The one element they have in common is their purpose: moving curtains.

Creating a standard for such an eclectic family of equipment is not an easy task. The similarities and differences between the intricacies of the most common arrangements had to be carefully examined. The task group has done its best to reconcile these varied requirements and reduce the language in the standard to the most basic of requirements. The current draft is an attempt to present the requirements without hindering design, creativity, or future development of new products. There will likely be many changes as the document is refined during the public review process. The task group is looking forward to seeing what comes next! ■



This ADC curtain machine uses a small gearmotor: powerful enough to move a curtain, but with limited power to tear things apart.



**Jesse Adams** is a Technical Projects Manager for Rose Brand. He has more than 20 years of professional experience in rigging and technical production with projects around the globe. Jesse holds an ETCP Theatre – Rigging certification and has spent the last 10 years volunteering with ESTA's Technical Standards Program.



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## What does “best practices” mean?

I REGULARLY HEAR someone say they are following “best practices” because they are following standards. Most standards do not say they are “best practices,” and, even if they do, “best” is a problematic term. Steve Adelman, writing as a lawyer in “‘Best practices’: A legal disclaimer” in the Summer 2015 issue of *Protocol*, argued that “the term ‘best practices’ is not very helpful” and reminded us what our fundamental legal obligation is in caring for each other. As a wordsmith, I would argue “best practices” is a phrase that works for some people some of the time, but “best” might not mean what we think it means.

“I would argue ‘best practices’ is a phrase that works for some people some of the time, but ‘best’ might not mean what we think it means.”

My second-grade teacher, in her lesson on the comparative and superlative, explained that you had to have at least three things for one of them to be “best.” If you only have two, one could be better than the other, but not best. That seemed crazy to me. If you gave me a choice between a Big Hunk and a Look candy bar, the Look bar was best because it was chocolate-covered! However, she’d explain it was only better; I’d have to have a choice that included a third item—a Snickers—for the Look bar to be the best. She’d also argue that the best was unique, so I could not have two best candy bars if I had a choice of four or more.



Sears Roebuck & Co. regularly offered three levels of quality in its catalogue: good, better, and best.

Only one would be “best.”

My second-grade teacher’s definition of “best” as distinct from “better” exists today. The Oxford Languages definition pulled up by Google says “best” is an adjective meaning “of the most excellent, effective, or desirable type or quality,” with similar words including “unrivaled, second to none, without equal, nonpareil, unsurpassed, unsurpassable, peerless, matchless,” and so on.

However, another meaning for “best”

often used in conversation and marketing, is “much better.” The *How to Spend It* magazine in the 5 March 2022 *Financial Times* ran a story, “The World’s Best Coffee Shops,” listing 25 shops around the world. Are each of these shops without equal, unsurpassable? That’s no more likely than the children of Lake Woebegone all being above average. If “best” is the top category of at least three categories, what are the other categories? There are only two categories here: one explicit and the other implicit—



the coffee shops listed here and all the others not listed. Despite the title, this is not a listing of “the best” coffee shops; it’s a listing of coffee shops better than the ones not listed. However, a story entitled “The World’s Better Coffee Shops” is not likely to catch a reader’s attention in *How to Spend It*, so, of course, that’s not the title.

Most standards do not say they offer best practices, but a few do. The ones I can find are in law enforcement. In researching for this article, I came across *BSR/ASB BPR 160-202x, Best Practice Recommendation for Initial Response at Scenes by Law Enforcement Officers*, a draft new standard. The description in *ANSI Standards Action* said, “This best practice recommendation provides guidance for the initial response by law enforcement officers (LEOs) to scenes. The guidance includes: arrival procedure, safety considerations, medical intervention, assessing the scene, preventing scene contamination, scene containment and control, evidence identification and preservation, turning the scene over to investigators, and documenting actions and observations.”

The *ANSI Standards Action* listing had a link to a free public review document, so I could actually read it. What the document recommends as “best practice” is broad. Article 4.6, Scene Containment and Control, says “Once an assessment of the scene has been made, responding LEO(s) should establish perimeters in order to control crowds and to restrict access into areas . . . Movement throughout the scene should be limited to only necessary actions by authorized personnel only.” Then the LEO(s) “. . . should make a reasonable effort to:

“a) Control individuals at the scene to prevent altering/destroying the scene and any physical evidence within it, while ensuring and maintaining safety at the scene.

“b) Identify individuals at the scene, such as suspects, witnesses, bystanders, victims/family/friends, law enforcement, medical, and other assisting personnel.

“c) Control the flow of persons, animals, etc. entering and leaving the scene to maintain integrity of the scene.

“d) Document the entry/exit of all people entering and leaving the scene, once boundaries have been established.”

. . . and so on for three more list items.

“Reasonable efforts” are by definition reasonable; it would make no sense to require unreasonable efforts, but the range of actions that could be considered “reasonable” is wide. I once accompanied LEOs as they broke up an under-age drinking party at a mansion in Montecito. As the officers arrived, hundreds of adolescents scattered in all directions—far more people than the few officers present could control. Only a few people were detained and identified. In contrast, the New York Police Department marshaled a small army to sweep up hundreds of people from the streets and sidewalks in mass arrests to control demonstrations during the 2004 Republican Convention. Lawyers for the city argued that the arrests were permissible because “where it reasonably appears to the police that a large group is engaging in unlawful conduct, the police have probable cause to arrest the entire group.” Letting people go and arresting everyone on the street all might be “reasonable,” depending on who is making the judgment. Article 4.6 of *ASB BPR 160* doesn’t say exactly what an LEO must do in specific instances other than that the LEO should take **reasonable** steps to accomplish the listed items. Thus, there really are only two classes of actions implied in *ASB BPR 160*: you do what is reasonable or you don’t. My second-grade teacher would say these are not “best practices.” They are “better practices.”

Given the cultural context of law enforcement in the United States, it’s not surprising that a law enforcement standard calls its guidance a “best practice recommendation.” What administrator defending a city’s police is going to say that the officers follow better practices? Of course they are going to follow best practices—just as the *Financial Times* is

going to list the best coffee shops! And the draft standard does offer useful advice, such as making sure that lawn sprinklers don’t obliterate evidence. Much of this would be learned in police academies, but a standard reinforces that body of knowledge and helps make what LEOs are supposed to do clear to the affected public, the people the LEOs work for.

Most standards do not say “best” in the title. Most say somewhere in the scope that they are minimum practices, or they simply give a specification. An example of a minimum practice standard is *NFPA 101, The Life Safety Code*. Article 1.2 says, “The purpose of this Code is to provide **minimum** requirements, with due regard to function, for the design, operation, and maintenance of buildings and structures for safety to life from fire.” [Emphasis added.] Furthermore, it’s a standard written to be enforced by “the authority having jurisdiction designated by the governing authority.” (Article 1.6) It offers requirements that are easy for the AHJ to measure and say have been met or not. For example, article 7.8.1.3 says that the floors in an exit path shall have a minimum illumination of at least 1 foot-candle, except for assembly occupancies (e.g., theatres) where it can be as low as 0.2 foot-candle during a performance. Simple! Put a light meter on the floor and see what it says. If it shows the minimum or more, okay! If less, not okay. This is not a best practice. It’s a better practice since the choices are two: okay or not okay. Okay is better.

“ This may seem like a pedantic grammatical argument, but words affect how we think, and what we think affects what we do. ”

This may seem like a pedantic grammatical argument, but words affect how we think, and what we think affects what we do. If you think standards are “best” practices, and you learned the difference between better and best from your English

teacher, you might think a standard’s recommendations are unrivaled, second to none, unsurpassable. You may be tempted then to do the minimum specified and call it “best.” That may cause problems.

*NFPA 101* is a useful document, but if a person thought the minimum illumination levels for exit paths in *NFPA 101* are unsurpassable, the exit path may be impossible to see for some people. Some populations will need more light—residents of a senior living facility, for example—and glare may obscure the floor. I recently was in a theatre where the aisle lights shined up as well as down. I had to shield my eyes to see the floor, although I have no doubt that the floor met the minimum illumination requirement. *NFPA 101* also requires a minimum of one trained crowd manager for any assembly occupancy, and an additional one for every additional 250 occupants, but churches are exempt from this requirement if the crowd is fewer than 500. (Article 13.7.6) If your church only holds 499, you don’t need any trained crowd managers at all per *NFPA 101*. Zero is easy!

“There is no singular, universal ‘best practice’ any more than there is a world-wide best coffee shop.”

Zero is easy, but is having no one trained in crowd management exercising a reasonable duty of care? What is reasonable depends. For any event—religious or secular—there are going to be risks and steps that can be taken to ameliorate those risks, and what is truly reasonable depends on the event. Perhaps no managers is fine for some religious services, but I’ve been to some Pentecostal services where a few people appointed to take care of those in ecstasy would have been good. I’ve stage-managed jazz fusion concerts where the mandated two managers were frighteningly few for a stoned crowd of 460. Chamber music events in the same venue were easily handled with an usher and a house manager.

“Best” is not a fixed number.

Adelman argued in his Summer 2015 *Protocol* article that the law does not require you to do what is best, only what a reasonable person would do in similar circumstances. “Circumstances” depends on different factors—different for each event. Events are of the moment, and no moment is the same as any other. Shows change, venues change, the surrounding community changes, and people change. (I’m now allergic to chocolate; Look bars aren’t “best.”) “Reasonable” also means that a person must use reason. A reasonable person should have knowledge, experience, and mature judgment to apply to particular circumstances. That means gathering information, talking to others on the production team and in the community, considering the risks, and then, applying good reasoning, coming up with a plan and implementing it. “Reasonable” also means addressing the hazards and events that reasonably can be expected to happen. An event safety plan that includes responding to extraterrestrial alien invasion in addition to active shooters with firearms is not a better plan—it’s only thicker and less likely to be read by the people who need to implement it.

On 5 November 2021 over 50,000 people went to the Astroworld Festival in Houston. Ten died in a crowd-crush and several thousand were injured, despite there being a security team including “more than 500 hundred on-duty Houston police officers” (*New York Times*, 15 November 2021). Texas Governor Greg Abbott formed a Task Force on Concert Safety to determine what went wrong and what can be done to ensure it doesn’t happen again. On 19 April 2022 the Task Force’s nine-page report was published (<http://estalink.us/opyzz>), with five findings that can be summarized as:

- (1) a need for a unified command and control structure;
- (2) a need for a unified permitting process to establish jurisdiction and authority over an ultimate event shutdown;

(3) a need for adequate training for security and event staff for each specific event;

(4) a need for event planning with risk assessment relevant to the unique event; and

(5) a need for a centralized depository of resources to help with the four items above, an *Event Production Guide*.

The *Event Production Guide* can be found on the Texas Music Office website at <http://estalink.us/3ssep>. It’s referred to in the Task Force’s report as a listing of “best practices.” It’s 34 items: standards, books, classes people can take, government regulations, government guidance, PowerPoint presentations pointing to other resources, and a link to ESTA’s TSP published standards website, where many of the listed standards can be downloaded for free. It’s a more heterogeneous list than “The World’s Best Coffee Shops,” but similar in that there are commonalities among these resources. The *Event Management Plan Template* from the Lincolnshire Event Safety Partnership is not the same as the *Guidelines for Concerts, Events and Organised Gatherings* from the Government of Western Australia Department of Health on the other side of the world, but they aren’t that different. Which is best?

What’s best is none of these documents, websites, PowerPoint presentations, classes. These are all only better, but they can help people to use reason to arrive at what is best for their particular event—the act, the venue, the audience, and the people running the event. There is no singular, universal “best practice” any more than there is a world-wide best coffee shop. ■



**Karl G. Ruling** is ESTA’s Senior Technical Standards Manager. He also serves as *Protocol*’s Technical Editor. Karl can be reached at [karl.ruling@esta.org](mailto:karl.ruling@esta.org).



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## PERG Council plans additional resources for member rental companies

PERG WAS THRILLED to finally reinstate our in-person events in 2022, but the PERG Council is also cooking up new ways that PERG hopes to provide services for rental companies.

“Both camera and lighting rental companies can benefit from service education.”

At NAB, PERG was delighted to announce the new Equitable Workforce Initiative, sponsored by Netflix (see full article on page 12). The week after, PERG held its pre-Cinco de Mayo event in Los Angeles. This networking/social event, co-hosted by the AICP, was held at the lovely Culver Hotel. A month later, it was time for the Cine Gear Expo and the PERG Rental House Breakfast. This year, the breakfast was also a fundraiser for the Behind the Scenes charity. Cine Gear was held at the LA Convention Center, with the breakfast at Tom’s Watch Bar, a sports bar that is within easy walking distance to the show. The upscale venue is filled with screens, giving the breakfast a backdrop of music videos and messages about PERG programs and PERG’s sponsors. The breakfast was a great success, being attended by about 75 people, vendors and rental companies, from as far away as the Netherlands and United Kingdom, and facilitating relaxed, uninterrupted conversations between all. The event raised \$1,680 from 112 donations for Behind the Scenes.



PERG members and guests enjoy breakfast together at PERG’s Rental House Breakfast during Cine Gear, held at Tom’s Watch Bar.

In addition to bringing back its annual events, the PERG Council has been working on new ideas to identify valuable, tailor-made ways to support its members. PERG is currently in the initial stages of arranging with manufacturers to facilitate product/service training for rental companies that goes far beyond the sales pitch. Working with manufacturers like ARRI and Sony,

PERG has identified three kinds of education that could help rental companies expand their capabilities. The first is to discuss options for purchase decisions/ accessories upgrades/buybacks; the second is providing deep product orientation for rental staff; and the third targeting service technicians with technical procedures for general maintenance and resolving

common issues. Both camera and lighting rental companies can benefit from service education.

“ PERG is strengthened by representing a greater number of rental companies in the US, Canada, and beyond. ”

While these long-term plans are being worked on, PERG identified two immediate steps it could take. The first was to partner with Filmscape Chicago to offer a full day of training, specifically targeted for rental companies. The event, which was held at CineCity Studios on Friday, June 24, was followed by a multitude of other educational sessions that took place at the weekend trade show, June 25 – 26. Most of the local Chicago rental companies sent representatives to the rental company training session, which covered the new Alexa 35 camera from ARRI; 12 V and 24 V battery systems from CORE SWX; configuration, calibration, connectivity of ARRI Skypanels and Orbiter lighting systems; high-level insights into wide-gamut production monitors and live color controls from Flanders Scientific, Inc.; a discussion of zoom lenses from Canon; and a presentation on large format director’s viewfinders and filters from Lindsey Optics.

The other immediate action PERG has

taken is to open official Slack channels for service technicians to share information and ask questions. Slack has long been used on an ad hoc basis by neighboring companies, but PERG wants to open this valuable resource to all its members. Increasing the capabilities of service departments at rental companies helps ease overwhelmed service departments at manufacturers, it decreases downtime, and it increases confidence in the products.

ESTA’s PERG group continues to broaden the number of ways it engages with its partners in the industry, with one thing building resources for the next. PERG is strengthened by representing a greater number of rental companies in the US, Canada, and beyond. If you run a rental company that serves the motion picture/TV market, please consider joining ESTA as a PERG associate—we all benefit. ■



**Harry C. Box** has been working in the motion picture and television industry since 1989 specializing in cinematography, camera, and lighting. Harry is a member of the Cinematography Guild and the Society of Camera Operators. The fifth edition of Harry’s book, *The Set Lighting Technician’s Handbook*, is now available. He serves as Council Manager for the ESTA Production Equipment Rental Group. Harry can be reached at [harry.box@esta.org](mailto:harry.box@esta.org).



Caitlin Sheil and Michelle Nishimura-Palmer in the Duclos Lenses booth at Cine Gear Expo with Matthew Duclos reminding attendees about Rental Guard.



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# The 2022 NAMM Show and *homo faber* BY KARL G. RULING

TWENTY-NINE MONTHS after the last in-person NAMM Show, NAMM was back at the Anaheim Convention Center June 3 – 5. The show had 50% as many exhibitors as it had in 2020, and 40% as many registered attendees, but 46,627 people is still a lot of people, and, with them coming from 111 countries and territories, a diverse group. The floor space was a bit smaller than in 2020 and reconfigured, but the result was that the foot traffic in the entertainment technology part of Hall A, where most of the ESTA members were, seemed good to me. The hall was brighter and felt more open than it did in 2020. The hall lighting was turned off only over the booths where companies needed darkness. I saw people not obviously on a mission to shop for gobos, lighting, and effects walking through the hall and stopping to look—which is exactly what a vendor wants for new markets.

The NAMM audience is different from the crowds at other trade shows I cover. NAMM's wrap-up press release says attendees included domestic and international retail and distribution buyers and employees, exhibitors, entertainment tech and pro audio buyers and professionals, media, artists, college music students and faculty, school music administrators and buyers, and NAMM nonprofit affiliates. That's a long list of labels for 46,627 people—about the entire population of Sheboygan, WI—but no one in the entertainment industry does one thing, everybody has multiple

things they do for a living or for love. One person I know—and he is not unusual—has worked as an actor, bartender, event security, an event venue manager, and, when COVID shut those options, started work as a drone operator doing aerial surveys for a solar panel company. If I want to succinctly describe this crowd, I'd call them creators—*homo faber*. At NAMM, besides the impromptu and scheduled music-making, I saw couples spontaneously dancing. I met people who made the things they were showing in the booths—e.g., a speed control for a vintage analog Mellotron, a homeostatic ultrasonic humidifier. The creator of the latter, Thomas Caudill, built fog machines for the Navy during the pandemic to disinfect SARS-CoV-2 contaminated ships. The pandemic proves versatility is vital.

So, what do you show this crowd that might be musicians today but audio and lighting technicians, or event planners tomorrow—the creators of events? I visited the booths of ESTA members to see what they were marketing and how to the NAMM audience.

4Wall showed what it had to offer a couple of different ways. I noticed a lot of 4Wall road cases during the setup of the Yamaha Grand Plaza outdoor stage, but their most obvious presence was in the Loudspeaker System Showcase Hall, where 4Wall provided trussing, lighting, atmospheric haze, and video walls, running advertisements for 4Wall between the speaker demonstrations. You



4Wall provided equipment for the Loudspeaker System Showcase Hall.



Calzone Case Company makes cases for just about anything you would want to put in a box and roll up a truck ramp.



Joel Nichols and Keith Kankovsky in the Apollo Design booth.



Jake Rhodes in the Altman Lighting booth.

don't need haze to hear a line array, but there it was, obvious for anyone interested in atmospheric beam effects and providing eye-candy while people waited for the next speaker demo. The Grand Plaza outdoor stage also was where Robe showed what its lights can do, competing with the sun during the day and looking brilliant at night.

ACT Entertainment had one of the largest booths (about 30' by 30') listing their immense product line. Most of the wall space was devoted to showing RapcoHorizon audio and DMX cables, but Robert Juliat followspots anchored two booth corners and flanked a stand displaying Just Industries's the.BRIDGE, a plug-and-play VPN solution for remote production that allowed by Ken Billington, Aaron Porter, and Rob Halliday to light a production of *Waitress* in Tokyo's Nissay Theatre during the pandemic while they stayed at home in New York and London. MDG machines tucked into corners of the booth made a fine haze.

Decades ago, I was half the two-man crew on a tour of the Inkspots. Our lighting rig included a followspot, PAR cans, pipes and trees, and a 24-channel, two-scene Teatronics board with dimmer packs. Altman Lighting showed equipment what would have been far better for our tour had it existed then: the AFS-700 LED Followspot, the AIP-200 Hydra Par, and the Genesis lighting controller handling 24 luminaire groups with ten playback faders

and ten pages of memory. We could have traveled with half the instruments and perhaps fit the rig into a van instead of the truck we used—and the show would have looked better with more color. The Hydra Par won an ESTA Members Choice Equipment Award at the show.

Apollo Design had a small booth showing gobos and a new, small gobo projector. During the pandemic, a young man set fire to the Apollo factory for the fun of watching the blaze. The factory was destroyed. Apollo Design has been rebuilding in a new location, with initial production focusing on what they have been known for the longest: gobos. The new product shown was the SpotFX gobo projector uses a small 3.8 W white LED, convection-cooled lamp house, and has three lens tubes for different field angles. "Made in the USA," proclaimed senior account executive Keith Kankovsky.

The Calzone Case Company had a fairly large booth to show their wares, with a focus on keyboard and guitar cases. The guitar case shown at the front of the booth was lined with a green plush and held four acoustic guitars upright—but Calzone makes cases for just about anything you would want to put in a box and roll up a truck ramp. The Ascot Strongbox line is particularly handsome, with black hardware matching the black panel finish.

Chauvet trimmed their show, leaving out the Chauvet Professional and Chamsys products, to focus on their DJ line, which



The Chauvet team gather for a photo before the show floor opened.



Eric Rouse, Jessica May, and Joe Champelli in the Entertainment Project Services booth.



Chrissy Ott, Steve Gough, and Pat Basileo in the Harlequin Floors booth.



Joe Menhart in the InCord Safety Netting booth.

resulted in a less-overstuffed space and more visual coherence. The emphasis was on their “integrated lighting system” that integrates the most popular products in the DJ catalog into a coordinated system, wired or wirelessly, so a DJ (who is often a one-person show and road crew) can get the system running quickly for an event. It was a pretty booth, but the eye-catching draw was a Hurricane Bubble Haze X2Q6 machine at the intersection of two aisles. It blows bubbles of fog, which burst in a puff of smoke; children and adults stopped to play with the bubbles. It’s obviously a party effect, but I’m filing it away in my head as something possibly for a theatre piece. (*Fat Ham* and *POTUS* both end with full-out disco scenes.)

Entertainment Project Services had a slide show featuring *Harmonious*, the new nighttime spectacular at EPCOT’s World Showcase Lagoon, with floating giant screens, choreographed moving fountains, lights, pyrotechnics, and lasers to give NAMM visitors an idea of what EPS can do. *Harmonious* was way above what most NAMM visitors might think they want, but it got people to stop and talk, and once they start talking you can find out what they need.

German Light Products (GLP) had five products sales manager

David Barten showed me. The newest, and the one I want to mention, was the impression X5 Compact, a 7-LED source moving head. The sources are 40 W red-green-blue-lime under zoom optics with a 3.5° to 60° range. Preliminary data lists the output at 4,600 lumens with a maximum candlepower of 725,000 candela. It’s a compact unit, shorter than a PAR 64 can, and it moves with a pan range of 540° normal (650° extended) with three modes: fast, normal, and smooth. Thinking back to that Inkspots tour, I can imagine a couple doing the work of a dozen lights—and giving movement.

Many of the theatres I have worked in had hardboard (aka “masonite”) covering the stage floor, which gave a smooth surface for a while, but got chewed up and sometimes cracked under grand piano caster loads and needed frequent replacement. Harlequin Floors showed RockSure, a polymer composite designed for use in live performance spaces instead of hardboard. It’s matte black (black all the way through), can support heavy loads and withstand dropped shackles, is flame retardant, and has low thermal expansion. It comes in 4’ x 8’ sheets and pre-drilled with counter-sunk screw holes, but it can be worked with standard





John Von Fange and Stephen Ellison in the Light Source booth.



Cindy Tennenbaum holds down the *Lighting & Sound America* booth.



Harman promoted its audio products, with particular emphasis on JBL speaker systems and AKG mics with USB outputs. The only evidence of Martin Professional Lighting visible was "Martin" printed on the booth wall.



Destin Klug and Eric Abad in the ACT Entertainment booth.

woodworking tools.

InCord Safety Netting showed the Rescue Line, a product ESTA past-president Eddie Raymond had suggested. When someone walks off the front of a stage, an InCord Orchestra Pit Net can save that person from striking a sour chord in the bottom of the orchestra pit, but leave him struggling to crawl back to the stage. It's nice if someone can throw him a Rescue Line—which is a rope with a lightweight handle at the end—light enough not to hurt the person you are trying to rescue if your toss is not on target.

Light Source showed the new Mini-Pendant X, a smaller version of their LED houselights, with white or RGB and white sources, and a 4.5" output lens. It's available in a zoom version with a 52° to 86° range or fixed focus at 86°. Output is 3,300 to 4,400 lumens, depending on the lens position and beam angle. They also showed a variety of clamps that allow the attachment of lights and equipment to tent poles and other structures—things you might need to service a mid-summer party or wedding.

Link USA won the ESTA Members Choice Award in the Gadget category for their "PCB Widgets." It's a collection of panel-mount

connectors that are connected to other panel-mount connectors inside a distribution box via LAN patch cords with RJ45 connectors. I was shown these at the end of my tour of the variety of PDLink power and data distribution product. One Link product theme is the integration of power and data distribution. Link has a line of circular 19-pin connectors that will handle the usual six power circuits but also distribute data over optical fibers embedded in the center of the protective grounding pins. With fiber-optic data distribution, there's no chance that damage to a combined power+data cable will put 208 V on a data line—and the cables are rugged, hard to damage in any case. The LKO MTP Hybrid connectors are single power-circuit connectors with three pins for power and ground and a connection for twelve multi-mode or single-mode fibers. The award-winning widgets—the whole line of panel-mount connectors—look wonderfully versatile, allowing a person to make in-house custom distribution panels and reconfigure them with minimal chance of broken wires.

Roadies of Color United Association (ROCU) is one of the newest members of ESTA and a 501(c)(6) non-profit association. (Read



Kiana Gold, William Irwin, Mark Ravenhill, and David Barten in the GLP booth.



Marco Piromalli, Assunta Fratocchi, Bob Vanden Burgt, RJ Kenny, Joel Pare, and Diane Jensen in the Link USA booth.



Lance Jackson, Co-Founder and Executive Administrator of Roadies of Color United, in front of a listing of sponsors in the ROCU booth.



Bill Sapsis and David Gillispie in the Sapsis Rigging booth while the road cases for the booth were lost in transit.

about them in the Winter 2022 issue of *Protocol*.) I talked with Lance Jackson, Co-Founder and Executive Administrator of ROCU and stage manager for Earth, Wind & Fire, about the need for training in our industry, which can help to improve diversity, equity, and inclusion as well as provide younger skilled workers. Jackson estimated that we've lost about a third of our trained workforce with the pandemic. Shows and venues are coming back, but we don't have the people to run them. This is an opportunity to bring people into the industry who are not the son or daughter of someone already

here—and to do it with no one complaining, “They’re taking our jobs!” There’s more than enough work for everyone. ROCU will be working with ESTA on training in general and the Equitable Workplace Initiative sponsored by Netflix to improve diversity in the motion picture and television industry. (See the PERG Equitable Workforce Initiative article on page 12.)

And that’s my show report for 2022! Next year the NAMM Show will move closer to its usual time by being held in Anaheim April 13 – 15 and then returning to its traditional January slot in 2024. For more information, visit [www.NAMM.org](http://www.NAMM.org). ■



**Karl G. Ruling** is ESTA's Senior Technical Standards Manager. He also serves as *Protocol's* Technical Editor. Karl can be reached at [karl.ruling@esta.org](mailto:karl.ruling@esta.org).



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**Behind the Scenes Fundraiser**  
The annual fundraiser, hosted by ESTA (Entertainment Services and Technology Association), helped generate funds for live event professionals in need.



The 2022 NAMM Show was an important move back to the reality the music industry so desperately needed. The entire industry was able to gather for a few days of fun, friendship and fellowship, and the results were amazing. All the people and entities represented were a phenomenal display of the resiliency of our great industry. It is important to remember that this was simply a step on a journey, and we must continue down this path. I offer a huge thank you to Joe Lamond and the great staff at NAMM for delivering this treat!

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# ESTA events and education at The 2022 NAMM Show



ESTA's Laura Hoepker presents the Members Choice Award in the Equipment Category to Jake Rhodes of Altman Lighting.



ESTA's Laura Hoepker presents the ESTA Members Choice Award in the Gadget Category to RJ Kenny of Link USA.

PHOTOS COURTESY OF IANE PARSON

## ESTA 2022 Members Choice Awards

The winners of the ESTA Members Choice Awards were announced on June 5 during The NAMM Show in Anaheim, CA.

ESTA member exhibitors nominated new products, and ESTA members who attended The NAMM Show voted on their favorites in two categories, Equipment and Gadget.

In the Equipment category, Altman Lighting was awarded the prize for its AIP-200 Hydra Par, a compact 200 W RGBL IP65-rated and convection cooled zoom par. "It's always gratifying to receive

recognition for a product that so many people put so much hard work into," said Nicolas Champion, Altman's Vice President of Sales and Marketing. "And, when it's ESTA members that are recognizing your product, it's extra special. We are very proud to support the work that ESTA and its members do for our industry and community. We are greatly honored by this award."

In the Gadget category, Link USA took home the prize for its PCB Widgets, a solution for using standard CAT cabling to take advantage of multipin connectors and typical panel-mounted XLRs. Of its

win, Link USA Vice President Bob Vanden Burgt remarked, "The Link global team was proud to represent ESTA at NAMM 2022 and is very appreciative of the membership for recognizing our PCB Widgets for a Members Choice Award!"

To find out about all this year's nominees and winners, visit [www.esta.org/MCA](http://www.esta.org/MCA).

## ESTA curated education

ESTA presented three days of technical training during The 2022 NAMM Show where an attendee's badge gave them free admission to any of ESTA's education

sessions. In addition, all in-person training provided ETCP Certification renewal credit. The sessions were well attended with participants sharing positive reviews of the presenters, quality of the sessions, and line-up of classes offered.



Richard Cadena shared two sessions at NAMM: Clean, Safe Power for Audio, Video, and Lighting; and Electrifying the Audience, Not the Stage.



The Future of Holistic Design and Control was discussed in this session by moderator Kyle Means with panelists Stephen Baird-Smith and Aaron Hubbard.



Special thanks to all the presenters for their time and expertise, the volunteer organizers, as well as ESTA's partners NAMM and *Lighting&Sound America*/PLASA. ■



Jason Potterf presented a session on Advanced Networking.



Eric Rouse and Elmer Veith teamed up for the session on Understanding Truss Loads, Outdoor Structures, and Rigging Math.

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## CITT/ICTS Rendez-vous and World Stage Design 2022

THIS YEAR'S CITT/ICTS RENDEZ-VOUS Annual Conference and Trade Show will be held in conjunction with World Stage Design 2022 on the campus of the University of Calgary, in Alberta, Canada. As hundreds of professionals coming from around the world and from all sectors of the live performance arts will converge to the majestic Canadian Rockies to share, discover, and experience this unique happening, we already know this is truly a not to be missed, once in a lifetime experience.

### Rendez-vous 2022 Annual Conference and Trade Show – August 10 – 13

For this very special in-person edition of Rendez-vous 2022, we are looking forward to an engaging program of professional development, offering our usual mix of lively roundtables and panel discussions on current topics related to our industry along with compelling educational sessions, TEC Talks, hands-on workshops, fun social events, and the industry trade show. Here are some highlights:



#### Opening Soirée – Wednesday, August 10

We can't think of a better way to kickstart the conference than with a relaxed and joyful celebration among friends, colleagues, and members from across Canada. Drinks, hors-d'oeuvres, and networking are on the menu.

#### Conference Sessions – Thursday, August 11 to Saturday, August 13

The programming of the conference aims to bring together professionals and students alike around the most relevant and current topics close to our industry, in order to share ideas and knowledge, best practices along with new ways of doing, practical expertise and accessible resources to the community.



Trade show floor at Rendez-vous 2018 in St. Catharines, Ontario



Gallery Lighting at Rendez-vous 2019 in Whitehorse, Yukon



Beyond Off Shelf at Rendez-vous 2019 in Whitehorse, Yukon

### Product Showcase Breakfast – Thursday, August 11

Trade show exhibitors take center stage at the Product Showcase Breakfast. They will have a minute or so to showcase their product or service during this analog show & tell. A fun prelude to the trade show!



Two-day ETC Ion Console Training at Rendez-vous 2018 in St. Catharines, Ontario



Foliage Workshop – Past and Present Painting Techniques at Rendez-vous 2018 in St. Catharines, Ontario



Lighting Diverse Skin Tones with Tungsten and LED at Rendez-vous 2018 in St. Catharines, Ontario

### Trade Show – Thursday, August 11 and Friday, August 12

The Rendez-vous Trade Show is a unique and friendly way to meet and network with industry suppliers, manufacturers, organizations, and schools. Held over two days, it will feature over 30 exhibitors and schools, educational TEC Talks, and a networking lounge.

### Swag BINGO Night Fundraising Event – Thursday, August 11

This event actually starts when the trade show floor opens, as all exhibitors are given Swag BINGO cards to distribute to conference delegates. The more booths they visit—the more cards they get! On Thursday evening all participants gather for a notoriously entertaining evening of BINGO where they play to win company swag and bid for donated items at the live auction. Swag BINGO is part corporate recognition, part social mixer, part fundraiser for the AFC—and a whole lot of fun!

### CITT/ICTS 2022 AGM Luncheon – Saturday, August 13

The Annual General Meeting is an occasion for the CITT/ICTS Board of Directors to present the 2021 – 2022 annual report with the financial statements, to introduce the elected board members, and to discuss the future of the organization.



ERD Certified Pyrotechnics Safety and Legal Awareness Course at Rendez-vous 2018 in St. Catharines, Ontario

## World Stage Design 2022 – August 6 – 16

World Stage Design (WSD) is the first and only designer-based exhibition to showcase and celebrate performance design from individual designers. The fifth WSD exhibition will be held in Calgary, Canada from August 6 – 16, 2022.



World Stage Design is an OISTAT (International Organisation of Scenographers, Theatre Architects, and Technicians) event held every four years that is comprised of four distinct components that are presented simultaneously: International Design Exhibition and Competition, Scenofest Conference, Theatre Architecture Competition (TAC), and Technical Invention Prize (TIP). 2022 marks the fifth iteration of this event with the previous locations being in Taipei, Taiwan (2017); Cardiff, Wales (2013); Seoul, South Korea (2009); and Toronto, Canada (2005).

This event is the most prestigious exhibition globally of theatre design by individual designers and will exhibit 158 designs from 35 countries with more than 790 entries. WSD will be welcoming

artists, designers, technicians, and architects from all over the world to share and celebrate stage design for 11 days. There will be a plenty of activities for theatre lovers to enjoy, including performances, exhibitions, panels, and OISTAT meetings.

### The inspiration for WSD 2022: The Three Sisters

Located near Canmore, Alberta, between Calgary and Banff National Park, is a mountain known as the Three Sisters. The mountain is known for its three peaks and is a significant landmark to the area with stories and the name originating with the Stoney Nakoda First Nation. This mountain has served as an inspiration for our thinking around World Stage Design writ large and small. WSD is a multi-summit event, like the Three Sisters.

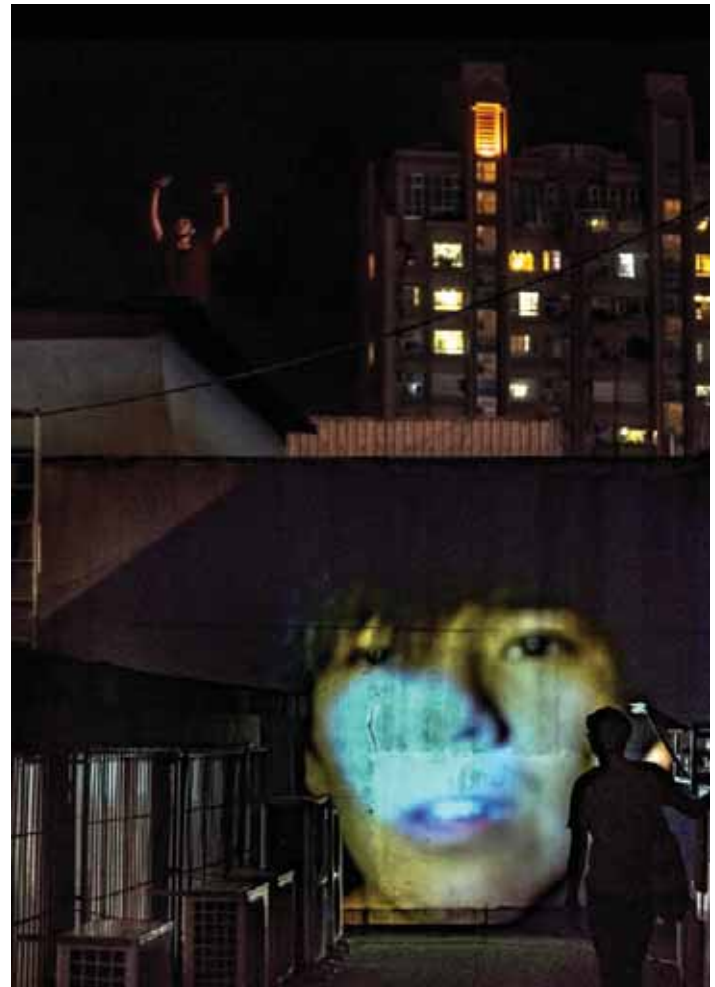
Through our discernment of priorities for this event, the planning committee has been inspired by landscape of the region. While travelling from Banff to Calgary, surrounded by the Rocky Mountains and looking onto the prairie unfolding before us, we crafted our three sisters of Scenofest. These sisters are individual peaks but also closely connected as they share a singular base, and extend from the same piece of earth. Like the base of the Three Sisters mountain, the coming together of our Three Sisters will be a fertile and lively place.



*Carmen*, produced by Teatro Bicentenario, León, Guanajuato, México.  
Lighting Design: Ingrid Nallely Sanchez Acenjo Carrillo



*Red Curtain*, produced by Shanghai International Dance Centre, China.  
Lighting Design: Yaron Abulafia



*Break & Break!*, produced by PROJECT ZERO Performing Arts Management, Taiwan



## Registration

Registration for this year's Rendez-vous will be done through the World Stage Design online registration portal. A single registration gives you access to both events. It is the first step before registering for individual activities and events for the Rendez-vous Conference program and is required to get tickets for World Stage Design ticketed events. Learn more about the registration process at <https://bit.ly/3NBGTIG>.

View the World Stage Design and Rendez-vous 2022 preliminary schedule at <https://bit.ly/3z9LBts>.

For more information, visit:

Rendez-vous 2022 at <http://bit.ly/2VwG0dW>.

World Stage Design at <https://bit.ly/3aaDGld>.

See you in Calgary this summer! ~ The CITT/ICTS National Office Staff and April Viczko, Associate Professor – SCPA Drama, UCalgary | World Stage Design 2022 – Project Lead. ■

### Don't miss any update!

- Follow Rendez-vous on Facebook @CITTICTSRendezvous
- Follow CITT/ICTS on Facebook and Twitter @CITTICTS
- Follow World Stage Design on Facebook @wsd2021

# ESTA

would like to give a very special **THANK YOU** to **CHRIS KAISER** and **SYRACUSE SCENERY & STAGE LIGHTING**

for their generous assistance with helping ESTA sponsor the World Stage Design and Rendez-vous 2022 events!



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# 2022 New World Rigging Symposium: Continuing the conversation

BY ED LEAHY

“WE ARE ALLOWED to be smarter today than we were yesterday.” This simple idea, expressed by engineer Jeff Reder of Clark Reder Engineering, is perhaps the best and most concise reason to bring riggers together for the New World Rigging Symposium, held online April 5 – 7. In an industry where everything has changed, and changed again, there is a lot to talk about. We are back to familiar surroundings but working in new ways. We are dealing with many of the same challenges we’ve always faced, along with a host of new ones. We are looking to care for ourselves and each other while still being the people who always deliver. It is a great time to be talking to each other, to be “Continuing the Conversation” as the symposium tagline suggests.

At a time when in-person events are gaining traction, it may seem an odd choice to keep the symposium online. Symposium organizers Bill Sapsis, Eddie Raymond, Lori Rubinstein, and Frances Thompson made the decision to stay virtual, “. . . based on a number of factors, not the least of which was uncertainty over what the COVID conditions would be like in the spring. The most compelling reasons, however, were the desire to reach as many people as possible, provide the optimum experience for presenters and attendees, and keep the registration fee low.” One could argue that this approach was a success, with some 290 riggers in attendance hailing from all over the world, and presenters literally answering questions between show cues or before boarding flights. Nothing matches the fellowship and collegiality of an in-person

event, but the trade-off was getting to hear from tip-of-the-spear professionals who would never have been able to carve out time to come to a two- or three-day event in person.

Sessions covered the wide range of topics we have come to expect from the NWRs. From general information about load cells or working in a university setting to specific information about ropes or talking to your engineer, the presentations ranged from practical to inspirational, detailing successes, failures, and all the challenges in between. Here are some of the highlights . . .

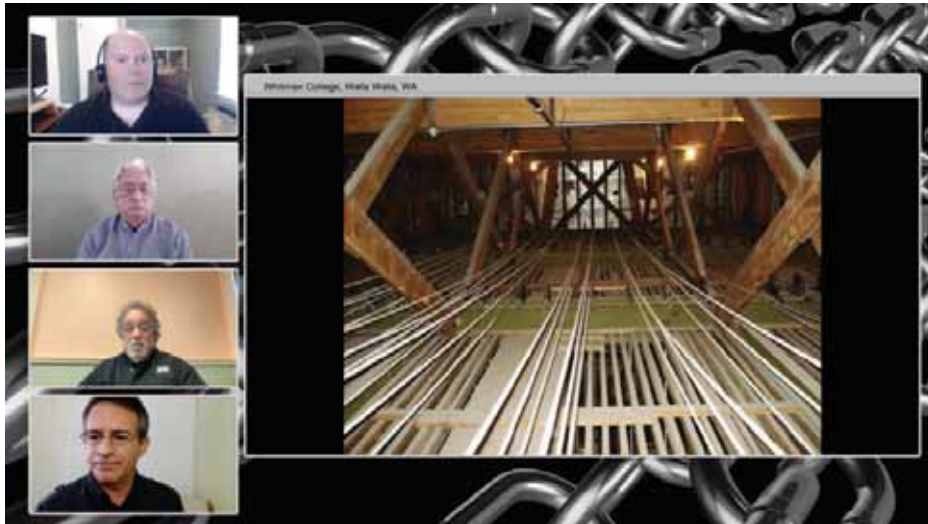
## What’s My Line, Again?

Eric Rouse and Andy Schmitz of EPS returned with a second edition of their popular session about ropes, joined this time by Stu Cox of Sapsis Rigging. After a quick refresher on rope construction and classes of fibers, this session dug into how

splicing for hollow braid and double braid ropes differs from three-strand splices. After sorting out the differences between a Brummel splice, buried lock stitch splice, and a long bury splice, the guys went on to show how these splices can be used to make simple, flexible tools for riggers. The elegant efficacy of those tools—whoopie slings, loopie slings, soft shackles, and the like—suggest that in the right situation, fiber rope can be put to better use than steel hardware. While not advocating a wholesale shift away from traditional hardware in arenas, for example, the presentation made a good case for considering how the lighter weight and flexible nature of these rope solutions could improve safety, efficiency, and effectiveness (our industry’s holy trinity) for some riggers in some applications. Wise riggers look at all the options, and these tools, as well as others borrowed from the arborist and sailing worlds, correctly have a place in the rigger’s kit.



Andy Schmitz with Eric Rouse and Stu Cox continued the conversation on ropes in What’s My Line Again?



Adam Shalleck (bottom) led us through installing a rigging system in an all-wooden theatre in Walla Walla, WA while Scott Madaski, Joe Mobilia, and Bill Sapsis waited their turn.



Touring legends Chad Koehler, Bill Rengstl, and Jim Digby told some stories, gave some tips, and talked about what tomorrow may bring, in Touring Overseas: Getting Your Ducks in a Row.



Miriam Paschetto, Bill Gorlin, Dan Louis, and Jeff Reder had a lot of information to share in What the Engineers Want You to Know.

## What the Engineers Want You to Know

Pivoting from last year's Ask the Engineers session, this two-part presentation brought Miriam Paschetto (Geiger Engineers), Bill Gorlin (McLaren Engineering Group), Dan Louis (Theta Consulting), and Jeff Reder (Clark Reder Engineering) together to share the things they want their clients to understand. Engineering is all about the details, and this discussion got granular in a hurry. Against the backdrop of code requirements and the need to be able to defend their choices in the case of an incident, the engineers talked about how small changes on site can have a big impact on safety, and how they prefer to be involved when something needs to change. Much of what they had to say was focused on physics principles that are easy for users to overlook. A complex structure loaded within rated capacity may still have individual members that are overloaded. The angle of a bridle or guy cable can have a big effect on cable tension. A doubling of wind velocity equates to a quadrupling of force on a structure.

One particular area of interest was the way that ballast on outdoor structures is designed and installed. With many variables that change from site to site and sometimes daily on a single site, the engineers made clear the need to consider what the ballast will be, how it will be attached, and how easily it may move if conditions change. Another potentially surprising nod to site conditions is the idea that truss diagonals might not always want to be vertically oriented. In conditions where the gravity load is light, but the wind load is substantial, the "strong" direction of the truss is better used to resist the wind. While seemingly against the rules as most riggers know them, the choice to turn the truss is a matter of risk assessment—something engineers are very good at. In the right situation, it can be the right choice.

The session wrapped up with a useful look at the general approach engineers bring to their work. On the surface, it seems

a simple progression that looks a lot like scientific method—define the problem, gather data about possible solutions and code requirements, analyze the information, and draw conclusions to guide the project as it moves forward. Where things get complex is the task of assigning a level of confidence to the conclusions. Because the outcomes depend on a large number of ever-changing variables, there is a delicate dance between allowing too much risk and unnecessarily constraining the ambitions of a project. Uncertainty breeds caution in engineers, so more and better information is the key to dialing in the optimal outcome. Communicate with your engineer early and often for best results!

## Women Riggers of ETCP

Continuing a conversation about diversity and inclusion that has been a part of the NWRS for the last several years, Karen Butler, Sandra Dickson, Cindy Parker, and Sydney Rush, joined by moderator Eddie Raymond, discussed their experiences as certified riggers. Covering a wide range of age, experience, and geographic location, this is a group of women who are defined by their strong connection to the work and the lifestyle of being a rigger and not by the all-too-common experience of being marginalized and underestimated because of their gender. Far from being a vehicle for complaining, this was a conversation among confident professionals with engaging stories and a deep commitment to the aforementioned trinity of safety, efficiency, and effectiveness. Panelists told personal origin stories, gave their thoughts on the benefits of certification, and talked about where we have been and where we are going as an industry. That their stories were informed by the inability of male colleagues to recognize their skill and dedication suggests that this is a conversation worth having until we reach a day when, as one commenter suggested, the word we use for “women riggers” is simply “riggers.”



Eddie Raymond moderated Women Riggers of ETCP with Cindy Parker, Sandra Dickson, Sydney Rush, and Karen Butler.

## Introduction to Mental Health First Aid

Following up on last year’s Focus on Mental Health session, Bryan Huneycutt of HuneyBadger Entertainment Consulting gave an informational session on Mental Health First Aid (MHFA), which is a set of skills designed to be an initial approach for those in crisis similar to the way that CPR is used for physical injuries. In an industry that already had a higher-than-usual risk for suicide and mental health issues, the pandemic has only increased the need for mental health intervention skills. Fortunately, organizations like Behind

the Scenes are responding with tools and resources to get help to those who need it. Mental Health First Aid training is one of those tools—one that, unlike CPR, can be useful every day. Consisting of eight hours of training, MHFA teaches responders to recognize a potential mental health challenge, how to reach out and start a conversation without judgement, and how to refer someone for further support. Recommended for anyone who wants to better understand mental health, MHFA is especially good for people in leadership positions—those responsible for the safety of others. In the current environment of unprecedented challenges, monitoring and



Bryan Huneycutt explained the importance of learning Mental Health First Aid.

# 2022 New World Rigging Symposium Schedule

## TUESDAY, APRIL 5TH

### What's My Line Again?

(1 ETCP Renewal Credit)

Presented by Stu Cox, Eric Rouse, and Andy Schmitz

### Rigging Challenges:

#### Infrastructure Case Studies

(1 ETCP Renewal Credit)

Presented by Scott Madaski, Joe Mobilia, Bill Sapsis, and Adam Shalleck

### What the Engineers

#### Want You to Know – Part 1

(1 ETCP Renewal Credit)

Presented by Bill Gorlin, Dan Louis, Miriam Paschetto, and Jeff Reder

### Performer Flying Case Study:

#### It Happened at Wembley

(1 ETCP Renewal Credit)

Presented by Paul Sapsis

## WEDNESDAY, APRIL 6TH

### What the Engineers

#### Want You to Know – Part 2

(1 ETCP Renewal Credit)

Presented by Bill Gorlin, Dan Louis, Miriam Paschetto, and Jeff Reder

### Intro to Mental Health First Aid

Presented by Bryan Huneycutt

### Women Riggers of ETCP

Presented by Karen Butler, Sandra Dickson, Cindy Parker, and Sydney Rush

Moderated by Eddie Raymond

### Rope Access in Entertainment:

#### Training and Usage

(1.5 ETCP Renewal Credits)

Presented by David Freitag, Michael Matthews, Katie Ryan, and Benaiah Seilen

## THURSDAY, APRIL 7TH

### Load Monitoring Systems:

#### Know Your Limits

(1.5 ETCP Renewal Credits)

Presented by Ilan Bahar, David Bond, Chris Schmidt, and Ken Tilson

### Hosting Road Shows at a University

Presented by Rick Earl, Dan Sonnen, and Tracy Stark

### Touring Overseas:

#### Getting Your Ducks in a Row

(1 ETCP Renewal Credit)

Presented by Jim Digby, Chad Koehler, and Bill Rengstl

maintaining the mental health of our teams is more important than ever, but there are also more tools available than ever before. To learn more about MHFA and other useful tools, go to: <http://btshelp.org/mentalhealth>.

## Performer Flying Case Study – It Happened at Wembley

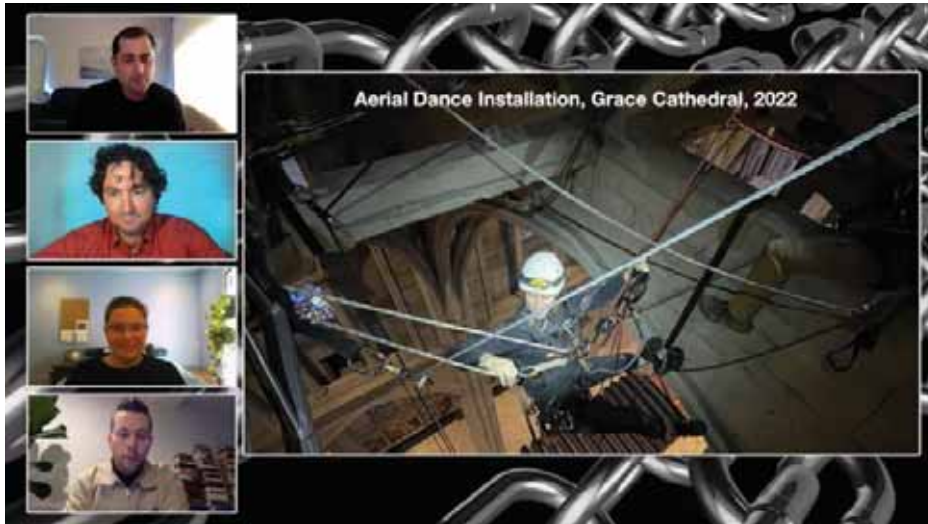
One of the best things about the NWRS is its ability to remind us that the work we do with careful planning and commitment to incredible outcomes can look like magic to the people who experience it. We can take inspiration from stories of impossible requests that throw out challenge after challenge because we take joy from walking that path in whatever scale we get to work. Paul Sapsis, head automation programmer for P!nk's *Beautiful Trauma* world tour, took



Paul Sapsis presented a breathtaking tour on automation in Performer Flying Case Study – It Happened at Wembley.

us on just such a journey, telling the story of pushing P!nk's aerial performances to a scale and complexity never attempted before. The story starts with the "simple" version of things—a multi-million-dollar popstar who sings while flying to the extreme

reaches of arenas on a coordinated catenary rig. Just another day in the industry, right? So, let's make it interesting. Let's take that show to a stadium and try to recreate the same choreography covering four times the distance. The old hoists can't go that far that



In Rope Access in Entertainment: Training and Usage, David Freitag, Michael Matthews, Katie Ryan, and Benaiah Seilen enthusiastically shared their passion for hanging around.



Ilan Bahar, David Bond, Chris Schmidt, and Ken Tilson did a deep dive into load monitoring.



Rick Earl, Dan Sonnen, and Tracy Stark discussed the challenging yet rewarding experience of Hosting Road Shows at a University.

fast, so let's invent some new ones that can. More line means more stretch. Stadiums also mean weather and wind. Let's walk through each piece of the puzzle until we see the whole picture. Eventually, there is a process and a show and tour. But wait, there is more. At Wembley there is a crew filming a documentary and a need to fly a camera along with the performer. Now there are two systems, and collision avoidance to consider. Again, discussion, inquiry, and testing to find a way to make it happen. And at the end, some really cool footage. (Check out the last ten minutes of P!nk: *All I Know So Far* on Amazon.) It was the kind of story we love to hear—creativity and collaboration in service to making something big happen in a way that is safe, reliable, and brutally cool.

## Takeaways

In its fourth year, the NWRS provided our community with an opportunity to learn as individuals and to move as an industry toward a place where tomorrow is better than today. For some, this was taking away a new piece of knowledge or a new skill to go learn. For others, it was being inspired by a story of success, or even one of failure. For still others, it was being moved to look after their coworkers more closely. The outcomes are varied but it is the conversation that is important. Today is strange, and tomorrow is looking like it will be pretty weird too. It is nice to be reminded that we have a whole community behind us as we figure out what comes next! ■



**Ed Leahy** has been the Head Trainer and Cruise Ship Division Manager at Chicago Flyhouse, Inc. since 2015. He is an ETCP Arena – Rigger and Theatre – Rigger and an ETCP Recognized Trainer. He serves on the Rigging

Working Group as part of ESTA's Technical Standards Program and contributes to the USITT Jay O. Glerum Masterclasses. Ed can be reached at [eleahy@flyhouse.com](mailto:eleahy@flyhouse.com).

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Would you like to see how standards are created? How do the TSP Working Groups decide what's included in a standard, how do they resolve public review comments, what does it take to reach consensus? Most of the Working Groups that are part of ESTA's Technical Standards Program are meeting during the USITT Conference. You are welcome to come and observe the meetings and find out how industry standards are developed that directly impact your safety or push the boundaries of technology.

meetings  
[esta.org/meetings](https://esta.org/meetings)





AVmedia's company meeting, internally known as the annual Family Reunion, was held in December 2021. Part of that meeting is "First Year Awards," or the awarding to all new hires in the current year of the coveted AVmedia jacket.

# Culture and values – the secret success differentiator

BY JOSH GREENBERG AND TODD SPENCER

Delivering superior service, exceptional value, and certainty of outcome

*RECENTLY, Josh Greenberg, President, CEO and Culture Captain of AVmedia Inc., visited with Todd Spencer. The conversation focused on building the company's internal culture, core values, making "family members" a top priority, and serving customers the way they want to be served. Below is a condensed, paraphrased transcription of the conversation.*

**Todd Spencer:** The AV industry has been hard-hit during the past couple of years, and prior to that, it was encountering a variety of headwinds with its customer base.

Despite that, you've continued to have good wins that seem to buck the trends. What's happening at AVmedia that's creating that success?

**Josh Greenberg:** I attribute our success to our internal culture and core values and the way we live them along with some timely innovation. Our AVmedia family is entirely on the same page when it comes to serving our customers the way they want to be served.

**TS:** Your customers talk a lot about having you as their trusted advisor. Where

does that fit into your cultural approach?

**JG:** Trust is SO important to us. We're the only company I'm aware of that has designed what we call our "three uniques." These are our version of core values that our team came up with collaboratively, to convey how we want to interact with our customers. The first unique is "one team," where we want to be seamless with our customer in delivering their event. The second unique is "honest and fair," so that we're providing transparency and tangible value throughout the relationship.



And third, is our “yellow cases,” as a visual symbol of our flexibility, creativity, and desire to challenge the status quo. We go to great lengths to ensure that our employees (or family members as we call each other), our freelance partners, and customers are top priority. If our family member’s experience is no good, the customer’s experience is no good.

**TS:** I’ve noticed that the majority of your business is client-direct, which is surprising in the world of in-house AV. Most in-house AV firms do not have a lot of client-direct business and would give their left arm to have that type of close relationship that you seem to have with your customers. What’s driving that dynamic for AVmedia?

**JG:** First and foremost, we are a production and creative services company at our core. We have some very large

customers’ vision and messaging for their business brand in a way that most don’t.

As an example, we had a client whose setup was taking place at 5:30 a.m. one morning and they needed some additional display product from the headquarters, located just a short distance from where the event was taking place. This is a major company name that people would recognize. And at 5:30 a.m. in the morning, we were given open access to their headquarters to walk in, grab some extra product that would help showcase their message better, and make it a seamless win for the show to come off with the full impact they wanted. When a customer essentially hands you the keys to their building to help make it happen like one of their team, it’s a trust that can’t be beat.

**TS:** That’s incredible. Let’s switch gears

inventory, and the above property support. It creates success unlike any other in the industry. However, I would also say that we intentionally embrace the friction areas and seek to give customers a good experience around pricing and service. We’re aware that our customers have had negative prior experiences and we’re sensitive to that. We don’t want to repeat that. We want a customer who walks away, feeling a tremendous sense of value and looks forward to seeing us again. Whatever we must do to make it right and keep the costs aligned to provide the level of service they expect and create smiles at the end is what we’re about.

## Culture must be partnered with expertise and deliverables to build overall trust.

**TS:** I’ve heard you say before it’s important that customers get more value than they pay for. That feels like a distinction point to ensure that you’re delivering actual value for everyone. How do you accomplish that?

**JG:** Absolutely. When we quote an event, it is thought-out and detailed, and is exceptionally rare that there’s any dialogue about a missed expectation after the show.

**TS:** Quoting integrity and clarity it sounds like? Giving people a straight answer from the start that they can trust and one that fits their budget expectations.

**JG:** Precisely. We truly care and are transparent at all times. We want to engage with customers intentionally in ways that help them understand in advance and throughout the process. We want them to feel respected. Being honest with someone is



AVmedia’s curved LED is perfect for a more intimate venue, while still delivering a high-end production value.

customers and it’s true that the majority of our business is client-direct. We feel like we’re the best kept secret in the industry, in that we’ve been so focused on our customers and serving them for so long, that we’ve not widely told our story about having a production and creative services arm that’s robust. It’s what has energized those client-direct relationships because we share in our

for a moment and talk about the gorilla in the room as relates to in-house AV. How do you create value for your customers in a way that’s real and tangible?

**JG:** When it comes to our on-site or “in-house” arm at AVmedia, our mission is to “change the way people think about in-house AV.” That all starts with our model around on-site staffing, the on-site

the greatest measure of respect we can offer. That's core to our culture.

**TS:** I can imagine that you're dealing with seasoned professionals and they, like myself, appreciate the respect of someone not "gaming" them and wasting their time.

**JG:** Yes. That's why we have the creative services arm and client-direct connections that we do. I don't want to come into a show and throw punches—I want to come into a room and show them why we're better. It's that simple. When people understand our core values, we find that it massively increases our business attractiveness to them.

**TS:** Let's go deeper on that topic, Josh. Working with hotels is an integral part of your business. Let's talk about some tough encounters you've had with venues and what realizations have informed or transformed your business as a result.

**JG:** (Laughs) We've had a few encounters to be sure. Sometimes I wish I could call Doc Brown and the DeLorean to go back in time, but as we know, we have to move forward and do the right thing. AVmedia is an anomaly in many ways. As I said, we want to change what people think about in-house AV and not just keep pushing the status quo. I'm realistic that's going to take incremental touch points over a long period, but we're equal to that task and that's who we are.

We've realized the importance of being likable and relatable as a core part of our culture.

So many times, clients get forced into doing things. Venue managers get forced as well. And we want to be chosen. We want to be able to come to the table, organize our thoughts to talk about things they care about, and give them a chance to ease their fears because they don't know us yet. We want people to be comfortable with our true capabilities. It's not a sales pitch and we're willing to take our time.

**TS:** Building a culture of "being chosen and likable" is the opposite of the business model that most would be familiar with in the in-house AV space. Based on that



**From the largest of conference halls throughout the United States and the world, AVmedia delivers powerfully to its audiences.**

approach, it makes sense that you would have so much customer-direct business and loyalty. As you think about maintaining that culture, what other factors do you find influence someone's perception of your brand quality?

**JG:** Credibility. We bring credibility to the table, with experts in their respective categories. Culture must be partnered with expertise and deliverables to build overall trust. We want to create what another industry friend of mine calls a "certainty of outcome" that a client can rely upon. When they hire us for their project, we want them to know that the culture is the lens that we view every action through, while the technical and creative expertise are the deliverables we provide to serve their event. Frankly, we love it when people call for references. We give potential customers our entire portfolio and let them choose who they want to contact. We're a family, and when you are family, they want you to win. And we want them to win.

**TS:** Your cultural approach to customers

is clear. Pivoting to the venue relationship, how do you interact with venue partners that's different than other providers and why?

**JG:** This is an area where we've made some deep choices about how best to live our cultural values in support of our venues. We create partnerships with hotels where we can advocate for them in the most authentic sense possible. We're very intentional about making sure that we aren't competing with ourselves next door at another hotel.

**TS:** A common method for companies is to sign as many venues as possible in a local area, to drive margin and utilization of resources (like equipment and labor). Your approach sounds distinctly different. I'm hearing that part of your culture is when you serve venues, you make sure you're not competing with the hotel next door and won't service a cluster of competing hotels, because it diminishes your ability to authentically advocate on any hotel's behalf. Did I hear that right?

**JG:** That's exactly right. We're a

production and creative services house and want to be seen as having a terrific on-site arm. We want to be a full partner and partners can't properly advocate for their venue when they're also advocating for the competitor next door. That's a mixed message in our view.

**TS:** Thanks for sharing your unique take on how AVmedia has created and lives its cultural values. For companies in the space that are struggling with internal morale or a disconnected customer base, what advice would you give them?

**JG:** Having a culture statement and core values are pivotal. If you don't have one, get one. Don't sit in a boardroom, but rather go to your team members and ask guiding questions to help your company develop one. Your culture is how you hire people, how you make business decisions, and how you do annual reviews. Keep modifying it until the teams say "that's who we are and want to be" because adoption is critical. If your teams don't embrace, help dictate, and live the culture, your customer experience won't get where it needs to be. Rebirth it in a way where you're willing and open to modify it. Let the teams dictate what that is. I think that's critical.

You have to over-communicate in times of anxiety and over-communicate in times of good. We're not perfect, but we live our ideals. I think the message begins before a team member is hired. I'll give you an example.

When a potential applicant to our job posting comes through, it comes straight to my desk first. How you treat a prospective employee sets the tone from the beginning. I don't want anyone starting in the company without a dedicated, structured orientation time with myself and a true understanding of our culture at AVmedia. We want to know their story, their families, and their passions. It's an anxious time for them, so we want to set the tone from the very first moment.

Align around culture, core values, great hiring experience, great orientation, and great annual review process.

In our annual review process, we've done

away with the "five-star rating" system.

We don't believe in force ranking our employees, but instead are more interested in them as a whole person and their contribution to the work family.

**TS:** What kinds of questions are in your annual review discussions that you've found beneficial?

**JG:** There are no ratings, we simply ask people ... are you living the culture? How do you think we're living the culture? How are you performing in key business areas? How is the company setting you up for success in those key business areas? Where would you like to go in your career and how can we make gains toward that? And finally, how do we get better together?

**TS:** There's a lot of vulnerability and authenticity in what you're describing. It gives a path that's not predestined. One of the greatest challenges I've observed in how companies handle employees' reviews, is the rating system. In my career, I've never seen a highly technical or creative person inspired by getting a 2% raise or a three-star "meets expectation" rating. What I have seen, and similar to the culture you're describing, is the success that comes with inviting team members to be a voice on behalf of the organization to the broader industry. Asking them to take on projects where their influence matters, and to grow their skills in ways that force-multiply morale and productivity. You've given them a chance to speak at a higher level.

**JG:** Exactly. We live that message. We all care about each other and have each other's backs and are trying to do the right thing for people. Still be innovative. Still develop peoples' careers. We embrace it when our family members tell us what they want to learn and we ask how we can support it. We've improved our benefits package even further through the pandemic, as well. We want to keep people and we won't keep people who have 20+ years tenure if we don't treat them great. You're never too important or too busy to slow down and hear someone's story, their talents, and passions. ■



**Josh Greenberg** is a 25+ year veteran of the hospitality and live event industries. He began his professional career in 1993 with Red Lobster Restaurants. In 2007, Josh joined Swank Audio Visuals as Southeast Regional Vice

President, overseeing the relationships in the high-profile Florida convention market. He joined AVmedia in March of 2014. After successfully building upon the foundation of AVmedia's hotel services partnerships and developing an industry leading family culture, Josh became President and CEO (proudly dubbed the "Culture Captain" by the AVmedia family) in the summer of 2017 to further guide the organization. He holds a BS in Hotel, Restaurant, and Institutional Management from Virginia Tech and serves on the Pamplin College of Business, Howard Feiertag Department of Hospitality Tourism and Management Advisory Board. Josh can be reached at [josh.greenberg@avmediainc.com](mailto:josh.greenberg@avmediainc.com).



**Todd Spencer** is President of Ventana Capital, a specialty consulting firm serving event industry companies. He is credited with building over \$1B in new revenue for general event, rigging, and AV companies

with an established track record of success in strategic plan development, operational optimization, new program design, and business acquisitions and sales. Todd partners with event companies to achieve their growth vision and supporting executives, entrepreneurs, and ownership groups to maximize the value and output of their current business.

Previously, Todd led operations and strategic planning as Vice President of Global Rigging Services for PSAV's worldwide portfolio, encompassing 1,100 venues across 11 countries.

Todd is honored to be serving as ESTA's President and believes strongly in the value of the Association, its community, and the many members who help to create a thriving future for our industry. He can be reached at [tspencer@ventana-capital.com](mailto:tspencer@ventana-capital.com).

BY LORI RUBINSTEIN

## Neal Preston book signings and presentation highlight BTS presence at The NAMM Show

BEHIND THE SCENES had a very successful NAMM Show thanks to famed rock 'n' roll photographer and author Neal Preston. Lines formed for each of the three book signings Neal held as fans of his work were thrilled to get copies of his newest book *Queen: The Neal Preston Photographs* as well as his earlier *Exhilarated & Exhausted*. Neal also spoke about his experiences photographing Queen over two decades and shared never before seen photographs of the band offstage.

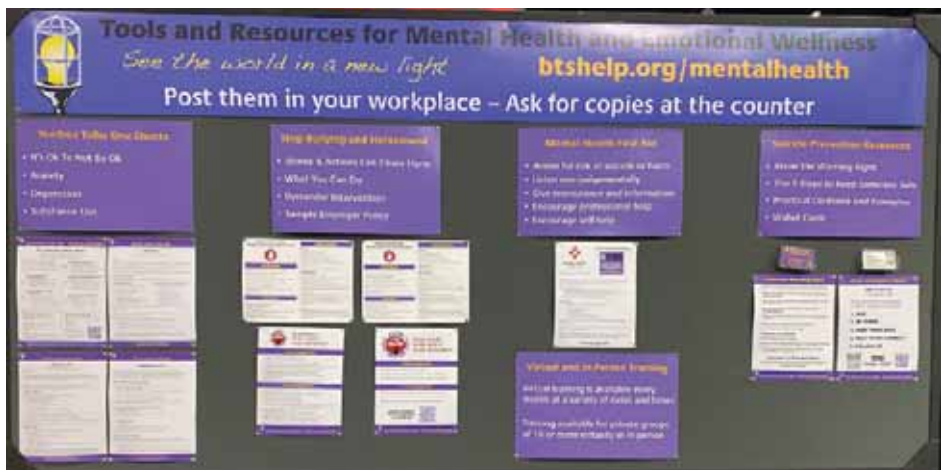
*Queen: The Neal Preston Photographs* is the official book on Queen, one of the greatest ever rock bands, as photographed by one of the greatest ever rock



Neal Preston shared his experiences photographing Queen over two decades as well as some never-before-seen photographs of the band offstage.



Altman Lighting presented a check for \$16,350 to BTS at The NAMM Show for their participation in the Pledge-a-Product program through sales of the BTS Ghostlight. Pictured are Nick Champion and Jake Rhodes from Altman Lighting with BTS' Lori Rubinstein.



The BTS booth also featured information about the Mental Health and Suicide Prevention Initiative which was gratefully received by many attendees. Copies of the information are available upon request at [mh@btshep.org](mailto:mh@btshep.org).



**BTS and Lori Rubinstein (fourth from left) are very grateful to Monique L'Heureux, Diana Raymond, Judy Lewis, and Jocelyn Ellis, for their invaluable assistance in the BTS booth.**

photographers. Produced in collaboration with the band, the book features over 200 images and is an exciting ride through their years on the road together. It is the first time Neal and Queen have collated this work in one volume: glimpses of life backstage, live performances, post-performance highs and lows, and outtakes—many of which have never-been-seen before—are accompanied by memories and anecdotes from Neal with forwards by Queen guitarist Brian May and drummer Roger Taylor.

Neal Preston is one of the most prolific and highly regarded rock photographers of

all time. He began working with Queen in the mid 1970s as their tour photographer. He was present on the legendary South America tour in 1981, Live Aid in 1985, and the band's last tour with Freddie Mercury in 1986, among others. Brian May has commented, "Neal just has the knack, the skill, to always be in the right place at the right time." Signed copies of the book are available for sale online at the BTS Boutique at <https://behindthescenescharity.org/boutique>.

Copies of *Exhilarated & Exhausted* and posters of Neal's work, including his famous images of Freddie Mercury, Robert Plant,

## Become a Mental Health First Aider and make a real difference

If you saw someone having a heart attack or bleeding from a severe laceration, would you know how to help stabilize them until professional help arrived? Chances are that you would—you'd start CPR or staunch the bleeding—or, at the very least you'd know to call 911. But would you know what to do if you saw someone having a panic attack or showing signs of substance misuse?

Mental Health First Aid is a training course that gives you the skills you need to reach out and provide initial help and support to someone who may be showing signs of a mental health or substance use problem, or experiencing a crisis, and help connect them to the appropriate care.

The BTS Mental Health and Suicide Prevention Initiative continues to offer Mental Health First Aid training on an ongoing basis at a variety of dates and times each month to accommodate industry work schedules. Visit <http://btshelp.org/mhfa> to learn more and see currently scheduled trainings.

## Announcing the 2022 Holiday Cards

The 2022 Behind the Scenes Holiday Cards <http://btshelp.org/holidaycards> are now on sale at the BTS Boutique. This year's collection features a wonderful mix of seven different designs created especially for the charity by Phil Foster, Jennifer Gillette, Robert Mendoza, Nancy Orr, Todd Potter, and Lauren Press. From a message of hope and peace, to a steam punk inspired holiday, and a card featuring the simple tools of so many industry crafts, you're sure to find a design that's right for you.

It's important to let family, friends, and colleagues know you are thinking of them and these unique holiday cards say it perfectly. They are also a personal and inexpensive way for a company to keep in touch with its customers and let them know "We are here, and you are important to us."

Cards are available in a variety of options: card packs of 10 with a standard greeting, personalized cards with a company logo and custom message, and electronic cards in multiple file formats plus an array of price points starting at just \$20.

Sending a BTS holiday card helps spread the word about the charity and lets your recipients know you are supporting industry colleagues who are ill or injured as well as the BTS Mental Health and Suicide Prevention Initiative.

Orders for printed cards will be taken until September 27, 2022, to arrive by late November. Electronic card orders will be taken until December 16th. View and order cards at <http://btshelp.org/holidaycards>.

While you're shopping, be sure to check out our industry-themed holiday decorations, from LED ghostlight Christmas trees and Hanukah menorahs to nightlights and tree ornaments.



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## Behind the Scenes News | The NAMM Show



Tony was thrilled to get his book personally autographed and to have his picture taken with Neal Preston to show family and friends.

and Carlos Santana, are also available online in the BTS Boutique. Proceeds benefit the Behind the Scenes charity.

Behind the Scenes would like to thank NAMM, The Lightpower Collection, ACT Entertainment, and GLP for making BTS' appearance at the show possible and express our deepest gratitude to Neal for his unwavering support of the charity.

The Lightpower Collection [www.lightpower-collection.com/en/](http://www.lightpower-collection.com/en/) of rock'n'roll art features photography and album cover artwork from many of the world's greatest photographers and designers. Neal's rock'n'roll photography represents the core of this collection and comprises more than 70 large-format original fine art prints. ■



Lori Rubinstein is Executive Director of the Behind the Scenes Foundation.

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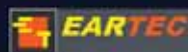
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# ESTA Happy Hour for Behind the Scenes kicks off the 2022 NAMM Show

BY LAURA HOEPKER

THIS YEAR'S HAPPY HOUR for Behind the Scenes opened the 2022 NAMM Show for the entertainment technology community on Thursday evening, June 2nd. Even with the shorter NAMM Show schedule and the ESTA Happy Hour for Behind the Scenes prior to the show doors opening, we enjoyed a great turn out and the energetic networking event raised funds for the important work of Behind the Scenes. Southern California in June proved to be perfect weather for a party on the patio and the entire ESTA team pitched in to create a fun and relaxed atmosphere for members and friends alike. See you next year! ■



Marcus Bengtsson, Sean Dane, Paul Royalty, Alan Rowe, Erin Grabe, and Mitch Hefter



Jim Digby, Bryan Huneycutt, Courtney Schmitz, Diana Raymond, and Erin Grabe



Joe Menhart, Eddie Raymond, Christina Smith, and Erin Grabe

PHOTOS COURTESY OF JOCELYN ELLIS





Jake Rhodes and Nicholas Champion



Judy Lewis, Jeff Flowers, Pat Basileo, and Kasper Nyboe



Steve Surratt and Nicholas Champion



Neil Huff, Joel Nichols, Drew Wending, Adrian Segeren, and Keith Kankovsky



Jesse Adams, Benjamin Adams, John Marczeski, and Bruce Darden



Karl Ruling, Jackie Tien, Erin Grabe, and Steve Surratt



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**HAPPY HOUR**  
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Pictured at Grayson Highlands, VA, the LRLRs meandered along the mountain backroads, ridges, and valleys of North Carolina, Virginia, Tennessee, and Georgia, and South Carolina.

# The LRLR Blue Ridge Ramble: Riding to help industry folks who are less fortunate

BY GREG WILLIAMS

WHERE DOES ONE START to talk about the highlights of the 2022 Long Reach Long Riders (LRLR) charity ride? With the chilly mountain river next to our hotel in Helen, GA? Or the 1880s Green Park Inn in Blowing Rock, NC, with the Eastern Continental Divide running through the lounge, appropriately named “The Divide Lounge?” Spill a drink on one side of the room, it will head towards the Mississippi. Spill a drink on the other side, and it will flow towards the Atlantic.

The LRLRs are pleased to report the 2022 version of the ride was the most successful fundraising year of any ride to date. The total raised in 2022 (as of this article) is up to \$93,500, and donations will be accepted through August 1st.

The LRLRs are also thrilled to announce that through the generosity of thousands of sponsors over the last 19 years, the total amount that has been raised, and more importantly, given to those in need since 2004 has topped \$1,000,000. A costume designer who wishes to remain anonymous put the amount over the top of \$1M with a very generous gift this year. Many thanks to her, and to the countless sponsors, and more than 100 riders who have donated to help those less fortunate over the years!

Thirty-seven riders and chase vehicle drivers participated in 2022 with the majority of those riding or driving the entire distance.

The 2022 ride, “The Blue Ridge Ramble” began and ended in Charlotte, NC. From there the riders meandered along the

backroads, across the ridges, and through the valleys of the mountains of North Carolina, Virginia, Tennessee, and Georgia, with a bit of South Carolina thrown in for good measure. All told the ride was around 1,600 miles across seven days.

Roads with names like “The Rattler,” “The Snake,” “The Diamondback,” and the famous “Tail of the Dragon” kept the riders on their toes while they enjoyed some of the most amazing scenery the Blue Ridge Mountains have to offer. As one rider wryly noted, “It’s the herpetological tour this year!” The roads were certainly as winding as a snake in motion, having been laid out during the earlier days of the US when following the lay of the land around the mountains was the only option.

The LRLRs have always encouraged all types and brands of motorcycles to join them, which leads to an interesting mix of sport bikes, on/off road combos, touring bikes, and full dressers. Back in 2009, we had a female rider on a sport bike who sported a bright purple Mohawk attached to her helmet. We use hand signals to announce: “single file,” “staggered riding,” “bunch up closer,” etc. We start these hand signals with the lead rider, and they get passed back until everyone has received the message. We started using the “Mohawk” hand signal across the top of the helmet to signify “fun, twisty roads ahead, if you’re on a sport bike feel free to zoom ahead and ride a more technical ride.” It’s much easier to communicate with a hand signal than stopping beside the road to relay all of that!

For 2022, we had the serious technical riders on sport bikes and very much into carving the curves, and a second group who wanted to step up the pace a little but didn't want to get quite as technical as the "Mohawks." We dubbed this second group the "FauxHawks," and they would also move ahead of the remaining pack through the twisties, but still behind the Mohawks. That left the third group, those who were happy just to ride the sweepers at a more leisurely pace. We dubbed that group the "KnowHawks," as in "I know better than to push my luck through here!" Tip of the hat to Kacey Conn for coming up with that moniker. It turned out the groups were fairly evenly divided, which meant that all riders could ride with their own group without feeling pressured to either hold back or ride beyond their comfort level.

As the riders gathered in Charlotte on June 17th, Behind the Scenes' Executive Director Lori Rubinstein and LRLR co-founder Bill Sapsis flew in for the announcement that the \$1,000,000 milestone had indeed been reached. Of the original 2004 Long Beach Long Riders (the one-year name of the group when it first started), six of those original members were there for the milestone announcement including Bill Sapsis, Moe Conn, Loren Schreiber, Wayne Rasmussen, Alice Neff, and Greg Williams.

On the first day out of Charlotte, the riders worked their way up through Little Switzerland, NC, then rode the Blue Ridge Parkway to the Beacon Heights Overlook, a giant escarpment overlooking the mountains. In the evening, the riders found themselves at the aforementioned Green Park Inn. The restaurant for the evening was within walking distance and has been in operation since before Prohibition in one form or another. The camaraderie combined with the sunset views of Johns River Gorge set the tone for the week to follow. Two nights in Blowing Rock NC, followed by two nights in Franklin, NC, and two nights in Helen, GA allowed the riders to cover a lot of the best roads in the Blue Ridge.

One of the highlights about the LRLR rides is the assembly of the "intentional community" as "Rev" Paul Sannerud has dubbed it. The rides draw people from disparate backgrounds and beliefs, for the singular purpose of helping those who are less fortunate than themselves. Since 2004, the LRLR have ridden across the US and Canada in search of the perfect day, the perfect road, the perfect weather. The 2022 ride came pretty close on all counts, and in the end was the perfect capstone to one fundraising effort.

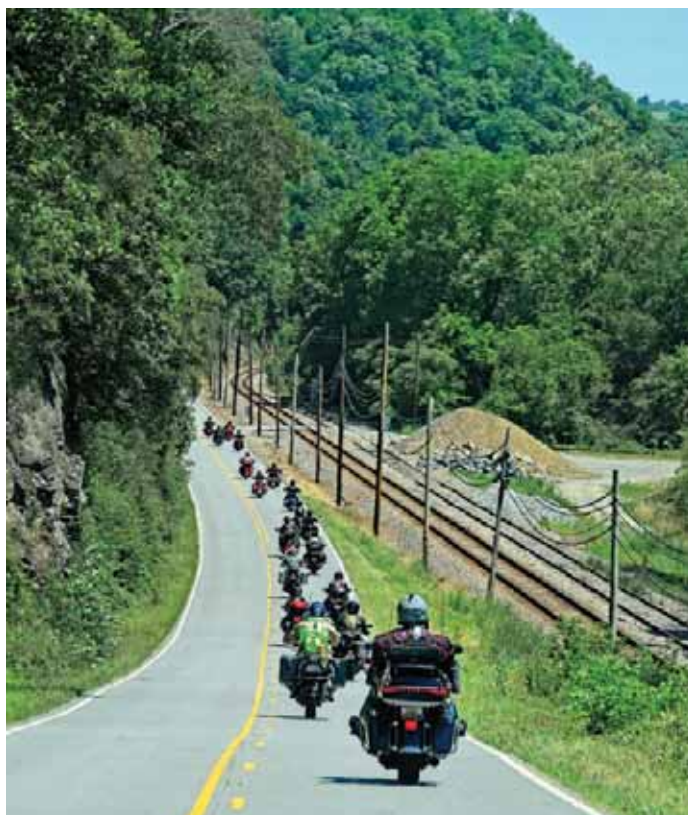
Now on to the next! Announcements about the 2023 LRLR ride will be coming soon. In the meantime, please check out [www.LRLR.org](http://www.LRLR.org), and don't forget to donate! ■



**Greg Williams** is a co-founder of the Long Reach Long Riders charity ride. He is a Regional Rigging Manager with Encore, and he and his wife Alice are proud supporters of Behind the Scenes. Greg can be reached at [greg.williams@encoreglobal.com](mailto:greg.williams@encoreglobal.com).



The Blue Ridge Ramble included 37 riders and chase vehicle drivers covering around 1,600 miles across seven days. Captured here along the Blue Ridge Parkway in North Carolina.



# “Emotional encounters and a great spirit of optimism:” A report from Prolight + Sound

BY RICHARD NIX

IN FEBRUARY, I was invited to attend Prolight + Sound, held at the Messe Frankfurt from 26 – 30 April, in Frankfurt, Germany. I was requested to speak about new standards and draft standards in-progress from the Event Safety Working Group, and to participate in a round-table discussion about current industry issues. I had a lot to be excited about—not the least of which this being my first trip overseas to a place I’ve never seen in-person. Many of the people I would expect to see at the show—Americans and Europeans alike, who participate in the Technical Standards Program—are the same people I would very much like to see again, face-to-face. Meeting

industry peers face-to-face again was something I’d only just recently experienced, returning home from the recent USITT Conference and Stage Expo in Baltimore with a renewed sense that our industry was finally opening back up again. The thought of attending Prolight + Sound, especially with the opportunity to meet new people and make new friends, took that optimistic feeling to a global level.

The emails leading up to the show began to arrive—the start of a frenzy for my excitement: “Prolight + Sound 2022 with a strong support from the industry: Setting the stage for a successful #restart,” closely followed by another, “Together with

hundreds of companies, Messe Frankfurt is acting in concert to send a strong signal at the show for the successful future of the event industry.” Then a day later, “Premiere of the ‘Green Event Day’ at Prolight + Sound: Moving into a sustainable future together!” Finally, “We can hardly put our joy into words: After two years of forced break due to the pandemic, Prolight + Sound can finally take place again and we can welcome our visitors and exhibitors in Frankfurt in person. Will you be there?”

By now, the industry is finished with COVID. The industry is ready, willing, and able to return. The collective “we” have many new things to talk about! Yes! I’ll be there!

I wasn’t sure what I might expect. When I arrived at the Frankfurt Airport, the land of international arrivals was surprisingly quiet at 8:30 a.m. The passengers from my flight, all 234 of the Airbus A300 capacity plus crew, were the only apparent travelers in this seemingly barren land; most of us were weary after an eight-hour flight, so the usual hustle and bustle of an international airport was lost in the quiet shuffle of moving feet. I wondered, “is this setting my expectations of what’s to come?” It took about 30 minutes to get from through customs, retrieve checked luggage, and make my way over to the main terminal gateway in one of the busiest airports in Europe—to the place where my reality of the world as I know it became awesomely larger. I didn’t have time to think much more about it. I had places to go, people to meet, and a trade show to attend.



Jake Rhodes gives a thumb’s up for Tom Casazza’s Hydra Lego handiwork, all happy to be found at the Altman Lighting booth.



The Layher booth—the author’s pick for stand with the most parts!

## Day 1 show installment

The show is held at Frankfurt’s main exhibition grounds, the Messe Frankfurt, this year occupying two floors of two exhibit halls, plus an outdoor pavilion area. This comprised 55,000 m<sup>2</sup> (592,000 ft<sup>2</sup>) of exhibit space, hosting 391 exhibitors from 39 different countries, and just over 19,000 attendees from 93 different countries. Forty-five percent of the exhibitors and 48% of the attendees were categorized as “international”—from places other than Germany.

The past two years have made me acutely aware of my surroundings. In general, Frankfurt has lifted mask mandates in most public spaces. Walking into the exhibit hall lobby, I immediately notice judicious placement of well-marked sanitizer stations, staff cleaning benches, tables, and other contact surfaces, but it’s also clear that masks are the exception, not the rule. There was no notable entry crowd, no lines, no waiting. Scan the pass—through the gate, then into the exhibit hall.

The first hall I entered was Hall 11—the main Prolight + Sound hall. It’s expansive.

The booths are large, but spread out; the aisles are double wide (10 m), but there were lots of people—enough to seem “busy,” but not overwhelming. It’s evident that many of the attendees are colleagues, meeting each other face-to-face for the first time in a long time. I noticed a lot of hugs, handshakes, and fist-bumps, along with a general attitude of enthusiasm.

This hall was primarily dedicated to audio, control systems, and infrastructure—wiring, harnesses, and wiring devices—but there was a large area, the entire length of

the hall and perhaps 25% of the overall area, dedicated exclusively to antique audio equipment, where one could see and try a veritable museum of microphones, audio consoles, guitar amplifiers, power amplifiers, and loudspeaker enclosures dating as far back as the ‘50s and ‘60s, a metaphor for how things from past times are reunited together, if only for historical, or posterity’s sake. Aside from the first shock and awe of being in the convention space, seeing everyone intermingling together, the first-day highlight for me and for most of the other attendees was the guided tour, complete with walk-through live demonstrations of this equipment, with accurate historic examples of the shows they had debut on, and comparisons (mostly of loudness and clarity) with both older and newer technology. I was glad to notice that most of the people on this tour wore hearing protection, because you’d be blown away by sound pressure levels exceeding 100+ dB. If you are experienced with it, you’ll be reminded of a particular system’s warm qualities as compared to a different system’s brighter qualities—all qualities that sound engineers know and understand well. It was clear that the few hundred attendees had great fun reminiscing about those days long past.

As I made my return pass back out of the hall, I was intrigued by a video of a mobile stage company, playing at one of the booths. Even though I had intended to stop,



The author prepares to phone in the day’s show report installment, along with his pick of “exhibit with the most parts,” at the Layher stand.



Interesting display of technology from ROE Visual.

## Prolight + Sound is an excellent opportunity to learn about your global competition and to simply get an idea of where the entertainment industry is going . . .

watch, and go, my first exhibitor interview arrives in the form of one Philippe Miksa, the CSO of Moving Stage Division of the Guillet Group, based out of Strasbourg, France, about two hours driving time from Frankfurt. Their main business is very diverse, ranging from broad-form transportation systems such as railway, bulk storage, and agri-food processing; to trucks, trailers, grain, and tanker vehicles; to sanitation systems, and architectural steel, and aluminum. The mobile stage market is one they discovered several years ago in an effort to continue diversifying, and, said Philippe, this diversification has allowed them to flourish during pandemic times where other, less diversified companies have

floundered or even failed. Their Mov'in 256 “King of Europe” stage is one example of a large-scale mobile stage: 256 m<sup>2</sup> (2,756 ft<sup>2</sup>) of stage space, with 210 load attachment points for over 26 mt live load capacity, including 5 mt on the line-array points. The roof opens to a 10.5 m (34.5') height and can be installed by eight people in six hours. The fully demounted front-to-rear trailer traveling dimension is 17.2 m (56.5') long, and 4.3 m (14.1') tall. I noted that this particular mobile stage—their largest—is too big to travel on many American roads because it's too heavy, too long, too wide, or too tall to travel without special permitting and routing. He agreed that some areas in Europe are similarly inaccessible without

special driver certifications, but this is what their drivers excel in. He said the only reason they hadn't made an effort to come to the US is because they hadn't fully researched the complete range of USDOT requirements—yet. Who knows, maybe we will see larger five-axle mobile stages rolling down the highways in a few years from now!

Leaving Hall 11 after a quick, first-day walk-through, I headed over to Hall 12, which is an experience more like our traditional entertainment industry show—fog and smoke, lighting, and truss—truss everywhere! Without actually confirming how many unique truss manufacturing companies were exhibiting, I counted at least 20 of them who offered truss for sale. Some of these companies had US distribution, but most were represented by their European counterparts. The single question that kept bugging me was how all of these companies were able to source aluminum materials across what appears to be such a small area, but seemingly saturated by companies who represent the demand side of the industry, and with no one representing the supply side of the industry. A few exhibitors were willing to share their stories.

Jan Verhijen, managing director for Interlat T.C. said that some of the European distribution channels for raw aluminum stock were quite narrow; many fabricators have long-standing agreements with single vendors, and so get first choice of new stock. However, he notices a trend over the past two to three weeks where his usual material supplier's lead time for standard orders has increased from two to seven days, to two to three weeks, and is anticipated to increase over the following weeks. Based on what I hear from our constituents in the states, even two to three weeks lead time on raw stock has been unheard of for several months. However, there's a very well-known reason for this increase in lead time: Ukraine plays an important role in the European aluminum product supply chain, so the follow-on impact means that anyone upstream or downstream of the

Ukrainian part of the supply chain is now suffering from the choke created by the current war in the Ukraine. Since these products flow through (to or from) the Czech Republic, those who source from the Czech Republic, are impacted. A significant amount of the raw materials and raw stock coming out of Eastern Europe make its way into China for further processing and fabrication, but China is experiencing its own set of challenges with COVID shutdowns and restriction. A large portion of all of these materials, from all of these sources, historically made their way into the US market; the US market does not have the domestic resources to meet demand, so this demand must be met using foreign, imported goods. The more I learn about this, the more I appreciate how small the planet becomes, especially in terms of aluminum supply and demand.

## Day 2 show installment

On the second day of the show, I presented for 30 minutes on the four published ESWG standards, and the six other drafts currently in progress. It was an easy presentation, attended by technicians from Germany, Switzerland, Australia, the UK, and—of course—the US. (Richard Cadena came to my presentation!) For me, talking about anything related to our standard program is much like a walk in the park. I could do this all day, at an easy pace, evoke questions, and answer them all without an outline. The subject matter meant we had a lot to talk about, because the scopes of my list of published standards—structural safety, crowd management, fire safety, and weather preparedness—are all on the attendees' minds, too. There was discussion about some of the minor differences between the US and European perspective. I learned (in Europe) that tents are held to a higher standard because they are considered a safe haven to go to in the event of inclement weather. The fact tents are not considered safe havens in the US and that they should be evacuated, (with recent examples of

incidents to support that point of view) led to some energetic conversation.

Immediately following my presentation, Richard Cadena presented 30 minutes on electrical stage safety. The audience participated in this lively discussion about the differences in industry practice, between Germany, Europe, Australia, and the US with respects to earthing, grounding, and the devices we commonly recognize as GFCI here in the US. Following this presentation, both of us participated in a round-table discussion with Randell Greenlee (VPLT), Phil Adlam, and Ian Cabelleroe (Backstage Academy) on any hot topic we chose to bring forward, which ended up centering on the very real labor and staffing shortages everyone is experiencing throughout the industry. The most common suggestion for solutions: training and preparation. That is, training, for those who are new recruits, or experienced hands who've been out of work for two years, and preparation for how to manage the shows coming back, when your labor pool is too small to accommodate it. Mental health also found its way into this discussion, and is an active topic in the European entertainment industry, too. The pressures of working longer hours with smaller staff can quickly take its toll, elevating the mental health risks.

After these sessions, I walked over to Hall 12, where an entire exhibit area was dedicated to the ever-growing world of digital workstation, podcasting, and video blogging. The past two years of forcing people to work remote—perhaps even repurposing careers—has spawned a demand for new and different products satisfying the need to convert casual work-at-home desktops into efficient, yet aesthetically appealing workstations. Companies now produce entire product lines of furniture, fittings, and production gadgets that are ergonomic and functional, yet look sleek and unobtrusive to the on-camera v-blogger's audience.

The nice end to the day's show activities was the VPLT after-show party, which began at 5:00 p.m.—one hour before the show



Workstation and desktop gadgets for digital content producers, part of the Gravity brand of products from the Adam Hall Group.

ended, and was still going strong at 8:45 p.m. when I left. It was another example of people willing and able to mingle and celebrate a long-overdue coming together.

## Day 3 show installment

I realized on the third day there was another entire floor of exhibits, located on the second floor of Hall 12. This was the quiet area, where the majority of exhibitors were lighting and video manufacturers. Many of them were ESTA members and TSP participants. I met with David Bond (a Rigging Working Group participant from Kinesys/TAIT), Jim Love (a Control Protocols and Stage Machinery Working Group representative for TAIT), and others from the TAIT group of companies—who were concentrating their efforts at this show on motion control and load sensing technology.

From there, a short walk over to the Altman Lighting booth, where I found Tom Casazza, a redux of his Lego Hydra handiwork from USITT, and Jake Rhodes (an enthusiastic Control Protocols Working Group member, and willing photogenic subject)!

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The EXE DST truss and trolley system from Area 4 Industries expands capabilities for video and scenery movement.

companies was showing its truss and staging product range, but was also debuting a range of chain hoists from its EXE4 brand: three styles, one with double brake, a second with double brake and load sensing, and the third with the added feature of variable speed, and ranging in capacity from 0.5 tonne up to 5 tonnes. EXE4 also debuted a modular control system for its hoists, along with a neatly-packaged rotator and motorized trolley for mounting in a truss module.

I've mentioned a lot of truss products in Europe, and there are a lot of hoist products, too. At least three brands we recognize here in America also serve the European market (CM-ET, Stagemaker, and Yale), but at least four others serve the European market exclusively. I was able to learn more about them from Tracy Hall, the UK representative from Columbus-McKinnon (a long-time ESTA, ETCP, and Technical Standards supporter), who was happy to explain that it pays to know one's competition in Europe. I suppose that applies everywhere!

Prolight + Sound is an excellent opportunity to learn about your global competition and to simply get an idea of

where the entertainment industry is going and how it is fairing. Next year's Prolight + Sound will be four days, April 25 – 28, again at the Frankfurt Messe. Details can be found at [www.prolight-sound.com](http://www.prolight-sound.com).

The first post-show email arrived with the subject, "Prolight + Sound 2022 closes: Emotional encounters and a great spirit of optimism." Indeed. I could start a show report with that . . . Tschüss! ■



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**Bob Bauer also found time for large-format film photography.**

AFTER A LONG ILLNESS, F. Robert Bauer left, slipping away on March 25, 2022. This much-loved man left to pursue his next great adventure. He will surely be checking in with friends and family that have gone before.

Born January 7, 1938, he was raised in New York City. Bob received his bachelor's degree in Religion and Philosophy from Wagner University in Staten Island. From 1959 to 1960, he was the original electrician for the *Fantasticks* that opened at Greenwich Village's Sullivan Street Playhouse. In December 1960, Bob left New York for Denver. He soon became the technical director for the Bonfils Theater on East Colfax. In 1968, he and his wife Judy returned to New York where he taught at Wagner College. While there, he received his MFA in Theatre Design from the City University of New York.

Bob taught masters classes in set design and lighting at Brooklyn College School of Television Science. Moving back to Denver, he spent years touring with the American Ballet Theater. In 1974, Bob opened Theatrix, the first technical theatre supply company in Colorado since 1952. The business closed in 2003.



His wife Judy shared this story about the couple earning a spot on the first major industry vendor trip to London: "Once



**Bob Bauer**

upon a time, there was a gathering of wonderful, crazy people from all over these United States of America. They were sent for a week-long vacation to London, England after meeting sales goals set by one of the suppliers. On the plane ride across the Atlantic, it was generally agreed, since we were 'on vacation,' we would not discuss 'business.' Along the way, all the theatrical dealers got to know each other and enjoyed a wonderful adventure. The week passed much too quickly, and we found ourselves on a large jet headed home. Lifted from our rule of no 'business talk,' all Hell broke

“Theatrix became one of the founding members of Theatrical Dealers Association (the TDA later became ESTA).”

loose! Up and down the isles we scurried and talked for hours. It was a joy. It was fun. It was eye opening. Out of this delightful group came the realization that we needed our own 'industry association.' The seeds were planted. The soil was fertile. The rest was history.” Soon after, Theatrix became one of the founding members of Theatrical Dealers Association (the TDA later became ESTA).

He is survived by his wife Judith (Judy) Bauer, son Edward (Ed) Bauer, claimed son William (Cleet) Forrest, sister Evelyn Johnston, along with numerous nephews, nieces, great and great-great nephews and nieces.

Say a prayer, raise a glass, and wish him bon voyage. If you would like to do something he would appreciate, plant a tree, grow a rosebush, make the world a better place! Donations in Bob's memory can be made to Behind the Scenes at [www.behindthescenescharity.org/donate](http://www.behindthescenescharity.org/donate). ■

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