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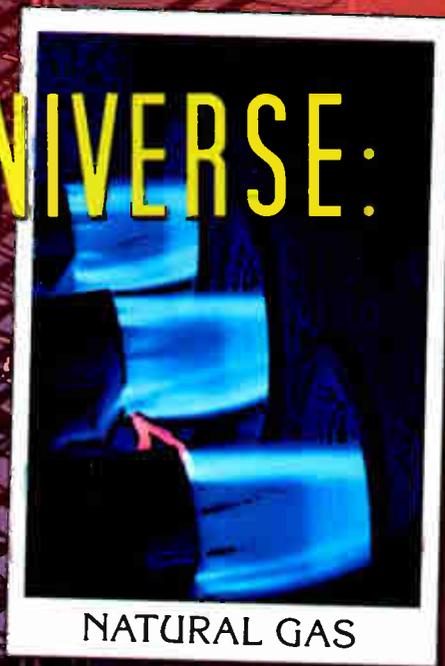
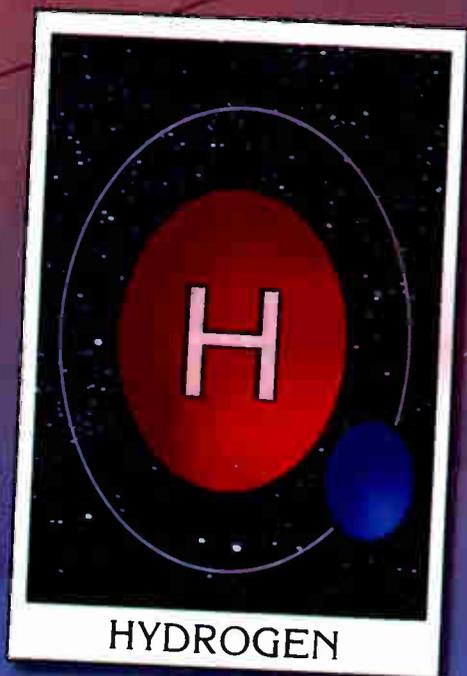
ABOVE GROUND LEVEL™

APRIL 2007

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*Donald E. Koehler*

Site reliability and environmental responsibility affect backup power systems choices based on the fuels that keep them operating.

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Nothing's quite as vibrant as aviation orange and white against a coastal sky, such as this monopole near Charleston, SC. *Photo courtesy of PennSummit Tubular, photography by Ranjeet Pawar, Monsoon Galleries.*

### 36 Powerful ways to dodge disaster disruptions

*Sandra Saathoff*

Use 'green' technologies to make the backup-power portion of your site disaster-preparedness plan reliable and unobtrusive.

### 40 Surge suppression: Comparing apples to oranges

*Dave Rowley*

Technical comparisons between metal-oxide varistor (MOV) and silicon avalanche suppressor diode (SASD) designs may be moot, depending on the application. The physical location of a suppressor to protect a specific point in an electrical-distribution system determines the type selection.

### 50 NATE Nashville convention spotlights safety

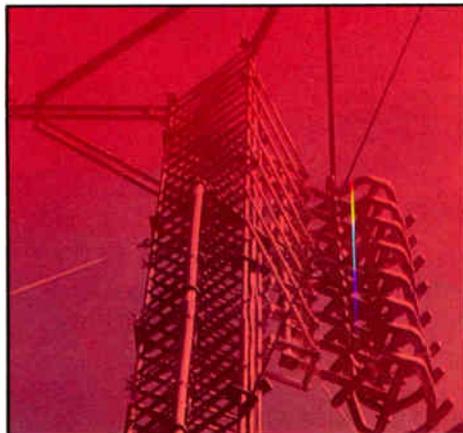
*Don Bishop*

Safety, safety, safety was NATE's theme as it presented sessions about riding the line, operating cranes, avoiding RF hazards and training tower hands, among others.

# Departments



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## on the cover

For backup power, broadcast stations may need the higher power that gasoline and diesel gensets deliver. Whether for primary or backup power, less energy-thirsty telecom basestations might be suited for alternative-energy sources, including fuel cells that use hydrogen and thermal-electric generators that use propane or natural gas. Check out the possibilities on page 28.

*Photo illustration by Scott Dolash*

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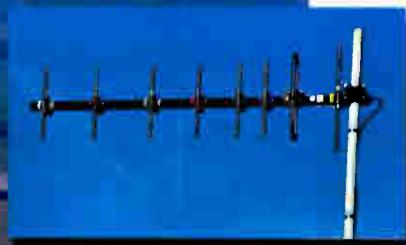
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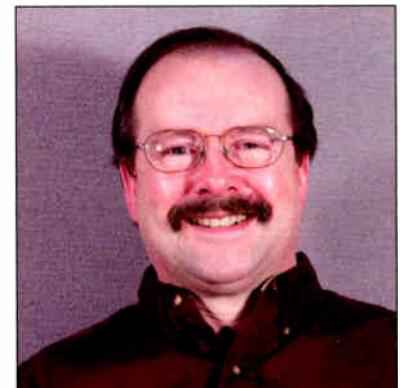


Meet **Julia Custer**, author of AGL's new environmental affairs column (page 18). Julia is regional office manager for Archer, a private consulting firm in Annapolis, MD. She specializes in providing technical and regulatory environmental services. Julia's college-educated in environmental conservation and management, plus she has experience providing environmental compliance and support services for more than 500 towers and antenna installations. If you can abbreviate it, she has experience with it: FCC NEPA regulations; USFWS bird-strike mitigation requirements and endangered species protection, plus wetlands and floodplains permitting; NHPA SHPO consultation; ACHP programmatic agreements and guidelines; EPCRA reporting; and many others. She's a web navigator: She navigates clients through the complex web of federal and state environmental regulations, FCC policies and local-permit requirements.

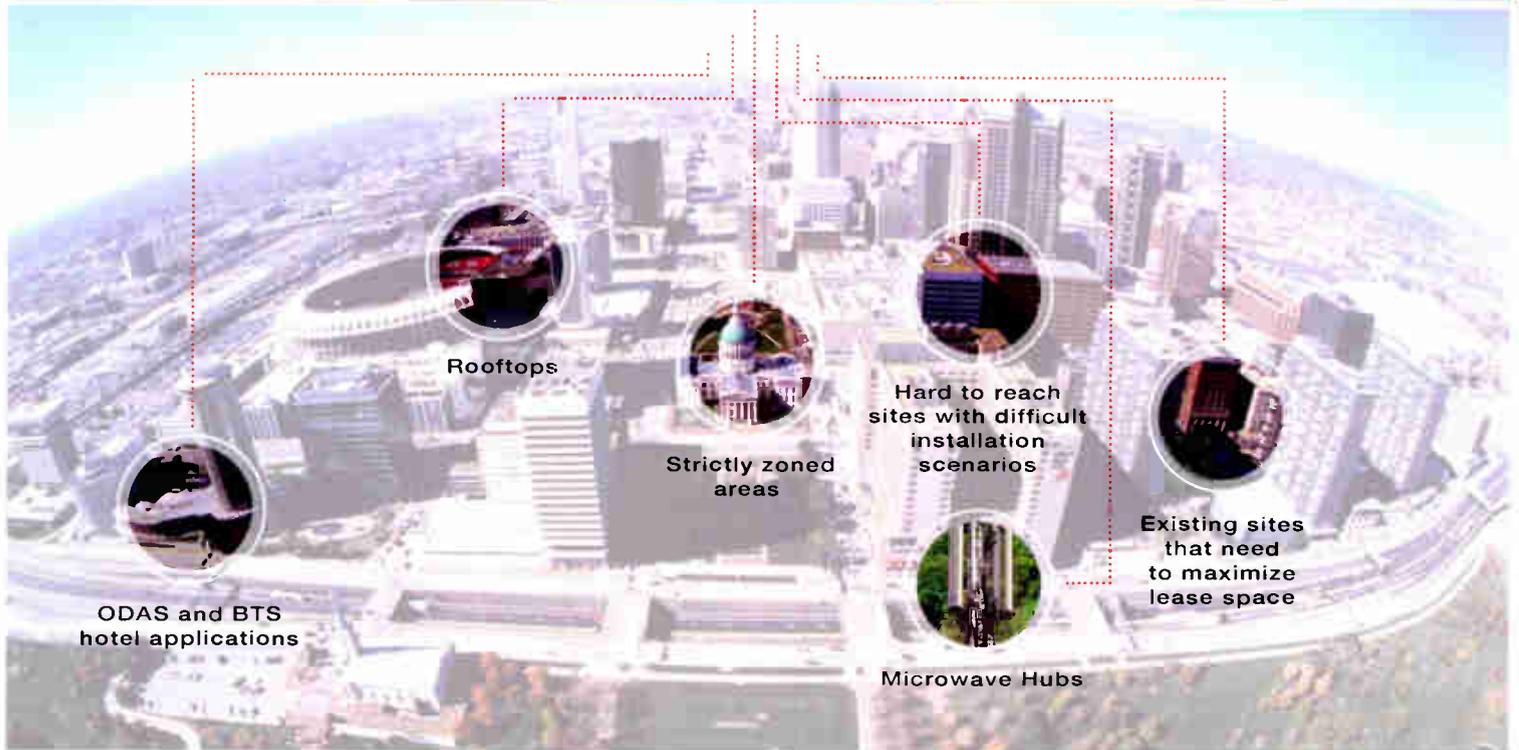
The backup power component of disaster preparedness is discussed (page 36) by **Sandra Saathoff**. Sandra is director of marketing communication for Spokane, WA-based ReliOn, where she has worked since 1999. Sandra holds a BA in Communications and English from the University of Oregon in Communications and a master's degree from Eastern Washington University. ReliOn provides hydrogen fuel-cell solutions to meet wireless and wireline telecommunication, utility and government customer backup power needs in applications between 500 W and 12 kW. Operators choose fuel cells when they don't like their current means of backup power because of the heat generated, the fuel that needs to be stored and the limited run time, and also environmental concerns. With a fuel cell, the run time is a matter of more hydrogen, not more batteries.



Proper application (location, location, location) of surge-suppression technology is covered this issue (page 40) by **Dave Rowley**, of Hayden, ID-based Transtector Systems. Dave holds a degree in electrical engineering from the University of Idaho. He has been involved with the design and application of power-treatment devices, and power-quality issues, for over 20 years. Dave is responsible for the regulatory compliance of the products developed by Transtector. He also conducts college-accredited courses for RO Associates, covering such topics as grounding and power quality. So remember, we may test you on this material.



This month's DAS forum contribution (page 24) comes from **T. Scott Thompson, esq.**, a partner with David Wright Tremaine in the law firm's Washington, DC, office. Scott represents cable, telecommunications and wireless operators in their dealings with local regulators, including local franchising; access to public rights-of-way; and wireless deployment and siting issues. Scott spoke at the DAS Forum Seminar and Case Study on Jan. 18, 2007, and the information we offer in this issue derives from that presentation. Scott's experience with contract negotiations, litigation and regulatory rulemakings regarding access to poles, conduits and easements; and access to inside wiring and premises makes him uniquely qualified to offer advice related to DAS. You can look for Scott at the CTIA/Tower Summit, where he often participates as a speaker at panel sessions.



**WHAT'S NEXT!**

\* VersaFlex shown without sliding doors for clarity.

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# Fascinating Feedback

We get a lot of praise and encouragement for our work on this magazine, but feedback regarding two articles in the February/March issue contained mixed reviews.

## Details in the 'Diary'

Anthony Peyton's "The View from the Top: Diary of a Climb" was avidly read



by those whose daily routine takes place in cubicle space, rather than in vertical space—which was our intention. We wanted to give non-climbers a little thrill ride into the world of climbers involved with tower construction, instal-

lation and maintenance so they could better appreciate the physical risk involved.

Readers who do these activities for a living, and are more accustomed to straightforward, technical "how to" articles than creative writing, found our romanticization of their work a little jarring. They seized upon many details in the story and sort of missed the overall point we were trying to convey to the people they work for: It's dangerous up there.

We are not the industry's safety magazine. (NATE's *Tower Times* pretty thoroughly covers that topic.) We intended the article to be a "story" about the folks who work with towers "hands-on." (Most AGL readers are hands-off.) We believe the piece was appropriate. Don Bishop's column (page 10) clarifies a few points within the article.

## Rooftop rumble

The second controversial article was "Queens Co-op Imbroglia Sires City Regs, Liability Focus" by Don Bishop. We were a little surprised by some negative

comments about the article. The question is: Did we let some details and assertions get a little far off base?

We chronicled the situation and story of one person. Yes, it was a one-sided article. I pointed that out in this column in that same issue. You simply cannot report some stories "objectively" if all parties to a controversy are not forthcoming. History—and journalism—is shaped by those who have something to say. We simply found it a compelling and interesting story with implications for our industry. (For those of you who want to know the status of new rooftop-siting laws in NYC, drop me an email, and I'll send it to you. It's a good read.)

Notwithstanding criticisms of bias in our article favoring the site owner, many readers responded with their own horror stories of working with carriers and did a little venting. We'll share some of the letters we've received in the May/June issue.

## Onward and upward...

A proposed FCC rules change would dramatically transform AM-detuning requirements. I've been participating with an ad hoc group, organized through the National Association of Broadcasters, that is seeking to create a rule that would incorporate *all* towers (not just those constructed for use by cellular and PCS folks). In short, the proposal would increase the complexity of the analysis applied to towers in proximity to AM stations while greatly reducing the number of in-field measurements required. It really looks like a win-win situation to me. I'll be supporting it heavily, and we'll run an article on it, probably in our July issue on siting challenges.

## Show time

The CTIA show (incorporating Tower Summit) takes place at the same time as the IWCE show this year. Nevertheless, we'll have staff at both shows. Whether you see us there or want to get in touch by email or telephone, please tell us what topics would be helpful to you if they appeared in AGL. **agl**

by Rich Biby, Publisher  
rbiby@agl-mag.com

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## PUBLISHER/CEO

Richard P. Biby, P.E.  
rbiby@agl-mag.com

## EXEC. EDITOR/ASSOC. PUBLISHER

Don Bishop  
dbishop@agl-mag.com

## MANAGING EDITOR

David A. Keckler  
dkeckler@agl-mag.com

## ART DIRECTOR

Scott Dolash  
sdolash@agl-mag.com

## ADVERTISING MANAGERS

Mercy Contreras  
mcontreras@agl-mag.com

Mary Carlile  
mcarlile@agl-mag.com

Phil Cook  
pcook@agl-mag.com

## CIRCULATION MANAGER

circulation@agl-mag.com

## CORPORATE OFFICE:

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# Free Climbing

Anthony Peyton used the words “free climbing” in the February/March issue. He asked us to publish the following clarification statement to make it positively clear what he meant when he used those words:

“My definition of ‘free climbing,’ as I used it in my article, ‘View From the Top,’ includes the use of an 8-foot fall-arrest lanyard, a full body harness and associated tower attachment hardware. ‘Always attached’ is our practice. To this veteran climber, the term ‘free climb’ is used to



refer to a tower that has no fall-arrest climbing ladder or 3/8-inch wire to use with a braking device in the event of a fall,” Peyton said.

Peyton sent me a copy of his OSHA 200 for 2006 and a copy of his HazCom (hazard communication) manual that he developed in 1996 with a senior OSHA contractor, Robert Buntin. It has yearly updates that he provides to his customers. He teaches and practices the use of “always attached” on double-signed, in-service training records for inspection.

“There is a difference in safety when the team leader leads by example and is certain a man can climb and work safely,” Peyton said.

With the diversity of installation, maintenance and modification work for which he has hard data, Peyton’s insurance-related experience modification rate (EMR) rating is 0.8. The EMR determines the workers compensation premium rate an employer pays; an EMR below 1.00 indicates that the employer will pay premiums below the manual rate.

by Don Bishop, Exec. Editor  
dbishop@agl-mag.com

10 above ground level

Peyton’s article was freshly published when I attended the National Association of Tower Erectors convention in Nashville, TN, during the week of February 12. During the convention, a federal official said he noticed the article and suggested maybe a disclaimer about free climbing was called for. An insurance expert who read the article suggested that free climbing could have implications for policies covering risks associated with towers and contractors.

Meanwhile, one convention-goer told me that, to his way of thinking, there are too many tower-service companies. “Too much competition keeps prices low, constricts profits and limits wages paid to tower hands,

leading sometimes to safety shortcuts. The answer is more regulation that would limit competition,” he said.

Along with NATE’s national safety partnership with OSHA comes a partitioning between companies that can cite their participation in that partnership and those that can’t. The partnership doesn’t rise to the level of regulation, but it may discourage some customers from doing business with tower service companies outside the partnership.

Otherwise safety-conscious tower service companies still could compete, and ought to be able to compete, based on their documented practice, safety record, EMR rating and other evidence of care taken to ensure the safety and health of their workers. **agl**

## Picture of the Month:



A McDonald’s restaurant near the NATE convention sported a self-supporting rooftop tower bearing the call letters of a faux radio station, WMAC. Get it? Big Mac hamburger? Anyway, legendary radio station WSM, home of the Grand Ole Opry, has several studios nearby. The restaurant probably intended to capitalize on WSM’s fame. The 50,000 W, 650 kHz WSM transmitter uses a rare Blaw-Knox tower that one of the convention participants we interviewed, John Hettish (more, next issue), has climbed a number of times. The 1 W, 150 MHz McDonald’s transmitter uses a headset to talk with drive-in customers. All this is not much justification for naming this photo the Picture of the Month. You could do better. Send us your pictures.

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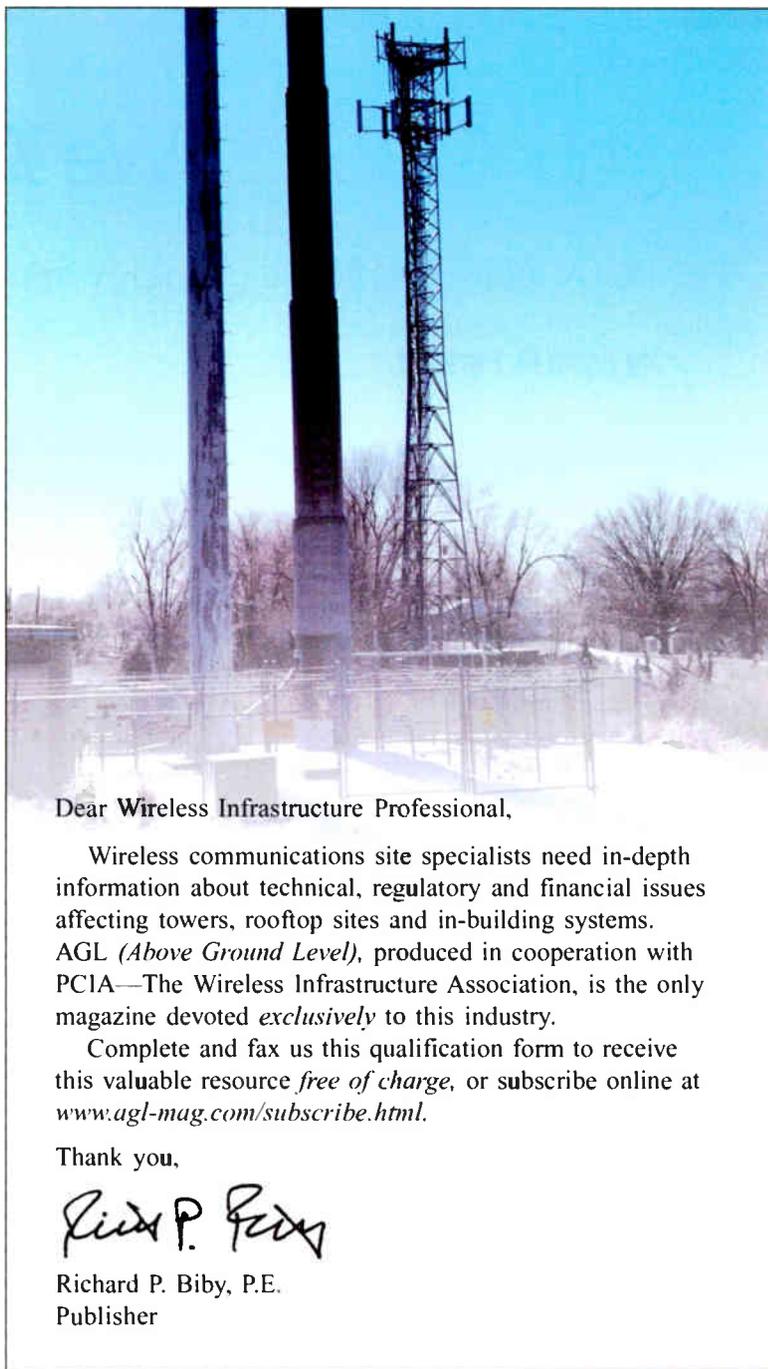
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**APRIL 07**

# You Asked... We Answered

PCIA addresses new technology applications echoing its NABER roots.

by **Anne M. Perkins**

A new age of technology brings a new age of radio dealers. The land mobile radio (LMR) marketplace of today is different from that of years before. The advent of digital technology has encouraged the adoption of new and improved products designed to enhance the LMR marketplace.

Recognizing the changing marketplace, many of the radio dealers upgraded their systems and services to serve the customers of the future. The problem was that there was no association standing ready to serve the LMR dealers of tomorrow.

At least there wasn't until now.

Earlier this year, PCIA—The Wireless Infrastructure Association launched a new membership group, the Commercial Radio Alliance (CRA) to serve the needs of these dealers of tomorrow.

The dealers asked and PCIA is answering. Why is PCIA answering? PCIA has a long history with the dealer community. This history stems from PCIA's original merger with the National Association of Business and Educational Radio (NABER) nearly 13 years ago. It continues today through PCIA's frequency-coordination business and advocacy on behalf of this industry in regulatory proceedings.

Although years ago there were many organizations designed to serve the needs of the radio-dealer community, that is simply not the case today. No one is currently serving their needs. To serve this unfulfilled need, PCIA decided to return to its roots, stepped in and created the CRA, an organization committed to serving the needs of the dealers. To that end, PCIA will work with CRA to prepare educational workshops for the members; to help formulate advocacy positions to present to the regulatory bodies on issues affecting the industry;

and to provide an overall support mechanism for this underserved industry.

The CRA was officially launched at the 2006 IWCE show in Las Vegas. At the show, PCIA hosted a meeting on behalf of the CRA to address the purpose and proposed course of action for this new group. Those dealers that attended the meeting asked for a neutral forum to discuss business growth opportunities; to formulate an industry best practices guide for solving problems unique to this industry; and to discuss issues that are important to the mobile communications industry.

The initial meeting provided an opportunity for the various industry participants to identify their needs and to ascertain what a membership group, such as CRA, can do best to serve them. First and foremost, they identified three significant needs moving forward: growing their businesses, sustaining their businesses and exploring new technologies. The world of 13 years ago no longer exists, and there are new arenas for the dealer to operate in, such as information technology and Wi-Fi. As new technologies emerge, the dealer for tomorrow must understand the technology, be able to implement the technology and then make it a household name.

To achieve this goal, the CRA is working with the folks at IWCE to co-sponsor a dealer day at IWCE 2007. IWCE is featuring a day devoted to the radio-dealer community with two workshops focused on best practices for dealers and new technologies to better serve the customers of tomorrow. The best practices session is a roundtable discussion wherein dealers can share their ideas and suggestions with one another. The new technologies workshop highlights the new technologies that will impact your business and how you can

become better equipped to incorporate these new technology opportunities into your business. This workshop will be a wonderful networking and educational opportunity for the dealer community.

CRA, the forward-looking membership group for the LMR community, has a positive outlook for the future. Moving forward, CRA will have sessions at the annual PCIA Wireless Infrastructure Show and will continue to work with the folks at IWCE to bring you the type of program that will be critical to the continued development and success of your businesses.

If you are a company that is: a provider of two-way radio, paging, messaging, mobile data, design, integration and other network services; an owner or operator of repeaters, SMRs, antenna or tower sites, private carrier or paging systems; a license-preparation firm; or a related equipment manufacturer, you are eligible to be a member of the CRA.

The CRA is dedicated to serving the needs of the LMR community for the future. The technologies of the future are rapidly changing, and it is critical for the commercial radio dealer to be at the forefront. CRA will make this happen. It is an organization for and by the community. Come be a part of it! **agl**

---

Perkins, who is also a lawyer, is manager of Industry Affairs for PCIA.

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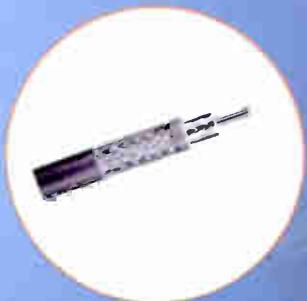
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# 'Convention-ing We Will Go'

by R. Clayton Funk

In the middle of getting his senior-credit facility lined up, the wireless industry's biggest event—"The Annual Convention"—comes up, and "Johnny Multiple," as he does every year, makes plans to attend for two days.



With the convention being held in Orlando this year, Johnny is a little bummed out as he finds trade shows in Las Vegas to always be incredibly entertain-

ing and distracting. But, with a cheerful demeanor and while whistling "Zip-A-Dee-Do-Dah," Johnny lines up his flight plans and accommodations, and he calls many of his friends and colleagues in the tower industry in hopes that they will be able to get together while at the convention.

Johnny approaches any convention as the best way to do business with multiple people in one setting. Is it physically draining to be out past midnight with customers and up for breakfast meetings with vendors? Absolutely. Is it mentally draining to be talking business every minute of every waking hour with little down time?

Totally.

But is it the best use of Johnny's time and money to be at the one destination where nearly everyone in wireless attends to network, strike deals, gossip and catch up?

Completely.

## Day One

Johnny's schedule is packed from the beginning. After landing, Johnny hops into a cab and checks into his hotel, conveniently located across the street from the Duckmarsh Convention Center.

After throwing his bags in his room

and scouring the lobby for familiar faces, he buzzes over to the convention center to register, getting his name badge, exhibit hall pass, conference schedule and canvas bag where he plans to stuff all kinds of exhibit floor trinkets and goodies. Opening the schedule, Johnny sees a couple of sessions he wants to attend and bolts back to the hotel to meet his buddies, "Steve Strobelight" and "Carl Candelabra," for lunch.

During lunch, they kibbitz about various industry gossip, and Johnny learns that a new carrier may be launching service in the "State of No Zoning" if they can get an affiliate to buildout the license. Johnny, with visions of multiple tower leases dancing in his head, heads to his meeting.

His first investors in "TCF Tower Company," "Peter Privatequity," "Irene Investor" and "Freddy Fundraiser," have invited Johnny to their suite at the Duckmarsh for a meeting to catch up. While it is great to see his original financial partners, Johnny learns little that will benefit his current tower company other than the fact he wanted to maintain a good relationship with his previous investors.

Johnny's next meeting isn't until a cocktail reception sponsored by his original lender, "SHPO Bank & Trust," and so he hits the show floor for a couple hours.

Walking from booth to booth, Johnny is amazed at the talent on the show floor. From the magician at one booth to the duo singing at another booth, every year Johnny is stunned at the amount of money spent by various exhibitors at the show. After two hours, his canvas bag is stuffed with foam balls, chocolates, breath mints, pens, pads of paper and yo-yos for his kids.

Johnny retreats to his hotel, but all of the sudden starts running into people he knows or has met before. He gets

cornered by his former staffers "Larry Lattice," "Gloria Guyed," "Sally Selfsupport" and "Monty Monopole," all of whom are now working for "800-Pound Gorilla Tower Company." After talking with them for several minutes, Johnny sees one of the brokers who tried to get his business, "Fast Talking Freddy" from "Flat Fee Financial."

Getting an "I'm busy" acknowledgment nod from Freddy (because Freddy's on his Bluetooth phone), Johnny then sees the engineers from "Will We Be Around in One Year Wi-Fi" and stops them for a conversation. He learns, to his delight, that they are likely selling to a larger carrier and will have more money next year to deploy more sites where Johnny owns towers.

Johnny finally gets over to the cocktail party, being held at the convention center, and spends a few minutes catching up with "Debbie Debt," the vice president he worked with before at the bank. She mentions that she would welcome the opportunity to partner with his new tower company and investors and that his investment bankers, "Ethical Experienced Intermediaries," should give her a call.

Johnny finally heads back to the hotel to freshen up before dinner. As he walks into the lobby he is stunned at the amount of activity going on around him. He immediately recognizes several folks including the buyers from "Big Boca Communications," "Tiara Towers" and 800-Pound Gorilla Tower Company. He sees again his previous investors and former staff members that he had to layoff when times got tight at "20x TCF Tower Company."

*What an orgy of networking!*

Johnny wishes he had time to say hello to everyone but he has to get ready to meet "Ernie Engineer," his main contact at "Perfect Coverage Wireless," his best customer and original anchor tenant on all of his tower sites.

During dinner over a big slab of dead cow and multiple glasses of red wine, Johnny learns from Ernie that Perfect Coverage will spend a ton of money improving their network all over the country this year. Johnny is beyond excited as he sees more and more dollar signs floating in front of his eyes.

After dinner, while out at the "Crazy Mustang Saloon," they run into the RF engineers from Plural Coverage Wireless and "Walk Push-to-Talk." "Randy Radiofrequency" from Plural Coverage says that their parent company not only plans to merge with a large partner but that in addition to changing their marketing name to "AAA Wireless" they will spend significant amounts of capital building out 3G. "Ricky Radcenter" from Walk Push-to-Talk boasts the same, despite his company's efforts to combine two vastly different networks.

Whether from the multiple cocktails, entertainment at the bar or from a long day of meetings and travel, Johnny's vi-

sion is again filled with spinning "\$\$\$" as he hits the bed, well after midnight.

#### Day Two

Johnny's alarm and wakeup call actually sound at the same time, and he gets up to meet his investors, Flush With Cash Capital, for breakfast. "Ivan Irr" and "Betty Boardmember" are there at 8 a.m. to meet Johnny as he gets to his investors' suite for the meeting. Filling Ivan and Betty in on his discussions from the previous evening, they all agree that the conference has been a great use of Johnny's time and the company's money.

Johnny leaves the meeting and hustles over to the convention center to make the only session he wanted to attend. After getting a quick update on the merger-and-acquisition environment,

Johnny's head is still pounding as he waits in the 50-person cab line in front of the hotel to heads back to the airport. Whether from the previous evening or from trying to figure out how much money he will make if he sells after getting all the potential new revenue on his towers, Johnny leaves The Annual Convention knowing it was the best use of his time.

Stay tuned as the latest developments from the conference affect Johnny's business going forward as he continues to focus on a profitable exit for himself and his investors. **agl**

Funk is managing director of Media Venture Partners, San Francisco. His email address is: [cfunk@mediaventurepartners.com](mailto:cfunk@mediaventurepartners.com).

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# Tying Drug Testing to Injury Reduction

by David Saul, AAI

From international corporations to small local companies, those that test for drugs appear to be successfully reducing workplace injuries, according to a new Cornell University study.



“While drug testing is controversial, the study provides useful data on a readily measurable outcome,” said its author, Jonathan Gerber, a May 2000 graduate of Cornell’s School of Industrial and Labor Relations.

The study was part of Gerber’s three-year independent research project. Robert S. Smith, ILR Professor of Labor Economics, served as adviser to the study, which has caught public attention and is pending publication in a national journal.

In the past 15 years, drug testing in the U.S. workplace has gone from ground zero to widespread employer acceptance. In 1983, less than 1 percent of employees were subject to drug testing. Today, about 49 percent of full-time workers are subject to some form of workplace drug testing, according to the Substance Abuse and Mental Health Services Administration, a division of the U.S. Department of Health and Human Services.

This growth is particularly evident within the construction industry. High rates of drug and alcohol abuse in the industry, coupled with the high-risk, safety-sensitive nature of the industry for workers and the general public, have prompted many companies to implement a variety of safety strategies, including drug testing.

In his study, *An Evaluation of Drug Testing in the Workplace: A Study of the Construction Industry*, Gerber proposed to test how effective drug-testing

programs at construction companies were in making the workplace safer.

Gerber developed a survey that he sent in December 1999 to a randomly selected national sample of officials at 405 construction companies. Officials at 71 companies responded. Gerber examined the data on injury incident rates and workers compensation experience-rating modification factors compiled over a five-year period and supplied by National Council on Compensation Insurance.

On average, those companies in the study sample that tested workers and job applicants for drugs experienced a 51 percent reduction in injury rates within two years of implementing a drug-testing program, compared with only a 14 percent decline in injury rates in the average construction company in general during the same two-year period.

Specifically, the injury rate at construction companies that tested for drug use dipped from 8.92 incidents per 200,000 work-hours before the drug-testing program was put into place to 4.36 incidents afterward.

Drug testing is most effective in reducing workers compensation experience-rating modification factors in the first three years following the implementation of a program.

The vast majority of respondents, whether or not their companies tested for drugs, believed substance abuse was a “moderately serious problem” in the construction industry. However, most believed workplace drug and alcohol abuse dropped between 1994 and 1999.

Seventy-two percent of the respondents at companies with drug-testing programs in place said they believed the benefits of drug testing outweighed the costs.

Respondents generally believed that their company’s drug-testing programs had had a positive impact in virtually every respect. They cited better overall safety of the work

environment, reductions in workers’ compensation costs and improved quality of job applicants.

The No. 1 reason why officials at the construction companies surveyed tested employees and job applicants for drugs was to promote worker and customer safety. Respondents believed that drug testing contributed positively to a company’s image and was an effective deterrent to workplace drug abuse.

The No. 1 reason why some employers did not test employees and job applicants for drugs was concern of increased legal liability. Other reasons: high cost and restrictive state legislation.

The study also revealed that larger companies were significantly more likely to test workers for drugs and alcohol. That finding suggests small firms are particularly vulnerable to substance-abuse problems, as drug users may intentionally seek out employment at companies where their substance abuse is not likely to be detected.

While the study’s results are interesting and suggest that further examination of the subject is warranted, “People should bear in mind that the data used [in Gerber’s study] were from firms willing to participate,” said Smith, Gerber’s adviser.

## Manage your risk when hiring

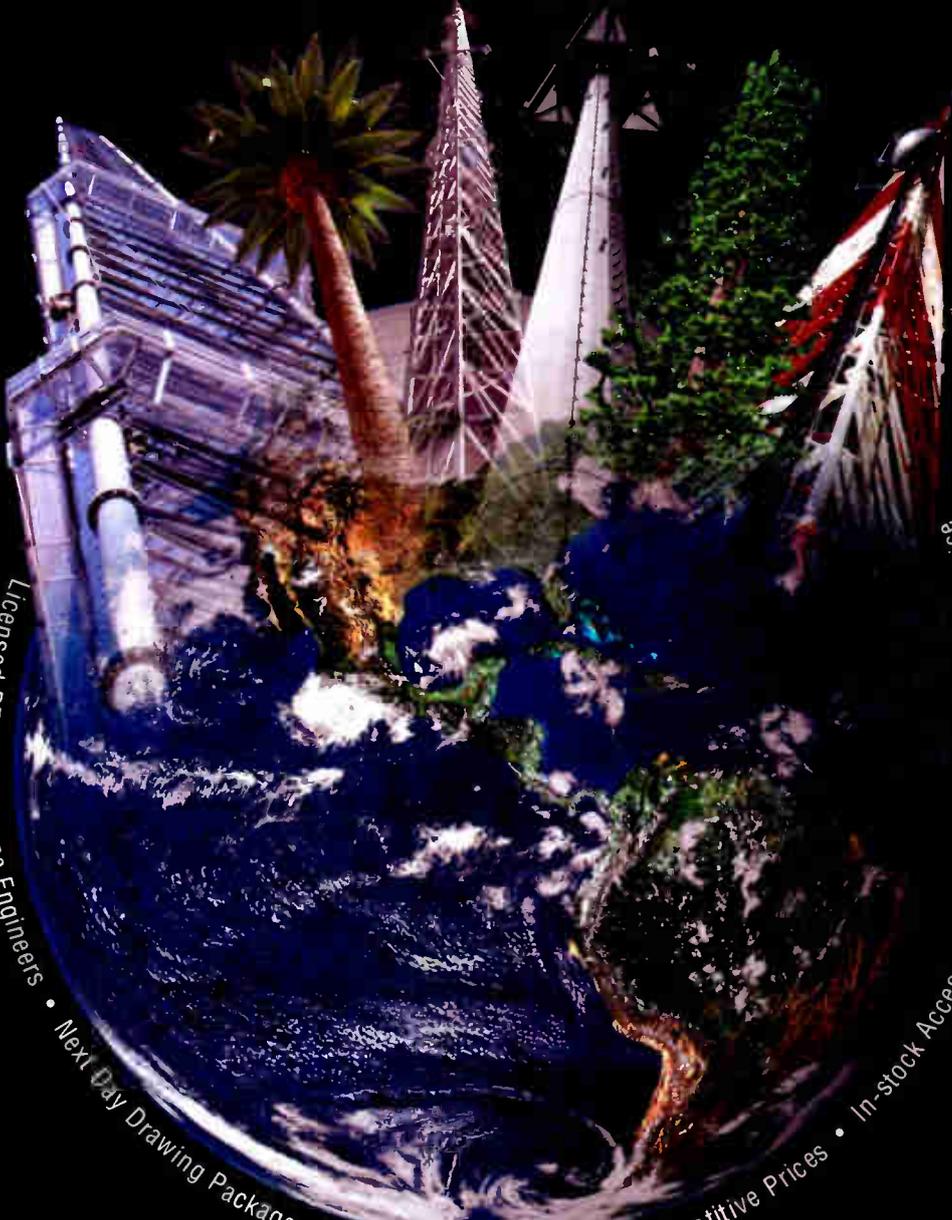
As this study indicates, the positive effects of a drug-free workplace policy are many and it all starts with proper screening of job applicants and periodic random testing of employees.

Ensure that when you hire a construction company, they have implemented a sound drug and safety program. **agl**

David Saul is vice president of Atlantic Risk Management, Columbia, MD, and an accredited advisor in insurance (AAI). His email address is: dsaul@atlanticrisk.com.

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# Lead-acid Batteries Carry Reporting Onus

Use batteries all you want for backup power, but report the amount you use to the authorities to meet public-safety regulatory requirements.

by Julia Custer

After following a lengthy process to comply with the FCC's NEPA (National Environmental Protection Act) regulations, telecommunications companies may believe they are above reproach from environmental agencies. Then the Environmental Protection Agency (EPA) slaps them with a multimillion dollar fine for failure to disclose backup batteries used at their tower sites.

This scenario was all too real for GTE Telecommunications, which merged with Verizon Wireless in 2000. According to EPA, GTE was fined \$3 million for misreporting battery storage at more than 300 tower sites in 1998.

GTE is not alone. In the past 10 years, EPA reports that 17 telecommunications companies have been fined for violations related to their backup power sources at more than 600 sites tower sites under the Emergency Planning and Community Right-to-Know Act (EPCRA).

The need to comply with EPCRA can be triggered at telecommunications

sites by the use of lead-acid batteries as backup power sources. EPCRA has set a threshold planning quantity (TPQ) for sulfuric acid of 500 pounds.

EPA estimates that a typical lead-acid battery contains 5 pounds of sulfuric acid. Therefore, under EPCRA, sites with more than 100 batteries are required to report these quantities to the state emergency response commission (SERC), local emergency planning committee (LEPC), and the fire department with jurisdiction over the facility.

Switch stations and backup power systems often have significantly more than 100 batteries stored onsite, especially in remote areas. In the case of GTE, 314 of their sites had more than 500 pounds of sulfuric acid. EPA doesn't levy a light fine either; the maximum civil penalty for failure to report under EPCRA is \$10,000 per violation, per day.

#### About EPCRA

Congress enacted EPCRA in 1986

as a stand-alone Act within the Superfund Amendments and Reauthorization Act of 1986 (SARA). The impetus was a December 1984 release of a highly toxic chemical from a U.S.-owned Union Carbide Corporation plant in Bhopal, India, which killed thousands of people.

That incident was followed less than a year later by a toxic release from a West Virginia chemical plant. EPCRA provides for emergency planning and notification that enables states and communities to prepare and respond to emergency releases of hazardous substances, imposes reporting requirements, and imposes civil, criminal, and administrative penalties for reporting violations.

EPCRA has two main parts. One part requires businesses to report releases of certain toxic chemicals for public information, and the second requires businesses to report the quantities and types of toxic chemicals stored onsite.

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Specifically, reporting the storage of batteries (and diesel/propane/gasoline) at telecommunications sites is a responsibility of site owners under Hazardous Chemical Reporting - Community Right-to-Know (40 CFR 370); also known as EPCRA Section 311 and Section 312 (or Tier I and Tier II).

**Filing details**

Under section 311 of EPCRA, if a facility stores a certain threshold quantity or more of any "hazardous chemical" as specified in the HazCom Standard, then it must submit either the material safety data sheet (MSDS) or a list of the hazardous chemicals to the LEPC, SERC, and the local fire department.

Federal regulations require that a facility submit an MSDS to the SERC for each hazardous chemical present at a facility at any time during the previous calendar year in amounts equal to

or greater than 10,000 pounds (or 4,540 kg). The same must also be done for Extremely Hazardous Substances (EHS) present in an amount greater than or equal to 500 pounds (227 kg) or the TPQ, whichever is lower.

Under section 312 of EPCRA, the owner or operator of any facility which is required to prepare or have available an MSDS for a hazardous chemical under the HCS must annually submit an inventory form to the SERC, the LEPC, and the local fire department, if any of the chemicals meet or exceed established threshold quantities.

In addition, EPA has clarified that for telecommunications companies leasing part of their site to other tenants, the operator of the facility must calculate the aggregate amounts of each hazardous chemical from all tenants to determine whether the reporting limit has been triggered.

In addition, tower owners who

lease tower sites but do not have their own telecommunications operations are still legally responsible for reporting those hazardous chemicals stored at the site in quantities over the EPCRA limits.

Batteries will remain a popular backup power source at telecommunication tower sites and switch stations, and EPCRA does not restrict the number of batteries you can use on site. Site owners and operators must be aware of EPCRA reporting requirements or risk significant fines. Of course, reporting under EPCRA needs to be done right, but does not have to be particularly onerous or expensive. **agl**

Custer is an environmental regulatory specialist and telecommunications program lead with Archer Inc. She can be reached at [jcuster@archerinc.com](mailto:jcuster@archerinc.com) or 410-897-9100, ext. 101.

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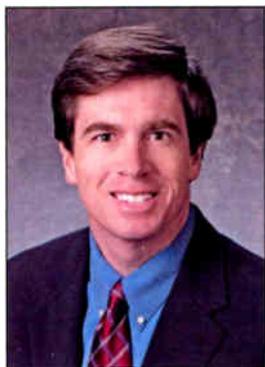


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# Mechanic's Liens: Use Them or Lose Them

by Vincent F. O'Flaherty, esq.



I routinely receive calls from tower contractors seeking legal help in getting paid for work performed and materials supplied. I will ask early in the conversation whether a mechanic's lien has been considered. Mechanic's liens are often an overlooked payment resource.

A typical fact pattern involves a client from one state, (say Illinois), who has done subcontract work for a general contractor from a second state (suppose Maryland), on a site in a third state (i.e. Texas) owned by a tower company in the fourth state (assume California). The Illinois subcontractor's sales manager has called and emailed the Maryland general contractor for three months trying to get an \$18,000 invoice for labor and materials paid. There have been promises of payment once the Maryland general contractor gets paid by the California tower company. The matter has dragged on too long, and now the Illinois company turns to its lawyer for help. Everything gets much more complicated if instead of one site there are 10 sites in 10 different locations.

Enter the lawyer and the mechanic's lien. Mechanic's liens provide security and a form of payment for an otherwise unsecured obligation to pay. Mechanic's liens are a charge against real estate and improvements. In most cases, towers

and their equipment are treated as real property under the mechanic's lien laws. If payment is not made, a mechanic's lien can be foreclosed, like a mortgage, for payment. Unsuspecting tower owners do not like their towers and real property being foreclosed. As a result, mechanic's liens often provide incentive for slow paying contractors to bring obligations current.

Mechanic's liens require careful and timely review of state law. Each state has different deadlines, procedures and requirements to understand and follow. Failure to timely file and secure a state's lien rights will result in forever losing this payment tool. While each state has its own distinct rules, some general concepts applicable to all mechanic's liens can be identified early to protect your rights to payment.



You will increase your payment prospects and avoid costly uncollectible receivables by knowing, and protecting, your company's mechanic's lien rights. These six key questions should be asked on every job in advance of providing work and material:

1) In what state will our work be per-

formed and materials supplied?

2) What is the legal address, city and county for the tower? Any mechanic's lien, if filed, will be filed in the local county. It becomes difficult, if a filing deadline is approaching, to protect one's mechanic lien rights if the purchase order and invoice only describe a tower generally by a customer's reference. At a minimum an address, and not a P.O. Box or town, is necessary for the lien.

3) What pre-lien notice requirements are there in the state where the tower will be located? Many states require certain notice to be given before work is performed to have a valid lien.

4) Is my company a general contractor or subcontractor on this project? Different time deadlines and requirements apply to general contractors and subcontractors in most states.

5) Is the end user and tower owner a public or private entity? Lien rights usually do not exist on public projects.

6) What are the time requirements in this state for filing liens?

Mechanic's lien laws are there to protect you, the hardworking, honorable contractor to get paid. They are meant to be used in the right circumstances. Failure to know and use mechanic's liens can often leave you

holding the bag trying to chase a customer 1,000 miles away. **agl**

O'Flaherty is of counsel with Spradley & Reismeyer, P.C., Kansas City, MO. His [www.towerlitigators.com](http://www.towerlitigators.com) website also addresses tower legalities. Email him at [voflaherty@spradleyriesmeyer.com](mailto:voflaherty@spradleyriesmeyer.com).

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# Case Study: Arizona Nevada Tower

Using revenue from prior transactions, a small tower company finances additional construction and builds its business.

by Jarred Saba

*Synopsis: Small tower companies often find it difficult to obtain loans with reasonable terms from a traditional lender, and many tower owners resort to selling off their existing towers to get capital. The Arizona Nevada Tower Corporation (ANTC), however, did not have to go this route.*



*The company grew its portfolio from four towers to eight towers along an underserved highway in Nevada with the help of Wireless Capital. The partnership of these two companies has brought ANTC opportunities for long-term wealth and reinvestment.*

The Arizona Nevada Tower Corporation (ANTC) faced several challenges in acquiring funding to build additional towers in rural Nevada. Having personally funded the construction of ANTC's first four towers, ANTC President George Peel wanted to build additional towers, but he was unable to obtain adequate financing. ANTC needed a telecom-savvy debt partner to assist in the challenging task of furthering its business potential.

Mr. Peel started ANTC in 2003 with the goal of building towers in rural areas. At the start, he used his private funds to finance his business venture, but he did not have adequate funding to build the number of towers that he desired. ANTC faced two main challenges. First, its loan application was rejected by the Small Business Administration (SBA) because the towers were on federal land, owned by the Bureau

of Land Management. These sorts of transactions fell outside of the SBA's guidelines because there was no recorded fee interest. Second, Mr. Peel was aware that he would have difficulty getting a loan from the bank because the cashflow from telecommunication towers tenant leases are cancellable assets and therefore not a risk that traditional financial institutions are interested in undertaking.

In February 2005, Mr. Peel was referred to me by his broker. Together, we set about the task of maximizing the value of ANTC's cell tower leases.

Using the ANTC's current tenant lease income as collateral, Wireless Capital was able to close a Non-Recourse Loan amount exceeding \$500K within 90 days of ANTC's initial contact. The capital from this transaction made it possible for ANTC to build four additional towers.

"We now own eight towers and currently hold the rights to build an additional five. Our business plan is to have fifteen towers by the year 2007," said Mr. Peel. With the debt partnership of Wireless Capital, ANTC has a virtual monopoly along Highway 95, providing the much-needed coverage along an otherwise underserved highway.

The economics of the tower business are such that, usually, two tenants on a tower will cover the financing, maintenance, utilities and taxes. The key to financing cancellable tenant leases is to find a debt partner willing to advance funds, using solely the tower cash flow as collateral.

Using one tower to finance the building of another tower allowed ANTC to expand its portfolio while not having to use or pledge Mr. Peel's personal assets. Further, ANTC did not have to give up the upside of future co-location revenue.

These transactions can best be characterized as a domino effect of profitable business dealings. Using the revenue from ANTC's first transaction, ANTC was able to finance the construction of four more towers. By leveraging the newly built tower, ANTC was able to construct four additional towers, and so on and so forth. This domino effect virtually provides ANTC with a limitless supply of capital for future transactions. Each transaction ANTC completes with Wireless Capital not only expands its growth potential, but also diversifies ANTC's risk, thus creating a more securitized asset. With three to four tenants on each tower, ANTC will have maximized the telecom potential on an otherwise underserved highway.

We work to remain available for ANTC to advance capital when needed. For ANTC to build additional towers, they need only make a quick call, complete a minimal amount of paperwork and they are all set to receive funding. ANTC has now completed three additional transactions totaling well over \$1 million, and the company has turned the funding provided into endless opportunities for future long-term wealth and reinvestment.

Wireless Capital helped ANTC achieve their goals through creating innovative strategies to meet the company's specific needs. This partnership and friendship has propelled ANTC into a future of growth and has allowed it to succeed in monopolizing an otherwise untapped market. **agl**

Jarred Saba is vice president of the Tower Lending Group and the Corporate Finance Group for Wireless Capital Partners, Santa Monica, CA. You can email him at [jsaba@wirelesscapital.com](mailto:jsaba@wirelesscapital.com).



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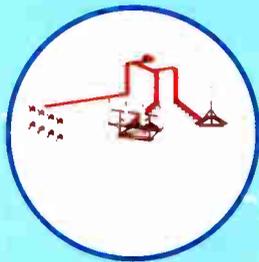
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# Legal Issues Facing DAS Deployment

by T. Scott Thompson, esq.

From a legal perspective, I find DAS exciting. It introduces issues that lawyers find interesting and operational types find frustrating. I hope I can overview the legal issues. A lot of these are where you have rights, and knowing them makes it easier for you.

There are three levels of legal issues: state, pole attachments and local issues.

**State** — What kind of DAS is it? Is the DAS a “carrier’s carrier,” or a self-deployment by a wireless carrier? Those two types actually raise different legal issues at different times. Sometimes they involve the same answers and the same rights, but sometimes not.

The “carrier’s carrier” raises more issues. As with NextG or Crown, typically a DAS is a telecommunications service like a traditional wireline carrier. You’re carrying traffic for someone else. As a result, there are some rights and some obligations. You’re probably regulated by the public service commission in each state. The state definition may require a certificate of public convenience and necessity (CPCN).

In the wireless carrier’s view, having to obtain a CPCN is something to be avoided. Yet, a CPCN brings with it some pro’s and con’s.

Among the pros is right-of-way and pole access. A CPCN isn’t required for right of way or pole access, but it may help. Among the cons are some regulatory burdens, but generally they are mild.

After the Telecommunications Act of 1996, regulatory requirements were streamlined, and the regulatory world for a DAS isn’t the regulatory world that the incumbent local exchange carrier (ILEC) deals with.

A lot of utilities and municipalities will ask, “Where’s your CPCN? Until you have one, we don’t have to deal with you.” Having a CPCN helps to establish your place in the world. I don’t agree with the opinion that it is required for right-of-way or poles, but you’ll hear it.

**Pole attachments** — The next issue is pole attachments. You’re going to be deploying DAS on utility poles and streetlights. You need pole attachment agreements from the utility. The good thing is that the FCC, pursuant to the Federal Pole Attachment Act, regulates rates as they apply to privately owned utilities. State- and city-owned utilities are exempt. Eighteen states and the District of Columbia have certified that they will regulate pole attachments; thus, the public service commissions there have jurisdiction. If not, the FCC has jurisdiction.

In 1996, the Act was amended to make clear that utilities have to give pole attachment access to cable operators and telecommunications providers. They can’t just say “no.” The Supreme Court clarified that this includes wireless, in the Gulf Power case. Utilities can’t say, “We don’t allow wireless attachments.”

There has been little action at the FCC on wireless pole attachment issues, but one thing they did come out with in December 1995 was a public notice reminding utilities of their obligation to give access to wireless. They cannot categorically refuse pole-top attachments. No one has taken this to the FCC yet. DAS providers can point to this. The FCC says you can’t just tell us “no” as a threshold answer about pole-top attachments.

Under the Act, rates, terms and conditions must be fair and reasonable. Since 1978, there is a lot of FCC decisional law about pole attachments on terms and conditions.

Rates are regulated by FCC or state formulas, based on the utilities’ costs. While the per pole rates vary based on the utility’s cost, they are certainly not hundreds or thousands of dollars per year. You can plug figures into the FCC formula and get the maximum rate.

For traditional wireline, the access space required is presumed to one linear foot. It hasn’t been litigated at the

FCC, but a wireless attachment may use more than one foot. But even then, the maximum lawful rate will be significantly less than what many people are being told. Many utilities claim that wireless is unregulated, and they get to charge market rates. The answer to that is “no,” it is a regulated situation, and they can’t charge hundreds or thousands of dollars per year for a pole.

**Local issues** — When it comes to deployment authority, there’s a traditional mechanism, a *franchise* and/or *permits* to deploy in rights of way. For example, in 1999 and 2000 when the competitive local exchange carriers (CLECs) were rolling out fiber, we would go into a city and they would say, “You need a franchise.”

We asked, “Where does it say that in your ordinance?”

“The cable company has one,” often would be the reply.

The cable company has to have one under federal law. In many jurisdictions, the CLECs have no franchise. Their deployment is conducted under a permit.

Local jurisdictions have the right to manage the public right of way, which can include construction and safety issues—when can you work in the street; when you open the street you have to place safety cones; the contractor has to be bonded, and so forth.

Ask the local authority how they treat the electric company and the ILEC: They need to have non-discriminatory, competitively neutral policies in relation to the right of way. I assure you that the electric utility is likely not being asked to do all the things that new DAS entrants are.

Section 253(a) of the Act prohibits barriers to entry. Ordinances that are overly burdensome have been held to be barriers to entry. Courts have looked at an ordinance and the application process and sometimes have ruled that they may be so burdensome as to rise to the level of a barrier to entry.

A second factor is the amount of

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**A utility pole may already be crowded with cross arms and wires that probably weren't subject to zoning. The addition of an antenna should not raise zoning issues. In this picture, the antenna is top-mounted in a radome. Photo courtesy of ADC Telecommunications and Phazar Antenna Corporation**

discretion granted to the authority. Unfettered discretion to choose among applicants has been held to be a barrier to entry. More about that later, as it applies to zoning.

The restriction upon deployment authority is not limited to right-of-way regulation. Sometimes cities argue it only applies to right of way. It does apply to wireless as a form of telecommunications. The ordinance and application process have to be competitively neutral. Typically they are not.

**26** above ground level

Another source of the right to deploy is found in state statutes that grant rights to telecommunications providers. Some statutes do not, but some are quite explicit. California has a statewide franchise for telecommunications providers to deploy. Cities are not allowed to require a telecom provider to get a franchise.

The State of Florida prohibits municipalities from requiring a franchise. That doesn't mean they can't have permitting, but a full-blown franchise, such as a 30-page document with

requirements, is not something a DAS operator should encounter in Florida.

Some states have adopted laws that grant rights to telecommunications providers that are important for the DAS operator to keep in mind. In South Carolina, for example, the statute limits the fees that a local jurisdiction can charge.

**Zoning of DAS**

The wireless industry is used to zoning for tower and monopoles. The question is, does zoning apply to DAS? It depends.

Many older zoning ordinances don't apply to installations in the right of way. The public right of way might be excluded. That's something to look at in the ordinance itself.

Is the DAS installation within the definition of a "tower"? Is the ordinance legal? They have addressed the interplay between the Communications Act and Section 253, and local zoning might violate it.

Should local zoning apply to DAS? I suggest that it should not. The deployment on existing utility poles should not trigger zoning considerations because the installation does not involve many of the concerns that may make zoning of a tower appropriate.

A crowded utility pole may already have cross arms and a transformer. Those probably weren't subject to zoning. The placement of a little antenna on the same pole should not raise zoning issues. Look at what is on the poles already. From visual and other standpoints, the antenna doesn't raise safety or aesthetic concerns. The fact that it is wireless should not raise other requirements.

A closing point to consider, the FCC has just issued an order that gives the ILECs quick entry into cable. According to the FCC, cable franchising is such a barrier to video deployment that if the city doesn't give them a franchise in 90 days, the FCC will let them go forward. I suggest that if the FCC is right about that, then the same time limit should apply for a DAS operator. **agl**

Attorney Thompson is a partner in the Washington, DC-based law firm Davis Wright Tremaine LLP.

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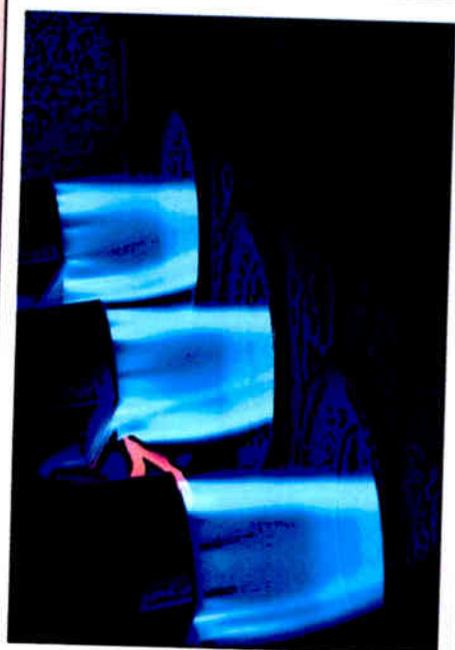
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# FUEL CHOICES

{ by Donald E. Koehler }



NATURAL GAS

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## SITE RELIABILITY AND ENVIRONMENTAL RESPONSIBILITY AFFECT BACKUP POWER SYSTEMS CHOICES BASED ON THE FUELS THAT KEEP THEM OPERATING.

---

**T**he need for—and the viability of—alternate-energy sources is a hot news topic for many industries, including telecommunications. Roller-coaster petroleum prices, related issues of consistent and dependable supply, and several new types of “green” fuels fill the headlines. What does this all mean for a site owner looking for either primary or backup power sources?

This new slate of energy sources may be good news for you, as a savvy site owner, if you want to increase reliability, save money or please your neighbors at urban sites. Whether for personal convictions, contract opportunities or PR purposes, you might want to become a “green” company.

Conventional users of off-the-grid or backup power for commercial sites seem to fall into two categories: those who use diesel gensets and those who don’t. Although the diesel motor-generator is a well-known and well-understood technology with a good support base, it does pose some problems. These include fuel storage and cleaning, problems with odor from fuel and exhaust, worries about spills and leaks, and noise. Another bottom-line concern is *waste-stream management*. More on that later.

Reliable alternatives to diesel motor-generators are becoming more common. You probably know about several of the alternatives—others might surprise you. First, a review of fuels, fuel storage and government regulations, noise, odor and waste-stream management for both urban and rural locations for these power sources. Some of these topics might seem tangential, but they all relate to real costs. If you have ever suffered through even a *small* fuel spill, you probably understand better than most that costs are not just monetary.

### Fuel-cell technology

Commercial fuel cells are online today, powering large and small facilities. In addition to electrical power, they provide hydronic heating for buildings and, in some cases, even provide the do-

mestic hot water for the facility. They run on gaseous hydrogen, at pressures ranging from 10 to 250 psig. When used with “reformers,” fuel cells can operate on natural gas, methane or petroleum. So-called “combined heat and power” (CHP) systems are readily available, and their use of waste heat makes the overall efficiency impressive. Waste heat, in conjunction with

absorption chillers, can provide for your equipment-cooling needs in one package. Relatively low maintenance demands, negligible noise issues and a small waste stream—in conjunction with compressed natural gas (CNG), natural gas or methane—make these devices attractive for urban sites where natural gas is readily at hand and CNG is a viable backup. More

about CNG advantages later.

#### **Thermal-electric technology**

Another low-demand power source, the thermal-electric generator (TEG), has been around for some time. Normally used to provide a steady direct-current feed for your onsite battery plant, TEGs are silent, virtually maintenance free and run on assorted fuels. Propane and natural gas are the most popular fuels for TEG systems. The waste heat is minimal, and the designs of some TEGs allow them to run on waste heat from other processes. Remote sites with access problems may derive the most benefit from TEG units. Once-a-year refueling and minimal maintenance make for a happy site operator. Nevertheless, if you have a large or erratic power demand, extremely cold locations or require automatic redundancy, a TEG unit might not be your best choice.

#### **Rankine cycle technology**

Another, but not so well-known, power source is a Rankine cycle generator. An external-combustion system, it is efficient, it can use multiple fuels and it is renowned for not requiring much maintenance. Used in the offshore and remote oil-and-gas industry for years, a Rankine cycle generator is a preferred choice when reliability is a criterion. Units come with outputs of as much as 4kW, and their reliability is legendary. Able to handle variable loads, the systems usually provide filtered direct current from internal, 3-phase alternators. I first observed these generators in use on the Trans-Alaska Pipeline System, where they have been providing trouble-free remote power for decades. External combustion significantly reduces emissions as compared to conventional engine-powered alternators. Adaptability to multiple fuel sources allows greater flexibility for the site operator. One drawback is the physical footprint of the units, which tends to be large for the power output derived.

#### **Stirling cycle technology**

Another external-combustion generator, the Stirling cycle generator, is a “mature” technology now entering the market in larger numbers. Based on the

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**Examples of Systems**  
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19th-century work of the Rev. Dr. Robert Stirling (1790-1878), these new-age external-combustion engines, coupled with modern alternators, provide an excellent source of onsite primary or backup power for the site owner. Able to use multiple fuels, these gensets are quiet, low-emission power sources. External combustion means cleaner running. The exhaust does not foul the lubricating oil, which extends the maintenance cycle and thereby reduces both labor costs and the site waste stream. These units operate at low noise levels, yet they are available with outputs as high as 55 kW. Much smaller units are currently in use all over Britain as home power/heating systems.

**No fuel like a new fuel**

Alternatives to diesel as a fuel for onsite primary or backup power sources provide different storage choices, may be more vandal resistant and can bring peace of mind to your immediate neighborhood. One alternative for diesel—*biodiesel*—produces a distinctive odor. Storage of biodiesel poses the same old problems and adds new ones related to slow flow or “no flow” at cold temperatures. Tank and feedline heating, pump lubrication and supply issues might rule this fuel out for commercial, remote sites. I am unaware of any long-term studies on how biodiesel fares if contaminated by water, microbial or storage-tank sources. The American Society for Testing and Materials (ASTM) is working on biodiesel specifications. Therefore, how the EPA will ultimately

deal with biodiesel storage, spills and other topics is also an unknown factor.

**Where do you keep it?**

Liquid-fuel tanks placed in underground vaults for protection from vandals still require regular inspection and maintenance to comply with federal EPA rules (40 CFR Parts 280 and 281). Above-ground tanks have their own requirements and rules. Many vendors supply well-built, compliant tanks at a reasonable cost. This still leaves you with concerns about spills, odor and public perception.

What about the use of CNG, propane or LPG for power generation? Many diesel engines may be modified to use these fuels, which have advantages. Use of underground vaults for protection against vandalism with a CNG source makes sense because the gas is lighter than air. LPG and propane are heavier than air, so the underground option requires care. Tanks for these fuel sources are typically smaller or have a low profile. They may be leased from suppliers, and they have less-stringent inspection requirements. For leased tanks, the gas supplier usually performs any required tank inspection, eliminating at least one worry for the site operator. CNG/LPG/propane spills pose insignificant long-term hazards, and use of these fuels greatly reduces exhaust-odor issues.

**Diverting the waste stream**

Couple a CNG/LPG/propane supply with an external combustion or TEG gen-

erator, and you quickly reduce or eliminate the waste stream. Legal disposal of used motor oil, especially from diesel engines, is becoming more expensive, and oil presents a site spill/contamination issue. Reduced maintenance means lower labor costs. Depending on the system you select, backup-power reliability might increase substantially. As recent disasters have shown, your liquid-fuel supply chain might become problematic if the catastrophe interrupts rail shipping or trucking. On the other hand, CNG/LPG/propane-powered systems—especially natural gas/LPG gensets—faired well when deployed in the aftermath of Hurricane Katrina ([www.tusaconsulting.com/katrina-more.htm](http://www.tusaconsulting.com/katrina-more.htm)). Long-term supply issues, whether involving diesel, LPG or CNG, still remain.

Newer, more-reliable power-generation technology, a move away from diesel or liquid fuel, and reduction of your waste steam can put your site “in the green.” This means both green for the environment and green for your bottom line. Not only will you profit—so will your customers. If you convert to a green system, let your neighbors know, perhaps with a newspaper article or some TV coverage. Tower owners also might find regulators and zoning authorities viewing “greener” sites with more favor.

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Koehler is a telecommunications and computer disaster-recovery consultant based in Anchorage, AK.

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# Powerful Ways to Dodge Disaster Disruptions

Use ‘green’ technologies to make the backup-power portion of your site disaster-preparedness plan reliable and unobtrusive.

by Sandra Saathoff

Communications, especially *emergency* communications, is about making sure the call goes through, no matter what. Natural disasters demonstrate the need to improve reliability at communication sites. Additionally, telecom network expansion increases backup power requirements. Multiple methods and technologies are available to network operators to meet backup-power needs. These include valve-regulated lead-acid (VRLA) and wet-cell batteries, and mechanical generators. Newer technologies also fit these categories of energy storage and power generation options.

Traditionally, communications system backup power has meant different things to different types of network operators. Wireline carriers traditionally designed outside-plant applications for 8 hours of off-the-grid operation. Wireless carriers, on the other hand, have implemented solutions that range from 2 to 8 hours or more, depending on the site and service requirements.

Natural disasters and concerns over terrorism have increased the dependence on and the need for reliable communications networks. Today, carriers seek ways to improve backup reliability to extend the capability of backup-power solutions to support their networks. Many operators require 48 or even 72 hours of backup-power operation—without the need for site visits, refueling or supplementary service. Traditional power solutions pose increasing

challenges related to recharging, refueling, environmental issues, reliability and theft.

In 2005, according to the Department of Energy’s Energy Information Administration, day-to-day disasters caused 86 days of lost grid power in

the United States, with durations from minutes to weeks. Causes ranged from hurricanes and tornados to thunderstorms, winter storms, equipment failure, fuel-supply issues and human error.

The ramping up of hurricane activity in the United States over the past 15 years provides a dramatic example of rea-

sons for increasing backup power. During the years 1991 to 2000, only five hurricanes hit the part of the United States referred to as the “Hurricane Belt”:

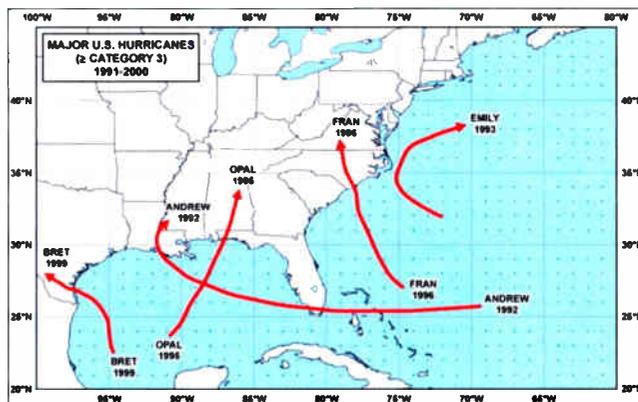


Figure 1. Major (category 3 strength or stronger) U.S. hurricanes that made landfall during the years 1991 to 2000.

From 2001 to 2005, this number increased and focused on a smaller section of the belt:

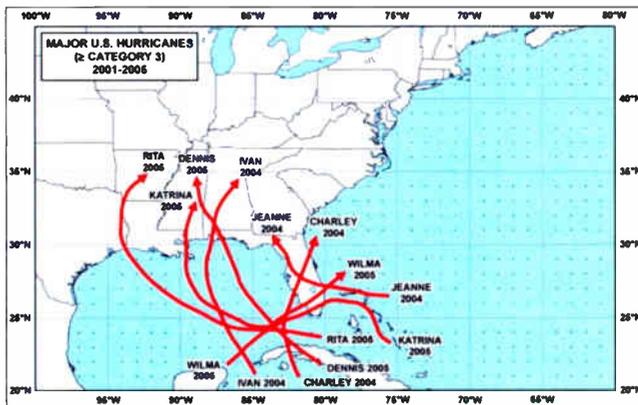


Figure 2. Major (category 3 strength or stronger) U.S. hurricanes that made landfall during the years 2001 to 2005.

**Traditional power solutions pose increasing challenges related to recharging, refueling, environmental issues, reliability and theft.**



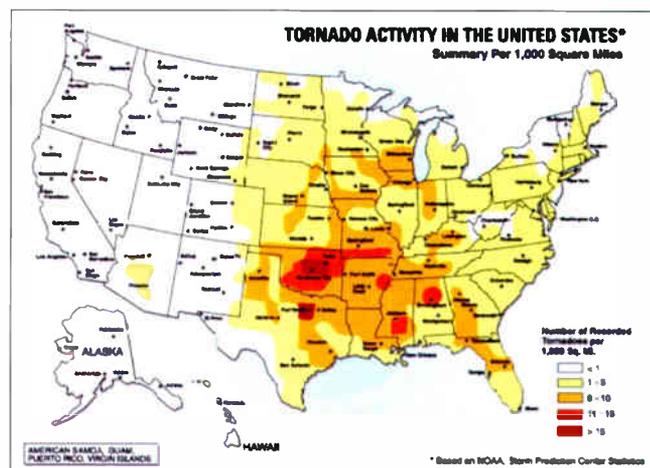
Although 2006 was a relatively light year for hurricanes, the reality remains that powerful hurricanes *will* affect carriers in the Hurricane Belt.

The Hurricane Belt and its inland counterpart, “Tornado Alley,” are proximate, geographically speaking, but Tornado Alley is significantly larger. According to the National Oceanic and Atmospheric Administration (NOAA), “Overall, for the United States, most tornadoes are considered weak, and around 98 percent of all U.S. tornadoes are below F3 intensity. That leaves just 2 percent of all U.S. tornadoes to be categorized as violent (F3 and above). Of these violent twisters, thankfully just around 0.4 percent of them achieve F5 status, with winds over 261 mph and nearly complete destruction. However, given that, on average, over 1,000 tornadoes hit the United States each year, that means that 20 can be expected to be violent and around four might be incredible.”

Other causes of grid-power disruption might be less dramatic, but the result is the same: no power means no communications. The need to prevent communications loss is great. Technologies for power backup fall into two categories: *energy storage* and *power generation*.

### Energy storage

Generally defined as a device that charges initially and repeatedly, an energy-storage unit delivers stored charge



**Figure 3. Average number of tornadoes recorded per 1,000 square miles.**

as needed. A battery is the best example of energy-storage units, with ratings defined in ampere-hours. Electricity charges the battery, which then can supply an output on demand depending on the battery’s ampere-hour rating. Energy-storage technologies can be difficult to monitor in terms of power per runtime remaining. Batteries have been the traditional choice for short-duration backup-



**Fuel-cell system designs are often modular to allow for upward scalability as power needs at a site increase.**

power support because their initial capital cost is comparatively inexpensive. Nevertheless, because of necessary periodic replacement, batteries have a higher *lifecycle cost*. The primary incumbent power-storage device for telecommunications systems has been the VRLA battery.

**Power generation**

Power-generation equipment produces energy at the point of use. Generally speaking, these technologies convert a fuel, in the form of diesel, propane or natural gas, to electricity. The quantity of stored fuel dictates the length of runtime, although fuel may be replenished as needed for additional or extended runtime. Fuel can be difficult to obtain during or following a disaster because of increased need and decreased availability. The primary incumbent power-generation device is the combustion-engine generator set (genset).

**New technologies for old problems**

Developers of new technologies for energy storage seek remedies to recognized deficiencies in lead-acid batteries. Battery manufacturers have commercialized several options, including *lithium-ion* and *lithium polymer* batteries as well as *nickel-metal hydride* types. A *flow battery* is another option, one that uses two electrolytes that are pumped through a battery-like cell. In the case of flow batteries, electrolyte-storage reservoir capacity determines battery capacity.

Other new storage technologies include the *ultra capacitor*; an electrochemical capacitor with an unusually large energy storage capability relative to size. Another option is mechanical storage, such as the flywheel. Essentially a mechanical battery,



**Fuel-cell systems require a relatively small footprint at a tower site, and their lack of combustion noise enhances their appeal for sites near residential or mixed-use neighborhoods.**

the flywheel stores energy mechanically as kinetic energy.

New power-generation technologies also include *proton-exchange membrane (PEM)* fuel cells, which generate electricity through an electrochemical reaction using hydrogen and oxygen. The benefits of fuel cells include environmentally friendly operation. They generate energy without producing harmful emission byproducts; the only byproducts are water and heat. Absent combustion, fuel cells are a quiet alternative for backup power. The amount of fuel-storage capacity at a site ultimately determines a fuel cell's runtime. Fuel cells use hydrogen, which tends to be more readily available than other more-widely used types of fuel. Using current equipment, fuel-cell technology sites can be installed with as much as 96 hours of runtime fuel, and fuel replenishment is easier compared to other generation technologies.

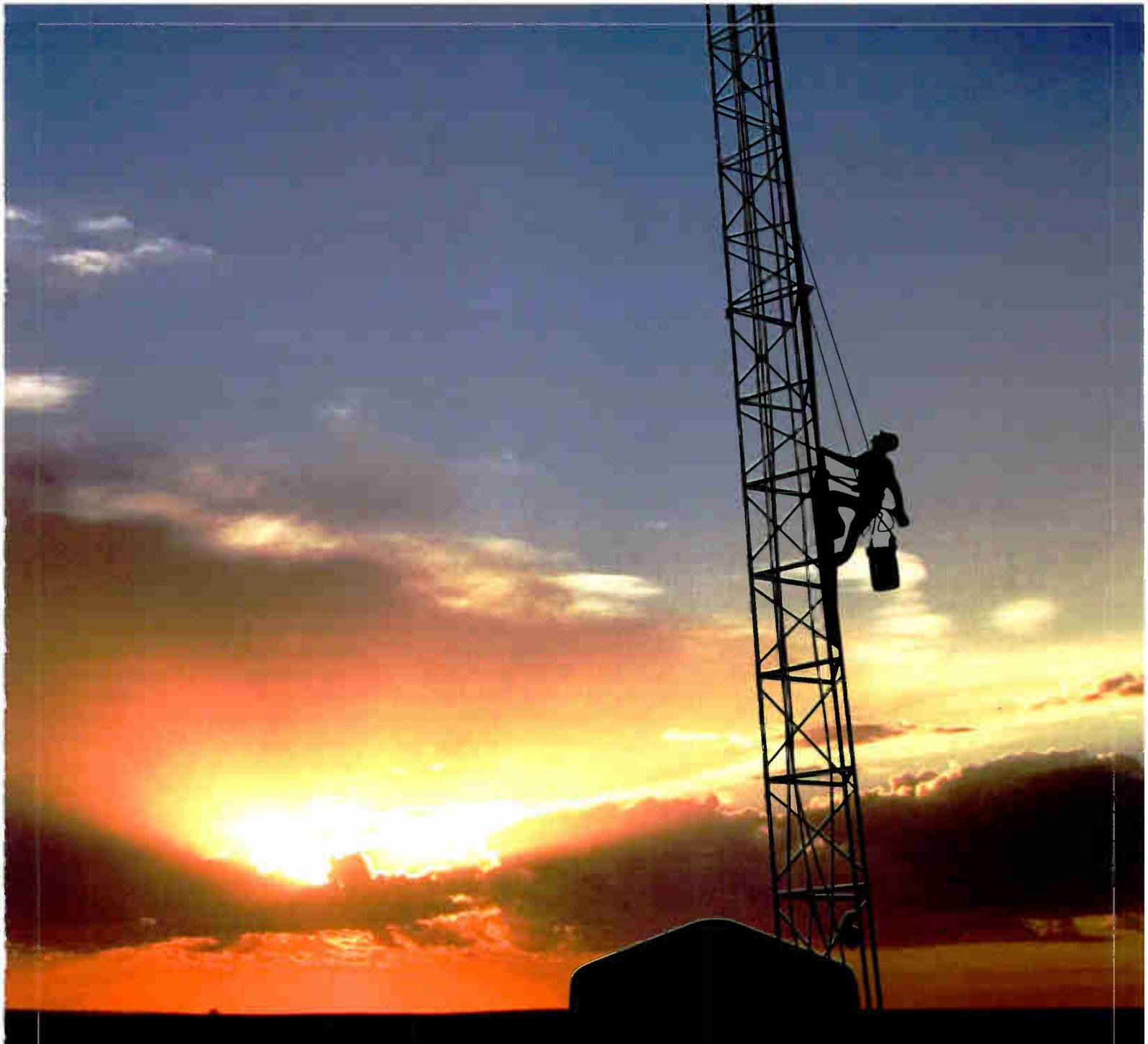
Some people might still regard fuel cells as a "future technology," but a handful of companies with products have placed thousands of commercial units into service for communications networks in the United States and worldwide. Reliability and successful performance of fuel-cell systems solutions have been verified operationally during hurricanes, ice storms, earthquakes and other weather events.

**Green choices for brownouts and blackouts**

As the communications industry expands its options for backup-power solutions, new technologies such as PEM fuel-cell systems offer advantages for increasing run-time and reliability. Future disruption of the power grid *will* happen. The question is whether network operators will choose technologies to protect the integrity of operations and the performance of their communications networks

agl

Saathoff is director of marketing communication for ReliOn, Spokane, WA.



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# Surge Suppression: Comparing Apples to Oranges

Technical comparisons between metal-oxide varistor (MOV) and silicon avalanche suppressor diode (SASD) designs may be moot, depending on the application. The physical location of a suppressor to protect a specific point in an electrical-distribution system determines the type selection.

by Dave Rowley

**T**he sole function of a high-quality surge suppressor is to protect sensitive electronic equipment from transient overvoltages that are present on ac-power circuits. It is irrelevant whether lightning generates these overvoltages or whether they are induced upon the ac-power lines by utility-grid switching, power-factor correction actions, power cycling of inductive loads or other sources.

A high-quality surge suppressor must limit transient overvoltages to values that do not surpass the ac sine-wave peak by more than 30 percent as it initially absorbs intense amounts of transient energy. The suppressor must immediately respond to transients before they reach their uppermost voltage values. Suppressor performance should not deviate or degrade with use when called on to divert extreme levels of transient current.

Transient surges are differentiated by their duration, frequency and amplitude. The surge suppression industry has adopted the IEEE Power Engineering Society's IEEE C62.41-2002 document, "IEEE Recommended Practice on Surge Voltages in Low-voltage AC Power Circuits," as the standard for categorizing transients and the associated waveforms used to test suppressor efficacy. This guide defines several varied voltage and current waveforms that occur in the electrical distribution environment.

The most frequently referenced IEEE waveform is the combination wave,

which is characterized by short duration, high-frequency, short-circuit 8/20  $\mu$ s and open-circuit 1.2/50  $\mu$ s current and voltage waveforms. It is used to simulate lightning-induced transient activity. Longer-duration, lower-frequency, higher-energy 10/1000  $\mu$ s voltage and current-test impulses (also detailed within the same IEEE documentation) are recommended to simulate transient activity originating from other sources.

For testing, actual voltage and current values are selected in reference to where the surge suppressor is intended for use. Surge suppressors intended for use at any location on the distribution system will be subjected to long-duration waveforms and should be tested to withstand these conditions, regardless of their suppression technology. Figure 1 on page 41 illustrates the combination waveforms.

When these combination waveforms are used to test surge suppressors, the generator voltage is adjusted to an open-circuit voltage (*Figure 1*). It rises to this value within 1.2 microseconds. The voltage decays to 50 percent of that value after 50 microseconds. Short-circuit, transient-current pulses reach their maximum value in 8 microseconds and decay to their half-point after 20 microseconds. The combination wave provides a starting point to analyze a suppressor's performance characteristics in reference to voltage protection levels (VPL) and power-dissipating capabilities.

Unfortunately, short-duration test pulses do not propagate far enough into an electrical-distribution system to give the suppressor user a clear idea of how the suppressor will perform in the real world. Transients that are generated by grid switching, power cycling of inductive and capacitive loads, and other sources cause suppressors to activate. This transient activity is typically characterized by lower frequency (1 kHz) 10/1000  $\mu$ s duration waveforms. The laboratory waveforms utilized to simulate this transient activity are shown in Figure 2 on page 41.

The physical properties of the electrical-distribution system limit how far lightning-induced or other short-duration, transient surges are able to travel. Extremely high-voltage transients are required to drive high-voltage lightning-surge current far into a facility. Transient voltages are limited (typically to 6000 V because of air-gap protection or insulation breakdown) at the meter base, preventing surge currents from propagating far into the building. However, most transients originate from sources other than lightning and are more likely to travel longer distances throughout the ac power system. These transient surges are more threatening to electrical loads because they are not diminished over shorter distances, unlike lightning-induced impulses. Lower level surges (less than 6000 V) actually force more current into a system be-



Photo illustration by Scott Dolash.

cause the transients pass “under the radar” of the air gap.

Suppressors intended to protect at specific points along the electrical-distribution system must be selected in accordance with their physical location.

Higher-energy-dissipating products must be used at main distribution points rather than at subpanels or electrical outlets. Suppressors intended to protect at low-exposure main or subpanel locations inside any facility rarely need to be designed

to suppress more than 3000 A of transient current. By design, meter-base gaps allow for extreme voltages to dissipate before they reach the distribution panel. Those outdoor transients might otherwise pose a threat to the facility’s electrical-

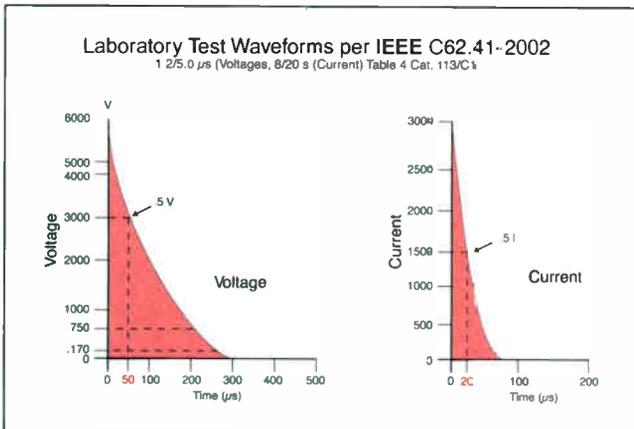


Figure 1. Because this generation has an internal impedance of  $20\Omega$ , the peak current value will be 3000A. The suppressor is connected to the generator for testing.

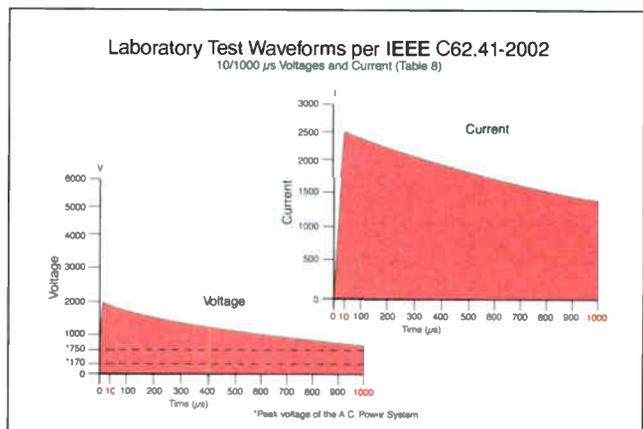
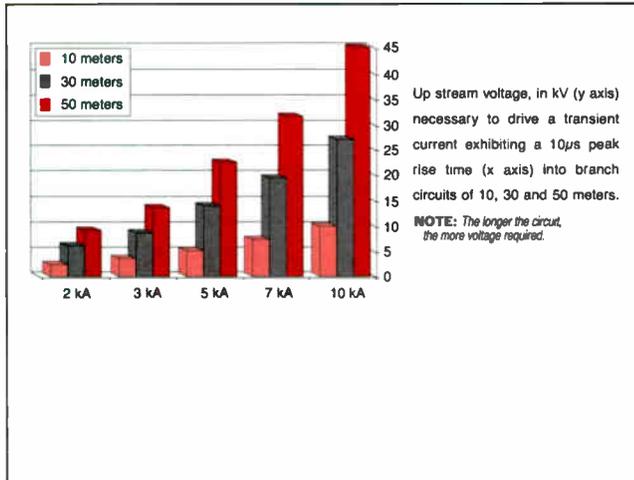


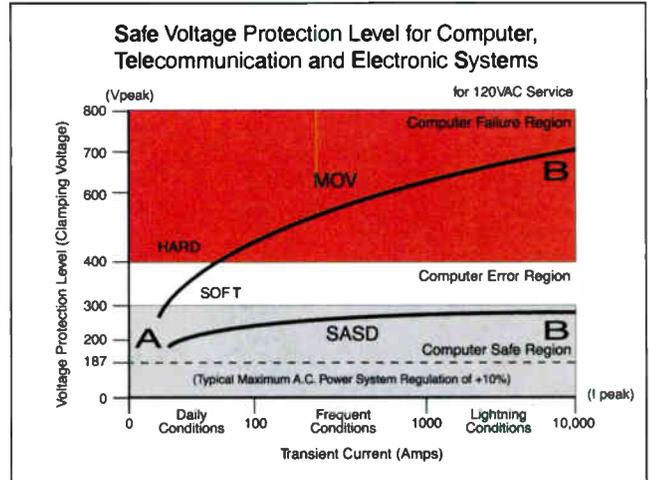
Figure 2. Laboratory waveforms used to simulate transient activity generated by grid switching, power cycling of inductive and capacitive loads, and other sources.



**Figure 3. High-level voltages (>6000 V) are required to drive surge currents >5000 A farther than 10 meters into an electrical-distribution system.**

distribution system. Figure 3 on page 42 illustrates that high level voltages (in excess of 6000 V) are required to drive surge currents that exceed 5000 A a distance farther than 10 meters into an electrical-distribution system.

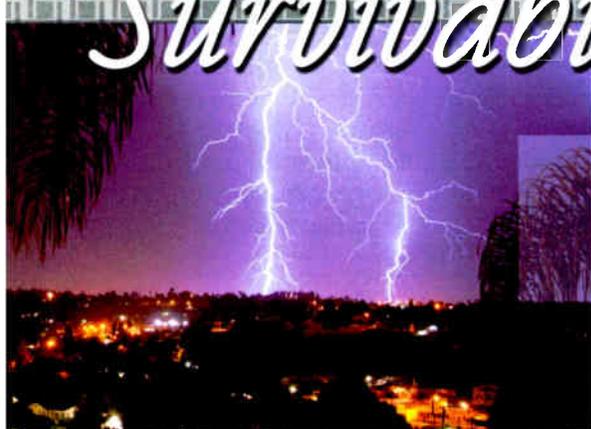
It is important that a surge suppressor be capable of suppressing short-duration impulses, resembling and including those generated by lightning. It is equally, if not more, important for a suppressor to be able to sustain sup-



**Figure 4. As an MOV conducts increasing levels of transient current, it cannot limit transient overvoltages to a value of less than 30 percent excess of the normal ac sine-wave peak.**

pression functions and divert current effectively when called on to suppress longer-duration transients. Suppressors intended to protect at branch panels or electrical outlets will be required to suppress these transients more frequently

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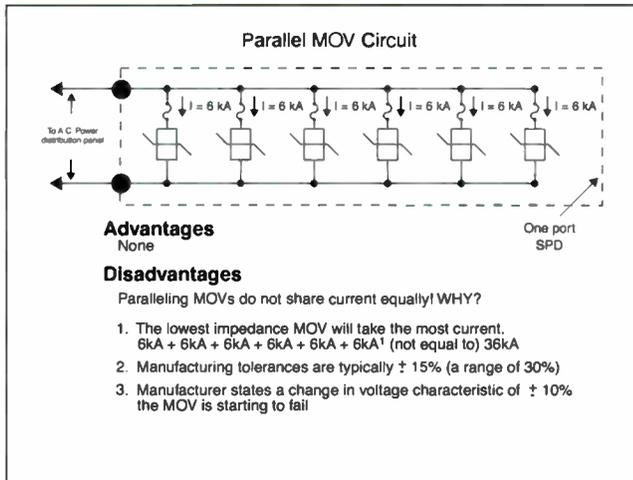


Figure 5. Individual MOV components are frequently rated with a high peak surge-current rating.

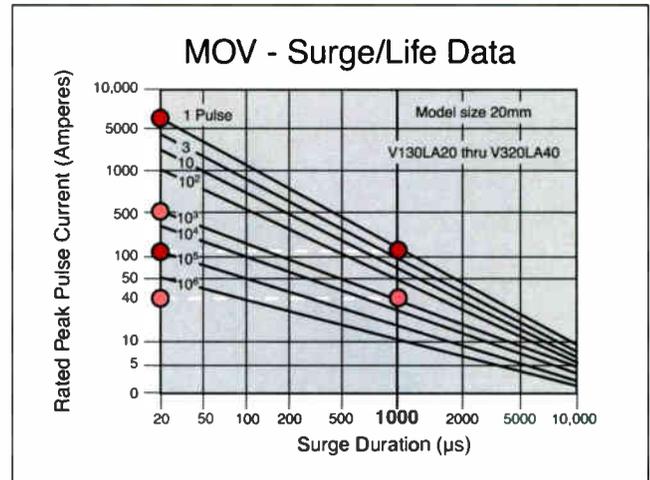


Figure 6. A comparison of the single pulse-life expectancy of 20 mm to 32 mm MOVs.

than those that are lightning induced. Surge suppressors should be tested to both long- and short-duration laboratory waveforms to confirm these suppression requirements.

Manufacturers use numerous technologies for suppressor components.

These include selenium, gas tubes, metal-oxide varistors (MOVs) and silicon avalanche suppressor diodes (SASDs). Most suppressors use MOVs or SASDs or a combination of the two. The advantages and disadvantages of these two most common suppression

technologies are noteworthy.

**Metal-oxide varistors**

MOVs are non-linear variable resistors with semiconductor properties that were originally designed to protect electrical motor windings against wiring in-



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sulation breakdowns. There are two advantages associated with MOVs in regard to surge suppressors. They are inexpensive, and they divert reasonably high values of transient current. MOVs are typically constructed with zinc oxide, which has non-linear resistive characteristics. ("Non-linear" is used to define any device with resistive characteristics that change as a function of the induced current. The equation takes the form of  $R = at^b$ , where  $a$  and  $b$  are constants and  $R$  will be a curved line.) The zinc-oxide particles are compressed under high pressure to form variously sized discs. To complete the varistor, electrical leads are bonded to the discs and covered with an insulating material.

When transient currents are introduced to an electrical system, the MOV shunts the current away from loads. As a varistor conducts transient current, its internal resistance increases. Unfortunately, its non-linear resistive characteristics prevent symmetrical resistance shifts equal to supplied current devia-

tions. The voltage drop across the MOV increases drastically as the varistor conducts high current values.

Numerous drawbacks become apparent when MOV-based suppressors are used to protect sensitive electronic circuitry:

1) An MOV-based suppressor device cannot maintain a stable VPL as it conducts increasing current values. As the device conducts increasing levels of transient current, it cannot limit transient overvoltages to a value of less than 30 percent excess of the normal ac sine wave peak.

Figure 4 on page 42 illustrates this inadequacy. Note that the curve representing the MOV's suppression response climbs steeply as it conducts longer-duration transient current. The curve representing the suppression response of the SASD shows that it does not suffer from the same drawbacks. Some MOV-based suppressor product specifications boast extremely high surge-current capacities (as much as 300,000 A) without report-

ing the VPL. These large figures sound impressive; however, this practice is misleading and often meaningless. As depicted in Figure 5 on page 44, the individual MOV components are frequently rated with a reasonably high peak surge-current rating.

If a product uses multiple MOVs connected in parallel, some manufacturers will add the current ratings of the individual MOV components together and report the sum as an impressively high total-value surge-current capacity. This sum method is inaccurate because it is impossible to coordinate simultaneous conduction of multiple MOVs that have varying component tolerances and degradation cycles. It is like saying that your car will be able to travel 200,000 miles on one set of tires because each of the four tires is a 50,000-mile radial.

In addition, it remains difficult to determine true VPL at the maximum-rated surge-current value. A device constructed with larger MOVs might be useless to protect electronic equipment. Although

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the component might be capable of suppressing much greater current values, it is likely that the VPL will be too high to protect electronic equipment.

2) MOVs degrade with use. Most MOV manufacturers warn users that the component is considered failed after its initial VPL has moved  $\pm 10$  percent from its original value. The MOVs conduct current through paths of zinc-oxide particles. After they conduct surge current, these particles change, and their resistive characteristics are weakened. This degradation cycle becomes more profound when the MOV conducts more frequently or conducts higher current values. Although larger MOVs are more robust, they are plagued by the same problems.

Figure 6 on page 44 compares the single pulse-life expectancy of 20 mm to 32 mm MOVs. Note that the 20mm MOV can withstand a thousand 500 A, 8/20  $\mu$ s current pulses and will self-sacrifice when it suppresses a single 6,500 A, 8/20  $\mu$ s transient-current pulse. However, its surge-current capacity de-

creases significantly as it is subjected to longer-duration 10/1000  $\mu$ s transient-current pulses. The 20mm MOV can be expected to fail when subjected to a thousand 40 A, 10/1000  $\mu$ s current pulses or a single 200 A, 10/1000  $\mu$ s transient-current pulse.

The 32 mm MOV is slightly more robust. It can handle one 20,000 A or a thousand 900 A 8/20  $\mu$ s current pulses but no more than one 450 A 10/1000  $\mu$ s current pulse. Its maximum surge-current capacity drops to a mere 50 A value if the 32mm MOV is required to suppress a thousand 10/1000  $\mu$ s transient-current pulses. At this level, the zinc-oxide particles will meld together to form pools of increasingly larger surface areas. More often they will increase in resistance. As degradation continues, the MOV will either short the protected power circuit or stop conducting current.

Typical MOV-degradation cycles begin as the component continues conducting current past its original VPL. The level continues to increase as the MOV de-

grades. Eventually the voltage values required to activate the MOV will be at such extreme levels that it will be useless. In the event that a damaged MOV functions as a resistor, rather than a varistor, it can overheat and introduce a fire hazard. In either failure event, no transient protection is provided for critical electronic loads on the affected power circuit.

3) Varistors create thermal runaway conditions when their initial clamp points or VPLs are set too close to the nominal ac-line voltage. When installed across an ac-power source, MOVs conduct small amounts of electrical current. They conduct more current if the VPL is set too close to the peak voltage value of the ac sine wave. Conduction continues over time and results in an elevation of the MOV's internal temperature. The heat causes it to conduct even greater current values, and this spiral continues until the unit shorts. This loads electrical circuits, causes circuit breakers to clear and can trip ground-fault interrupters. MOV-based suppressors with thermal runaway disor-

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ders have been documented as sources of fires. To prevent these catastrophic failures, the initial VPL of MOV-based suppressor products is typically set to a higher value. This design parameter eliminates the device's ability to provide adequate transient-voltage protection.

### Silicon avalanche suppressor diodes

Compared to other suppression technologies, the advantages associated with the use of SASDs are numerous. Like the components within the sophisticated circuitry of modern electronic equipment that they are intended to protect, SASDs are true solid-state semiconductors. Unlike MOVs, SASD-based surge-suppression components do not degrade or cause thermal-runaway conditions.

SASDs turn on faster than MOVs and respond rapidly to transient overvoltages. Transient surges are characterized by their extremely rapid rise times. A high-quality suppressor must respond fast enough to prevent transients from reach-

ing a potential voltage high enough to degrade electronic components, disrupt equipment operation or damage electrical loads. A SASD-based transient suppressor can be reasonably expected to demonstrate an in-circuit response time of five nanoseconds or less. MOV devices are also relatively quick to respond to transient overvoltages. Realistically, their in-circuit response times fall into the 35 to 50 nanosecond range.

high-quality SASD-based suppressor products have the ready ability to maintain a stable VPL at any location in the ac-power system while conducting maximum current values. Unlike the challenges associated with MOV designs, the simultaneous conduction of SASD circuits in parallel is plausible. In addition, the non-linear behavior of the SASD resistance is more abrupt and, therefore, more effective.

A surge suppressor must be designed to suppress near the peak voltage value of the ac sine wave while dissipating

extremely high levels of transient energy. Herein lies the basis of the cost disadvantage associated with SASD-based suppressor products: Individually, diodes cannot divert as much current. A properly designed SASD suppressor must incorporate numerous diodes to precisely perform their suppression responsibilities without self-sacrifice. As a result, the suppressor is often more expensive and physically larger than its MOV-based alternative.

SASD-based products do not degrade with use or over time. As long as their energy-dissipating capabilities are not exceeded, they will function perpetually. Quality SASD suppressors should not be designed (or expected) to self-sacrifice during a typical transient-surge event. It becomes apparent that a high-quality SASD-based surge suppressor must incorporate enough diodes to handle the transient currents it will likely be subjected to under normal as well as extreme transient conditions.



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It is also important to point out that non-diode-based suppressor manufacturers usually test their products to short-duration 8/20  $\mu$ s current impulses (intended to simulate those generated by lightning activity). They often do not test their devices with long-duration 10/1000  $\mu$ s long-wave pulses that the suppressor will more frequently be required to suppress. The high-energy pulses that facto-

ries use in testing can cause degradation of non-diode-based suppressor products before they reach the customer.

**Hybrid SASD/MOV suppressors**

Some suppressor manufacturers have hybrid designs that use both SASDs and MOVs. The hybrid designs attempt to take advantage of the positive performance characteristics while

overcoming the negative drawbacks associated with the two individual suppression technologies. For cost savings, these designs generally use fewer SASDs as compared to pure SASD products. In a hybrid, SASD circuits are used to take advantage of superior response times and stable VPLs while MOV stages are introduced to handle high-current dissipation.

Because of the vastly different operational characteristics of the two technologies, these hybrid designs fall short of their desired goals. There is even more difficulty coordinating simultaneous conduction between SASD and MOV components. The MOV stages cannot be coordinated to conduct reliably and simultaneously with the SASD stages. Often, premature suppressor failure occurs in the SASD stages because not enough diodes are incorporated to dissipate proper levels of transient energy. The MOV stages continue to function, but they are still plagued with the same deficiencies of the pure MOV-based product. Properly designed surge suppressors using 100 percent SASDs as their sole suppression technology are superior to hybrid designs.

**Drawbacks of filter networks**

A filter's operational characteristics, by definition, are frequency dependent. It cannot adequately protect critical electronic loads from lightning-induced transient surges, nor can the filter protect against transients generated from non-lightning sources. It is designed to attenuate noise occurring within a band of repeating frequency ranges at relatively low voltage and current amplitudes.

Filter manufacturers may design their products to target and to provide maximum attenuation to specified test waveforms to justify marketing their devices as surge suppressors. In these cases, filter networks may be designed to provide maximum attenuation to a 0.5  $\mu$ s-100 kHz ring wave, a 1.2/50  $\mu$ s waveform, or an 8/20  $\mu$ s current pulse, all used by the suppression industry as test parameters.

A filter cannot provide ample protection against transient activity. This is because transients differ from noise in that they are high-voltage, high-cur-

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rent impulses that are not frequency dependent. Transients are defined as random, or bursts of energy that last for less than 1/2 cycle of ac input induced on any portion of the ac sine wave. They exhibit extremely rapid rise times. They can reach their maximum voltage amplitude in one microsecond and typically do not display any identifiably repeating frequency pattern.

Lightning-induced transients are characterized by short-duration waveforms. However, most transients originate from other sources. Transient surges result from utility grid-switching activities, power-factor correction actions, and the power cycling of inductive loads. Most non-lightning-induced transient overvoltages exhibit much longer durations that last up to a full millisecond or longer. Therefore, transient overvoltages can exhibit both high- and low-frequency elements. Lightning-induced transients exhibit higher frequency elements than those generated by non-lightning activity.

A filter intended to protect against long- and short-duration transients would have to be capable of providing maximum attenuation for all frequencies falling within the kilohertz (kHz) through megahertz (MHz) ranges.

Suppressor products must use clamping components in their designs that adequately protect electronic equipment from transient overvoltages. They must not load the ac circuit, and they must not distort the ac sine wave as they perform their intended function. However, filter elements contained within any suppressor product can be counter-productive as they can introduce some of these problems into the protected ac-power circuit.

#### Location determines type

The suppressor to protect a specific point on an electrical distribution system must be selected according to its physical location. Higher-energy-dissipating products must be used at main distribution points as compared to subpanels or at electrical outlets. IEEE C62.41-2002 is accepted as an industry standard pertaining to the transient voltage and current test waveforms to be used to test surge suppression devices at various physical

locations throughout an electrical-distribution system. It specifies that surge-suppression equipment intended to protect at low-exposure main or subpanel locations inside any facility rarely needs to be designed to suppress more than 3,000 A of transient current. It explains that a high-quality suppressor will only be called upon to suppress from 5,000 to 10,000 A of surge current as it protects at medium-

and high-exposure locations. Therefore, the need for surge-suppression products capable of suppressing surge currents beyond these ranges does not exist. **agl**

This material is excerpted from a technical white paper by the author. Rowley is an electrical engineer overseeing product regulatory compliance for Transtector Systems, Hayden, ID.

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# NATE Nashville convention spotlights safety

Safety, safety, safety was NATE's theme as it presented sessions about riding the line, operating cranes, avoiding RF hazards and training tower hands, among others

by Don Bishop

The National Association of Tower Erectors welcomed an estimated 1,200 participants and 100 exhibitors to its convention February 12-15 at the Gaylord Opryland Resort & Convention Center Hotel in Nashville, TN.

Front and center at the convention was the national partnership between NATE and the U.S. Occupational Safety and Health Administration inked in November 2006 in Washington.

The assistant secretary of labor for occupational safety and health, Edwin G.

Foulke said. The national partnership stemmed from a previous partnership formed in 2001 between OSHA's Region 5 office and NATE. "There has been significant reduction in hazards among partner companies. They average 50 percent below non-partners in insurance rates," Foulke said.

"I sign a lot of partnerships and alliances. We do many of them. What impressed me about the one with NATE in November is the association's commitment to the partnership demonstrated by

the fact that the entire board of directors came to Washington for the signing. That shows me once again the commitment of your organization to safety and health," he said.

Foulke said OSHA wants to help employers first in being safe, and second in being successful. He said he recognized that many small companies

are worried about making the next payroll and sometimes are not as focused on safety as OSHA wants. He recognized that they may not have the money to spend on safety, so OSHA needs to let them know that all the ma-

terials they need are available on OSHA's website, [www.osha.gov](http://www.osha.gov).

"It is the best website in the government. There is no better. The amount of information and resources are there to help all employers along with best practices, model public-safety policies, training programs and various standards to train employees," Foulke said.

The OSHA chief linked safety with business success, saying a better safety record pays off with lower workers' compensation insurance rates; increased productivity, efficiency and quality leading to higher profits and improvement in U.S. job retention.

Foulke said OSHA offers consultation assistance for small- and medium-sized employers as part of compliance assistance, not enforcement. An OSHA employee comes on-site to assist with an employer's safety-and-health program and won't cite the employer for any but serious violations that are seen while rendering assistance.

Foulke spoke at NATE via amplified telephone because of a weather-related air travel delay that prevented him from leaving Washington in time to make a connecting flight.

## NATE-OSHA national partnership

Rob Medlock, area director for the OSHA Cleveland Area Office, told a breakout session that the NATE-OSHA national partnership is unlike any other the national office has. He said most national partnerships require local agreements with state OSHA offices and local chapters of associations.



Don Doty, Craig Snyder, Kevin Hayden and Patrick Howey at a 'riding the line' session introduced by Jim Goldwater.

Foulke Jr., who heads OSHA, told an audience at NATE, "You know it is a dangerous industry. We have to do whatever we can to develop the programs to get people trained to ensure that they get to go home safe and sound every day."



**Rob Medlock, area director for the OSHA Cleveland Area Office, said that although five climbers lost their lives in 2006 as a result of riding the line, no fatalities had been recorded for riding the line since 1999 as long as climbers rode the line properly and followed OSHA's compliance directive.**



**Don Doty, NATE's chairman and president of Stainless, said of climbers who were killed in 2006 in accidents involving riding the line: 'If they had followed the rules, there wouldn't have been an accident last year for riding the line. They didn't read it, didn't understand it, or didn't apply it. You can be hurt, killed or cause damage if you don't follow them.'**



**Patrick Howey, NATE's executive director, said that under a regional partnership with OSHA, hundreds of potential hazards had been identified and abated while as many as 50 NATE members participated.**



**Craig Snyder, president of Sioux Falls Tower and Communications, answered a question at the session on riding the line about how to avoid mistakes: 'Read the CPL and NATE manual and do what they say.' He also emphasized pre-lift meetings and documenting the work.**

"This is one for all. It is a cool deal. It doesn't matter where you're working," Medlock said.

He added that OSHA still has to get state plans on board, and the national partnership would help.

"Anything worthwhile, you have to earn. I remember sitting down with Don Doty and others in 2000 and saying, 'Let's get a national partnership together.' You have to prove that a partnership is effective on a local or regional level. We don't do them without local buy-in. We did that, and had success, and then last year the national partnership had been delayed for so long I didn't know whether we would get this," Medlock said.

Doty is NATE's chairman; he is president of Stainless, a company that designs, engineers, fabricates, constructs and maintains tall towers; and vice president of Doty Moore, a part of Stainless that fields crews to work on tall towers.

"OSHA thought about forming an alliance with NATE. An alliance is kind of a handshake without a commitment. NATE decided not to do that. 'We want substance,' NATE told us. 'We want a partnership and a commitment,' Medlock

said was NATE's desire.

Patrick Howey, NATE's executive director, said under the regional partnership, hundreds of potential hazards had been identified and abated while as many as 50 NATE members participated. Medlock said he wanted to sign up more than that for the national partnership during the convention.

Moreover, Medlock said the partnership isn't limited to people who erect towers and maintain them—the ones who climb. "This partnership has the potential to expand that to carriers and owners," he said.

Howey said that current eligibility is open to all NATE members who employ tower climbers. Requirements include meeting the requisite levels for training, such as 10-hour OSHA courses for climbers and 30-hour courses for supervisors. Partners have to implement a safety-and-health plan that meets the minimum NATE program. They must have a competent person on the job site at all times, and must conduct and submit safety audits to NATE.

He said that benefits to partners include OSHA inspections that would ad-

here to the items listed on the inspection list; reductions in penalties; no citations for other-than-serious violations when violations are immediately abated; and priority consideration for compliance assistance. He said recognition for participants would include listing their names in NATE's publication and website.

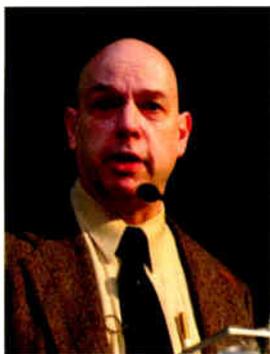
### **Riding the line**

Speaking to another breakout session, Medlock said that five tower climbers lost their lives in 2006 as a result of riding the line—yet no fatality has been recorded since 1999 when OSHA issued its compliance directive (CPL) for riding the line as long as climbers rode the line properly and followed the CPL.

At that session, Doty said some aspects of the fatal incidents are known, although he said it is dangerous for one who wasn't there to offer an opinion.

"You're not supposed to be riding rope. A fatality last year involved someone riding rope. He added equipment to it. It got cut. That's why you're not allowed to ride rope. It has to be wire rope," Doty said.

Another fatality had to do with RF



Ed Mantiply, a physical scientist with the FCC Office of Engineering and Technology, said the federal agency wants to make the definition of 'awareness' more clear, to define it as a written notice and an oral notice and that the worker be trained. The definition applies to those exposed to 'occupational' levels of RF.



Simon Weisman, president of Weisman Consultants, said that a change in guy-wire tension, 'like a change in blood pressure, is a mark of something that could be wrong.' He detailed several methods for measuring guy-wire tension.

arcing. "RF had damaged the load line, and he didn't do the inspections. Every aspect of the compliance directive is important. If they had followed the rules, there wouldn't have been an accident last year for riding the line. They didn't read it, didn't understand it, or didn't apply it. You can be hurt, killed or cause damage if you don't follow them," he said.

Doty said many people want to understand why the fatalities occurred, but the principals involved may not offer details for a considerable time, and he explained why. "Litigation and the OSHA inspection take six months, and then it might be months or years before the OSHA aspect is settled. Then civil litigation

often follows where the family of the worker goes into litigation with the company. It can be years before aspects of certain accidents are known," Doty said.

Craig Snyder, president of Sioux Falls Tower and Communications, said: "Read the CPL and NATE manual and do what they say."

Snyder also stressed the importance of documenting the work. "So many times we do things right but we don't document it. If there's an accident we need to document it. It may not matter which way you're doing it as long as you document it," he said.

### FCC requirements

Ed Mantiply, a physical scientist with the FCC's Office of Engineering and Technology, covered that federal agency's rules and licensee requirements regarding RF safety for tower climbers. He said the FCC's limit on maximum permissible exposure to RF is based on how much power the body may absorb measured in watts per kilogram.

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MPE is higher for so-called occupational exposure than for the general public, the difference being that those whose occupations call for them to be exposed to RF are allowed a higher exposure so long as the workers are aware of the hazard and have control over their exposure.

Mantiply said that "awareness" implies that FCC licensees must make sure workers exposed to the occupational limit are trained. He said the FCC wants to make the definition of "awareness" more clear, to define it as a written notice and an oral notice and that the worker be trained. "All it says now is that in order to expose someone to the occupational limit, they have to be fully aware and in control," he said.

Broadcast licensees are required to reduce power or cease operation when necessary to protect persons who have access to a site, tower or antenna from RF electromagnetic fields in excess of FCC guidelines.

Mantiply said that power-reduction agreements are a good idea at multiple transmitter sites. "It takes some analysis because if you have several transmitters and you need to climb a certain tower, you need to figure out what transmitters needs to be turned off and when. You climb past an antenna and only a small region is a problem for exposure from the antenna. It's complicated, and you don't want to do this on the fly. Safety consultants who work in this area should be pushing these agreements," he said.

Tower service companies should give ample notification unless it is an emergency, the FCC official said, explaining that sometimes broadcasters come to the FCC to complain about the protection requirement, "and we tell them they have to work it out. You can't overexpose people, period."

Mantiply said the federal agency advises tower service companies and broadcasters to be flexible with one another. "Schedule the work. Work during the night if feasible. Work on off peak times, maybe not morning and afternoon times, maybe during the day, the audience isn't a large. There's a need for cooperation and I know it isn't always there. You can come to us if it's

not. That's what this is about," he said.

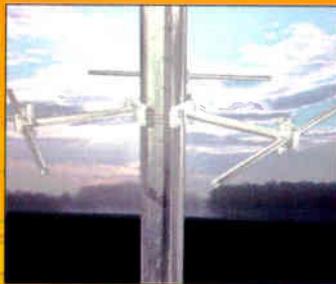
#### Guy-wire tensioning

Simon Weisman, president of Weisman Consultants, gave a talk about guy-wire tensioning. He explained that the indirect method of measuring tension is often preferred for use during inspections, and the direct method often is preferred when installing guy

wires or for projects that include making adjustments to the tension.

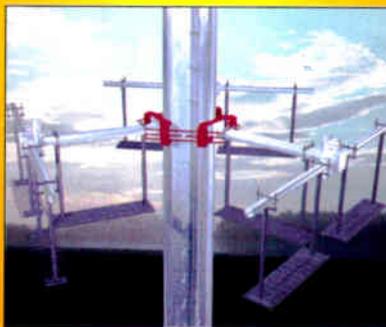
Weisman said that a change in guy-wire tension, "like a change in blood pressure, is a mark of something that could be wrong. You need the guy tensions to generate the stiffness to keep the tower in the proper location according to the design. A little fluctuation won't make a lot of difference. But fluctuations,

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if properly reviewed when the report is read, will give you an indication of changes. It could be due to settlement, a landslide, or who knows? A lot of things could be happening," he said.

Weisman gave an example of a tower in Canada's Yukon Territory where every spring, engineers would check its guy-wire tension and have to adjust it. After several seasons, "they realized they were pumping the tower into the ground.

As you tension the guys, you are loading the foundation. In the Yukon, they have permafrost. When it thaws, the guy-wire tension made the foundation sink. They had to fix the tower base to stop it from sliding down," Weisman said.

**Crane safety**

Tony Dotto, director of technical services for Crane Technical Training & Inspection, told an audience at the NATE

convention that the number-one cause of crane accidents is power-line contact. He said he tracks crane accidents, and every day, one comes across his desk—"Many days, more than one," he said.

"What is the best part of the working day? He asked. "Going home. Then why do we do things foolishly and unsafely to jeopardize the end of the day arriving? Don't jeopardize that," he advised.

Additional causes of crane accidents are *structural failure* due to overload; *stability failure* due to overload, and *improper setup*, Dotto said. He advised operators to calculate the load for every lift, and not to rely on a crane's computerized *load moment indicator* (LMI). "It is prone to electronic failure. It is prone to erroneous results," he said.

Adding to the list of crane-accident causes, Dotto enumerated *improper maintenance, operating unsafe equipment, inappropriate inspections and communication problems.*

Dotto gave details for calculating load limitations based on crane weight, outrigger capacity and extension distance. He said that cranes made years ago tended to be overbuilt, meaning they might not have failed immediately when their structural limits were exceeded. He said that newer cranes tend to be made with structural limits that track closely with their capacity limits with little or no margin beyond their specifications.

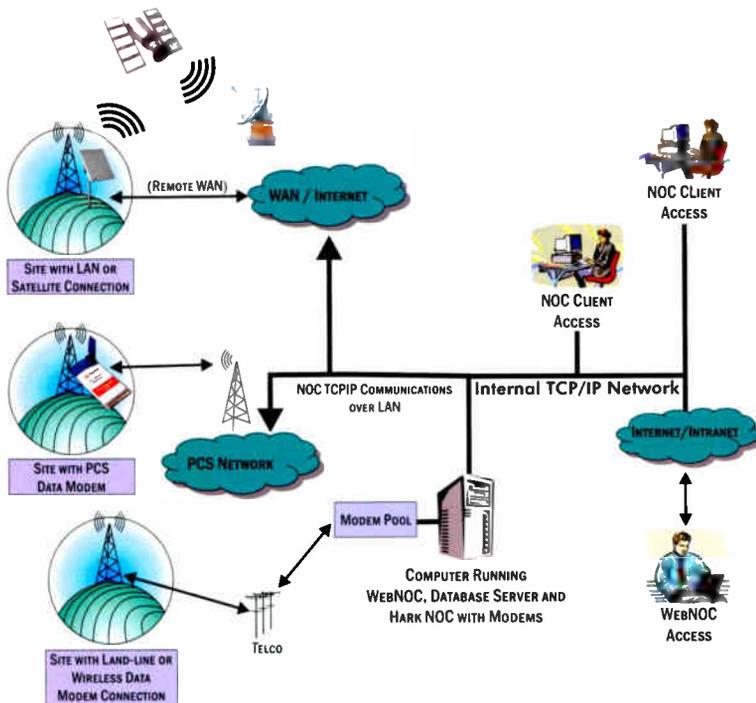
"If you think of taking the crane to maximum capacity and you don't have ideal conditions, you need to start planning. When your lift exceeds 80 percent of the capacity of the crane, you need a written lift plan," Dotto said.

**Tower failures: unseen problems**

When a session presenter, Matthew Arps, asked a NATE audience for possible reasons for tower failures, the responses numbered more than 20, from improper inspections to poor engineering and fabrication to defective installation and maintenance to overloading to monopole flange failure and—guy anchor corrosion. Arps, the general manager of AnchorGuard, a company that makes a cathodic corrosion control system for tower anchors, naturally fo-

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cused anchor corrosion, but the session included other presenters and a wider-ranging discussion.

"We want you to understand and know what is out there so you can stay safe and avoid encouraging certain circumstances," Arps said.

Todd Thorin, director of safety and training at Sioux Falls Tower & Communications, spoke about tower inspections. He listed some of the components of a 1,984-foot tower. They included 1.7 miles of steel in the tower legs, another 2.7 miles in the angles and 3.7 miles in the cross rods, together with 1,824 feet of ladder, all galvanized and with a coating of paint that needs to be bright and shiny.

He listed 1.36 miles of wire rope for the elevator, 3 miles of guard rail, eight miles' worth of 18 guy wires composed of 36 to 63 bits of 1/8-inch galvanized wire attached to nine anchor points in 120 acres, with 500 cubic yards of concrete per guy anchor. He mentioned an untold number of stainless-steel bolts, and 460 springs holding the transmission line to the tower.

"My point is that in a tower inspection, look at what you're called upon to inspect: miles of product and thousands of pieces that, in the end, your inspection report will say, 'It's all good.' How can an inspector do that and satisfy everyone?" he asked.

Thorin said there are at least two obstacles to overcome in successful tower inspecting.

"One thing could be the actual inspector. He has to be able to see what the problem is, realize it, and then be competent to make a good report of it. That either goes to the customer directly or we're processing the field report into a finished report," he said.

"Second, there is no industry standard for tower inspectors and no single standard for tower inspecting. Individual company owners can call anyone a tower inspector and the industry will accept it. I don't believe there is any single standard for tower inspecting. The ANSI TIA EIA 222G standard has a maintenance and condition assessment checklist. After that, there is a bunch of standards we pulled together when we do inspections. Some of it is

the manufacturer's standard for installation," Thorin said.

"Sometimes our customer doesn't expect much, and we give little, and sometimes they expect a lot, and we must deliver. It is up to us. We are the doctor; we know how it has to happen; and they're depending on us to know," he said.

Focusing on guy anchors, Craig Snyder, owner of Sioux Falls Tower &

Communications, said, "If you see corrosion at upper levels, that is not normal. It is not acceptable. It can look pretty good even at a couple of feet. It takes great caution when you inspect an anchor and call it OK. You should carefully word your report so your customer understands the nature of corrosion."

Snyder added: "If you find anchor corrosion, you need to recommend that

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**Matthew Arps, general manager of AnchorGuard, said that when tower specialists are acting as inspectors, 'We want to be the authority figure to the tower owner. We want to tell him what is going on with the site.'**



**Todd Thorin, director of safety and training at Sioux Falls Tower & Communications, said, 'There is no industry standard for tower inspectors and no single standard for tower inspecting. Individual company owners can call anyone a tower inspector.'**

the owner expose the entire anchor. If they won't do that, we recommend you install some kind of cathodic protection."

Arps said AnchorGuard has developed a corrosion rating system that inspectors could use for consistency in reporting and details to help an inspector know what to look for when digging around an anchor with a shovel that might indicate the severity of a hidden corrosion problem.

**Rooftop installation pitfalls**

Shane Muncy, owner of A6 Solutions, told NATE convention participants who make rooftop installations that a detailed understanding of existing rooftop sys-

tem technologies along with photographing and documenting the condition of specific rooftops before beginning work would help them and their companies to minimize liability. "There are some nasty roofs out there, and you need to be aware of what went on prior to your project," he said.

"Who can tell me at what point in the roofing project or walling on the roof are you supposed to have adequate fall protection?" Muncy asked the audience. Answers varied, and Muncy recommended a written guidelines.

With respect to fall protection, Muncy said, "rooftops get overlooked sometimes. If you can be tied off, definitely tie off."

He said that another methods of fall protection involves rooftops the use of a safety net, but that his company normally doesn't used nets. "We used fall arrest and safety monitors. When you use a safety monitor, that guy can do nothing else but monitor. The last thing

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you want is for him to be looking another way when a worker starts to move too close to the edge," he said.

So far as many building owners are concerned, roofs are "out of sight, out of mind," Muncy said. "They will be quick to repair a damaged entry door, yet years may go by with little attention paid to the roof."

Muncy recommended: "Take as many pictures as you can to document how the building owner has been neglectful of the roofing system. Another key is preventing any traffic across the roof. There is no way you can prevent all traffic across the roof. Yes, there are a lot of people crossing the roof. That roof damage is not covered by this 20-year warranty if they have walk paths. Use them as much as you can. If you have 60 guys from all your subs working and walking all over the roof, you need to provide protection for the roof."

Muncy said that the number-one

cause of roof failure is point loading. That should be a cause of concern to those who make rooftop installations, because all too often they place material on roofs without putting enough insulation or padding beneath them to spread the load over a wide area. The example he showed was a picture of a pallet and a large roll of hardline coaxial cable resting directly on the roof.

Putting material on roof in that way jeopardizes crushing the insulation, he said, and "once you crush the insulation, it has no memory. It won't grow back. As you walk on the roof, you crush and crush, which causes water ponding. Where there's ponding, the deterioration of the membrane accelerates by 60 percent. A 20-year roof becomes a 12-year roof," Muncy said.

Muncy said that when a roof fails prematurely, and if the roof manufacturer excludes warranty coverage because it claims installers damaged it, the build-

ing owner may look to every contractor who ever set foot on the roof to participate in funding its repair or replacement.

"Be cautious when working on rooftops. Make sure of the details. Make sure they're properly installed and insulate yourself from liability exposure. Protect the roof, and you will help insulate yourself. Go to Home Depot and buy some insulation to place on the roof to protect it while you're working, and take it to each site. You can't make the guys use it, but if you shove that water to them enough they'll drink it. Protect that roof all you can," Muncy said.

NATE is inviting proposals from those who would like to give presentations at next year's conference, and it announced a deadline of June 8, 2007 for submissions. For more information, visit [www.natehome.org](http://www.natehome.org) or call 888-882-5865 (605-992-5865 from outside the United States). **agl**

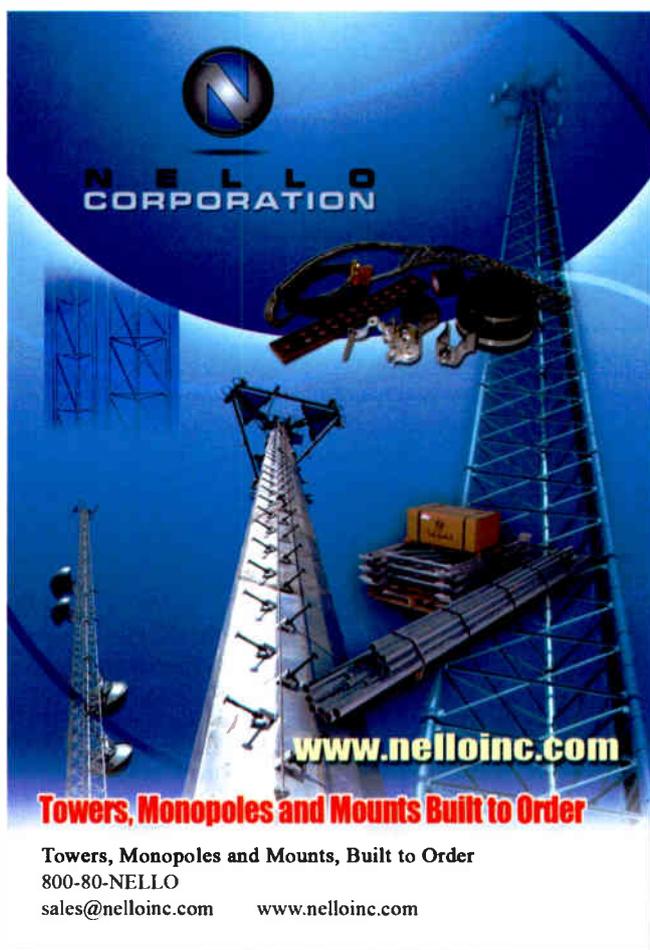


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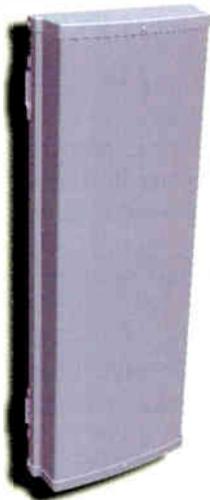


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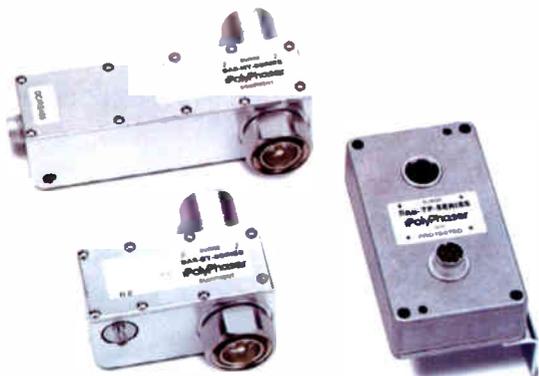
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[www.tenxc.com](http://www.tenxc.com)



**Lightning protection**

The AirSmart series of AISG-compliant surge-protection products has been released by **PolyPhaser**. AirSmart is a multi-faceted product line that not only facilitates communication between non-AISG legacy tower-mounted equipment and AISG-compatible base stations, but acts as a bias-tee, lightning protector, in addition to providing monitoring functions through a high-speed RS485 data interface.

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**Clustered antenna system**

An expanded range of antenna system cluster configurations is available from **Radio Frequency Systems (RFS)**. The low-profile integrated cluster series supports any member of RFS's Optimizer cellular antenna product line with variable electrical tilt. The integrated cluster is a complete antenna system incorporating a tri-sector arrangement of RFS Optimizer antennas in various lengths from 0.7 to 2.0 meters; optional fully integrated tower-mount amplifiers (TMA) with associated jumpers and connectors all hidden from view; and optional antenna-control units (ACU) for RFS's AISG v2.0-compliant remote antenna-tilt system.

[www.rfsworld.com](http://www.rfsworld.com)



**Aluminum braided cables**

A new product line, LMR-lite 50 W lightweight low-loss coaxial cables, is available from **Times Microwave**. The cables are constructed with an aluminum braid shield instead of a traditional tinned-copper shield. Attenuation is the same as standard LMR cable because the outer conductor is the same aluminum/polyester/aluminum tape. The cables are designed for use in wireless applications including land mobile, cellular, PCS, paging, WISP, Wi-Fi, WiMAX, WLL, wireless data and SCADA.

[www.timesmicrowave.com](http://www.timesmicrowave.com)



### Surge-suppression module

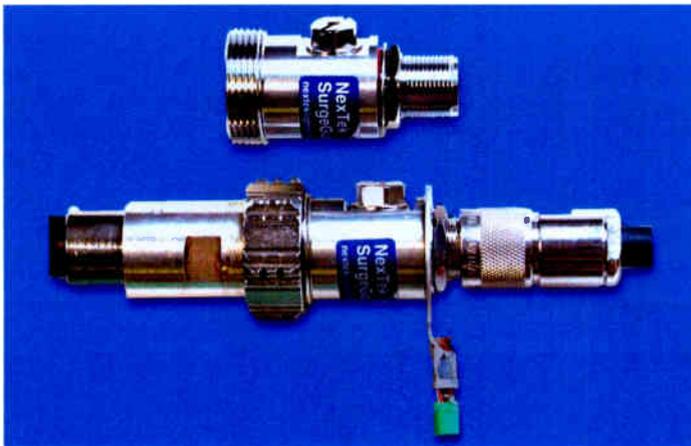
A transient-voltage surge-suppression (TVSS) module that provides uninterrupted protection from surge currents of as much as 200 kA is available from **Raycap**. The Strikesorb module is designed to meet the requirements of the revised UL-1449 (2nd ed.) standard without the use of internal fuses. The module consists of a single, large, distribution-grade metal-oxide varistor (MOV) disc (80 mm in diameter) in a hermetic aluminum housing.

[www.raycapinc.com/strikesorb](http://www.raycapinc.com/strikesorb)

### Passive intermodulation analyzer

The hardware design of its PIM Analyzers has been upgraded by **Summitek Instruments** for broadband testing of RF components used in the high-power paths of base stations. The new architecture comprises: an RF module for frequency generation and signal reception; a power-amplifier module for generating high-power signals and for power detection and control; and a front-end module for combining the two high-power signals onto a single RF path and duplexing the transmit and receive signals to achieve the required PIM-test capability. The PIM Analyzers achieve a  $-168$  dBc PIM noise floor at 43 dBm carrier powers for most of the available frequency ranges.

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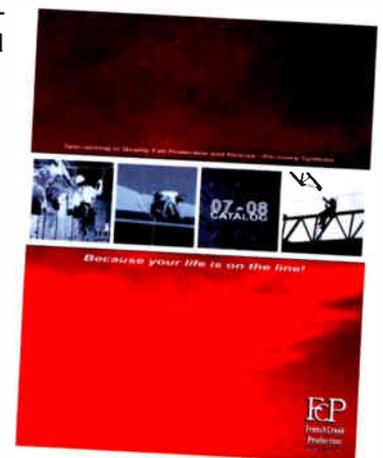
### Gas-tube lightning arrestor

A gas-tube lightning arrestor product line is available from **NexTek** to address installations where large, rigid or semi-rigid coaxial cable downloads from the tower transition to the cabinet by means of a more flexible and smaller cable. The arrestors transition from 7-16 to N-type connectors. The PTR0NF07F is designed for  $10\times$  multiple-strike capability at 20 kA and one-time 50 kA ( $8 \times 20 \mu\text{s}$ ) surge capability, and bi-directional protection.

[www.nexteklightning.com](http://www.nexteklightning.com)

### Fall protection catalog

The new *2007–2008 Fall Protection & Rescue/Recovery Systems* products catalog is available from FrenchCreek Production. There is also a section illustrating the necessary components of a fall-arrest system, plus a section on OSHA and ANSI Standards. The catalog can also be requested by email in PDF format.



[www.frenchcreekproduction.com](http://www.frenchcreekproduction.com)

## Enforcement

AGL provides this list of recent notices and fines issued by the FCC to remind our readers of operational activities and maintenance procedures that should be regularly addressed by site owners and managers. (Note: some fines listed include additional infractions not shown here.)

### Selected FCC Enforcement Bureau Orders and Field Actions for January and February 2007.

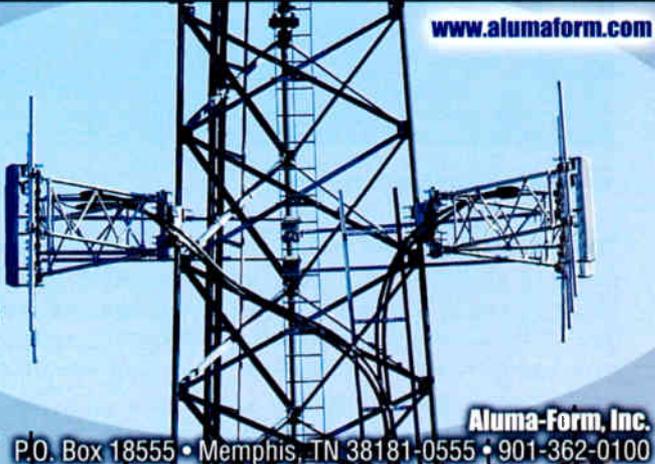
Company/Owner	EB Action*	Date	Section	Rules Violation	Fine
Pembrook Pine Elmira/WEHH-AM/WELM-AM Elmira, NY	NAL	01-12-07	17.48(a) 17.51(a)	Failure to notify FSS of lighting outage Time when lights should be exhibited	\$19,000
Morgan Co. Rural Elec. Assn; Fort Morgan, CO	NOV	01-17-07	17.50	Antenna structure cleaning and painting	NOV
Bruce L. Miller; Englewood, CO	NOV	01-17-07	17.48	Notification of extinguished/malfunctioning lights	NOV
Verizon Wireless; Vancouver, WA	NOV	01-17-07	17.57	Failure to report dismantlement of antenna structure	NOV
Arnold Broadcasting; Fort Morgan, CO	NOV	01-17-07	17.57	Failure to report antenna structure construction	NOV
New Jersey Turnpike Authority; Wall Township, NJ	NOV	01-19-07	17.50	Antenna structure cleaning and painting	NOV
Cablevision of Monmouth; Wall, NJ	NOV	01-19-07	17.4(g)	Failure to display Antenna Structure Registration #	NOV
Hiawatha Telephone; Eckerman, MI	NOV	01-22-07	17.50	Antenna structure cleaning and painting	NOV
Marshall D. Martin, Nacogdoches, TX	FO/MO&O	01-25-07	17.50	Antenna structure cleaning and painting	\$2,500
Blountstown Comm./WYBT-AM/WPHK-FM Blountstown, FL	FO/MO&O	01-25-07	73.49	Failure to enclose AM tower within locked fence	\$5,600
Greenwood Acres Baptist Church/KASO-AM Minden, LA	FO/MO&O	01-25-07	73.49	Failure to enclose AM tower within locked fence	\$7,000
Steven A. Roy/Estate of Lyle Evans Stephenson, MI	NAL	01-25-07	17.51(a)	Time when lights should be exhibited	\$10,000
Paradise Network of N.C./WHNC-AM Henderson, NC	NAL	01-25-07	17.57	Failure to report change in antenna structure ownership	\$7,500
A Radio Company/WEGA-AM Vega Baja, PR	FO/MO&O	01-30-07	73.49	Failure to enclose AM tower within locked fence	\$6,000
Flagship Communications/WNWF-AM Destin, FL	FO	01-30-07	17.57	Failure to report change in antenna structure ownership	\$3,500
Long Pond Baptist Church/WTBH-FM Chiefland, FL	FO	01-31-07	17.50	Antenna structure cleaning and painting	\$11,200
Metrotech; Brooklyn, NY	NOV	01-31-07	17.57	Failure to report structure ownership/dismantlement	NOV
Visionary Related Entertainment/KAOI-FM Wailuku, HI	FO	02-02-07	1.1310	Failure to comply with RFR MPE limits	\$10,000
Entravision Holdings/WVEA-LP; Tampa, FL	FO	02-02-07	1.1310	Failure to comply with RFR MPE limits	\$25,000
Infinity Broadcasting Corp. of Fla./WQYK-FM Tampa, FL	FO	02-02-07	1.1310	Failure to comply with RFR MPE limits	\$10,000
KOB-TV; Clovis, NM	NOV	02-06-07	17.4(g)	Failure to display Antenna Structure Registration #	NOV
MBC Grand Broadcasting; Grand Junction, Co.	NOV	02-14-07	17.57	Failure to report antenna structure construction	NOV
Forever of PA Holidaysburg, PA	NAL	02-22-07	17.47 17.48 17.51(a)	Inspection of structure lights and control equipment Failure to notify FSS of lighting outage Time when lights should be exhibited	\$10,000
Comcast of Washington/Oregon Vancouver, WA	NAL	02-23-07	17.23 17.47(a) 17.48	Failure to comply with FAA lighting recommendations Inspection of structure lights and control equipment Failure to notify FSS of lighting outage	\$10,000

**CONSENT DECREE ORDERS:** Feb. 23, 2007—United States Cellular, \$14,000 voluntary contribution to the U.S. Treasury; Consent Decree terminates an investigation into compliance with environmental regulations (Sections 1.1307, 1.1308, 1.311 and 1.1312) relating to construction of a wireless base station and tower at Fries, VA.

\*NOV (Notice of Violation); NAL (Notice of Apparent Liability for Enforcement); FO (Forfeiture Order); MO&O (Memorandum Opinion and Order)



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# Hilton Head Island, SC, hosts DAS Forum seminar and installation case study

The mayor pro tempore of Hilton Head Island, SC, Ken Heitzke, welcomed participants to a function hosted by the DAS Forum and conducted in his town on Jan. 18, 2007. "DAS" stands for "distributed antenna system," a method of connecting multiple antennas to one base transceiver station hub so as to minimize the footprint of each antenna.

Heitzke explained that the town's main concern is environmental control. "We have a lot of regulations to control, maintain and foster the environment. Sally Krebs, the tree lady, watches carefully," he said. Krebs is the town's natural resources administrator.

Heitzke explained that the island comprises 35,000 acres, with 25,000

acres, about 75 percent, in private unit developments often referred to as gated communities. Of the remaining 10,000 acres, the town owns 1,100.

"The town was incorporated in 1983. We're relatively young. We're a limited government, so we do not have public works and facilities or our own police. We rent police services from Beaufort County for \$2.5 million a year," Heitzke said.

As part of maintaining the environment, the island has few streetlights. Relatively dim lights



Seminar participants were bused to Hilton Head Plantation (HHP) to see elements of the DAS installation firsthand. Here, a group is viewing the DAS hub. Site selection and acquisition were no problem: The HHP board of directors told Crown Castle International where the hub would be placed.

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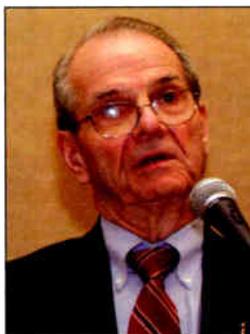


If it were easy to see, it would defeat the purpose. Nestled among the trees and no taller than them is a green-colored treated pole bearing an equipment box near the ground and an antenna on top. The remote access node installation is part of the DAS in Hilton Head Plantation.

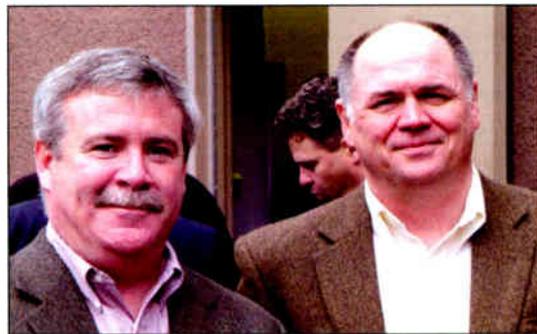
illuminate commercial property at night. Signage is minimal. "In the spring, we have a patrol about people turning their lights off, especially when their property faces the beach. Turtles hatch

installation in one gated community, Hilton Head Plantation (HHP).

Representatives of Corning Cable Systems, Crown Castle International, Donohue and Blue, and Sprint Nextel, the DAS Forum's founding



Ken Heitzke



Ed Donohue and Allen Dixon

and go toward the light of the moon. If there's no moon and lights are on, they go inland. We don't have many signs. We don't care if you have antennas and signs, as long as you can't see them," Heitzke joked.

This was the backdrop for the "DAS In Action Seminar and Case Study" conducted in the Hilton Head Marriott Beach & Golf Resort for more than 50 participants and speakers. The case study involved a DAS

members, were among those who spoke at the seminar.

Corning's manager of market development, Allen Dixon, who chairs the Forum's Council of Founders, said Corning became interested in DAS in 2002. By September 2005, it approached PCIA about sponsoring a community development that became the DAS Forum.

"DAS is a good opportunity. It is not the answer to every problem. If all you have is a hammer, then every problem looks like a nail. This is not a hammer. We look for the right places. And we'll explain where DAS is not the right thing," Dixon said.

Crown's director of national site development for DAS, Bob Gundermann, remarked that every quarter, more customers are going wireless. "The tower industry can't provide all the coverage. DAS will get you the urban environment. This Forum will allow all the players in DAS to educate each other and share information," he said. Crown is the company that HHP selected for the DAS contract.

Ed Donohue, esq., a partner in Donohue and Blue, said: "PCIA will bring energy to the DAS Forum as they do with other forums." He said that having so many participate in the seminar, as first function sponsored by the Forum, only added to that energy.

Sunil Prasad, director of technology assessment for Sprint Nextel, said

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**Sunil Prasad**

that as chairman of the Forum's technology committee, he is interested in finding ways that DAS can standardize and harmonize with other technology.



**Bob Gundermann**

The day-long meeting included a presentation about the DAS business model along with regulation and technology affecting DAS

deployment. It included details about the deployment of a DAS in the sensitive HHP environment. The meeting concluded after participants were taken by bus to several locations in HHP to view the DAS hub and two antenna installations.

Information about the DAS Forum is available at [www.thedasforum.org](http://www.thedasforum.org).

## Fuel-cell-maker IdaTech names new company head

IdaTech names Harol Koyama president and CEO, succeeding Claude Duss.

Koyama joined IdaTech in 2003, serving as senior vice president of sales and marketing, and more recently adding responsibility for product engineering, and research and development.

Duss had been president and CEO since May 2001. He cited personal and lifestyle reasons for resigning.

IdaTech develops and manufactures proton exchange membrane (PEM) fuel cells for telecommunications, commercial and industrial backup power.

## Jim Fryer launches Fryer Marketing

Jim Fryer, former publisher of Fryer's TowerSource and Fryer's Site Guide, has launched Fryer Tower Marketing to offer strategic marketing and promotion services to businesses serving the tower sector.

Fryer said he would help clients to define their end users, sharpen their message and create and coordinate collateral materials and promotions.

"I hope to serve the niche as either adding to the capabilities of an existing marketing department or allowing a company to focus their energies on their core business and 'farm out' the marketing to an expert," he said.

Fryer can be contacted at 610-931-7076.

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## NextG Networks launches protocol-neutral, scalable DAS in Del Mar, CA

NextG Networks launched a distributed antenna system (DAS) in Del Mar, CA, that the company said was operational in less than eight months. The network was designed to enhance the wireless performance for the ocean-side community by filling in coverage gaps and increasing the capacity of the existing infrastructure.

Steve Casey, Cingular's executive

director of network operations, said that the DAS "is a significant cooperative project enabling us to provide coverage and support for our new high-speed wireless services for the residents and visitors to Del Mar."

NextG's DAS networks use low-power, fiber-optic-fed antenna nodes that blend with the surrounding landscape by using streetlights and utility

poles. The systems are protocol-neutral, scaling to support multiple wireless carriers, services, and technologies.

"The challenge in cities such as Del Mar is to design and deploy a mobile communications system that is not noticed by most residents, yet supports the carriers' services for voice, instant messaging, ringtone downloads, Internet surfing and all the new services," said John Georges, CEO and co-founder of NextG Networks.

## California Wireless Association forms

The California Wireless Association (CalWA) held its inaugural meeting, on February 8, creating the 14th state wireless association. Jon Dohm of Crown Castle USA, serves as the association's president. The meeting drew an attendance of 325. For more information, visit [www.calwa.org](http://www.calwa.org).



Jon Dohm, president of the California Wireless Association.

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## Hutton goes west

Hutton Communications, a national distributor of wireless products, has opened a 55,000-square-foot warehouse in the Los Angeles area to serve western customers. Located near highways 5, 22, 57 and 91, the warehouse offers a location to pick up orders.

With the addition of the Garden Grove warehouse facility, Hutton has warehouse and logistics centers covering most of North America, including six in the United States and two in Canada.

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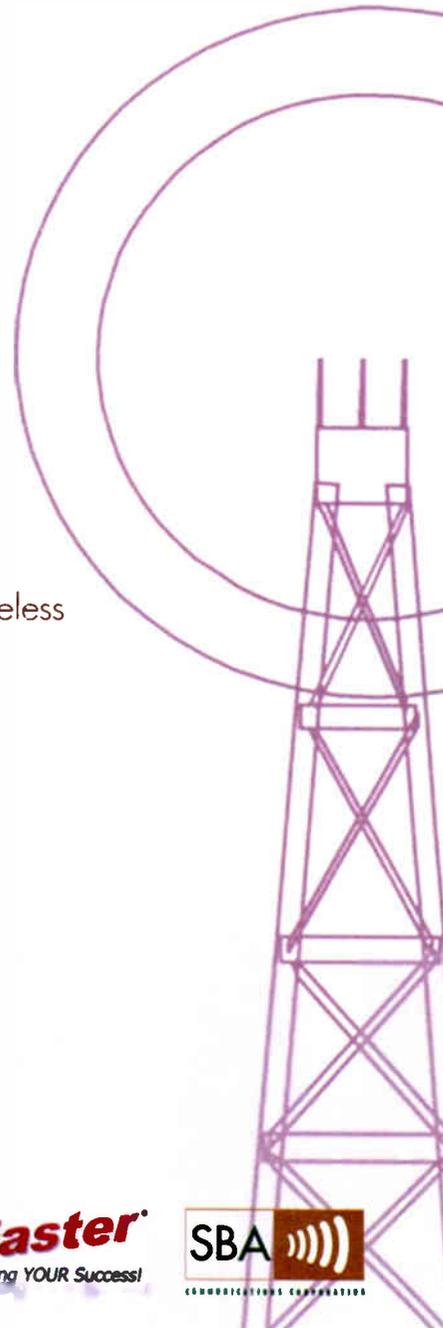
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