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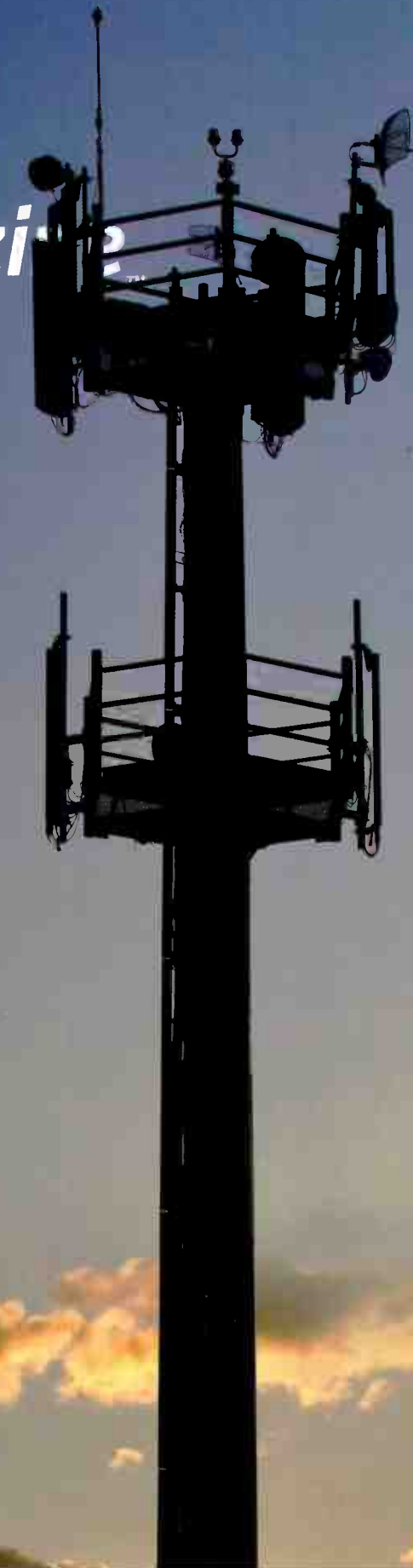
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YEAR OF THE CLIMBER

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Sprint: No to Auctions

Sprint announced on Sept. 26 that it won't bid in the FCC's incentive auction of 600-MHz radio-frequency spectrum.



This may have a positive effect on Sprint's spending for wireless infrastructure, including telecommunications

tower space rental for cellular antennas.

According to Sprint, the move might help to make money available to spend on cell sites. Here's how Sprint CEO Marcelo Claure put it, in a prepared statement: "Sprint's focus and overarching imperative must be on improving its network and market position in the immediate term so we can remain a powerful force in fostering competition, consumer benefits and innovation in the wireless broadband world. Sprint has the spectrum it needs to deploy its network architecture of the future."

Jennifer Fritzsche, a senior analyst with Wells Fargo Securities, said that the implications of this move are mixed for Sprint. "Sprint now has to show results with its network, but this removes the overhang question of how it would finance the spectrum," she said. "We believe Sprint also had serious concerns about the lack of plug-and-play use of this spectrum, given expected clearing delays of up to five years."

With 57.7 million subscribers, Sprint is in fourth place among U.S. wireless carriers, behind Verizon Wireless, AT&T and T-Mobile USA. Analysts have estimated that Sprint

spends significantly more per wireless subscriber than its competitors, according to a report in the *Kansas City Star*.

On Oct. 1, Sprint issued a statement about a report in the *Wall Street Journal* that it soon would be laying off a large number of employees as part of a plan to cut \$2.5 billion from its costs. The *Star* said the \$2.5 billion cut would amount to a nearly 7 percent reduction in the \$36.4 billion Sprint spent operating its business during the most recent fiscal year. Revenue that year was \$34.5 billion, a key reason the company showed a \$3.3 billion loss.

The *Star* said the planned cut dwarfs the first round of cost-cutting under Claure. During his first year, Sprint eliminated \$1.5 billion in costs achieved partly by 3,700 job cuts, about 11 percent of the company's workforce.

In bypassing the spectrum auction, Sprint said it has started a major effort to increase coverage and capacity by densifying its network and increasing the number of cell sites using its existing spectrum. Sprint said it is already deploying new technologies, such as carrier aggregation, that unlock the potential of its 2.5-GHz spectrum.

Tower operators will be hoping Sprint sends them a large part of the money it won't be spending elsewhere.

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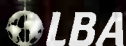
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Notes from an Infrastructure Junkie

Last month, AGL Media Group and Penton Media announced that we formed a partnership between AMG and Penton's International

Wireless Communications Expo (IWCE) called IWCE's Network Infrastructure Forum (www.iwceexpo.com/nif16). This new event within IWCE

brings together the industry's wired and wireless players to examine the communications technology infrastructure. The Forum will take place March 22–24, 2016, at the Las Vegas Convention Center.

I have this on my calendar already. As you may know, AGL Media Group was born from the team that ran *Site Management & Technology* and *Mobile Radio Technology*. The latter changed its name to *IWCE's Urgent Communications*. IWCE is the trade show run by the same publishers as before, and it really matches well with the magazine. I've been attending IWCE for many years. It's exciting to partner with them.

CCA

I'm still unpacking from a too-short trip to Fort Lauderdale, Florida, for the annual fall Competitive Carriers Association conference. Lots of great topics focused on spectrum, deployment of smaller carriers and the unique challenges smaller carriers face. I've heard many of the same arguments for a long time, and they all still hold true: big carriers get the

high phones in high demand; operating a small network is costly; there will never be enough spectrum; and the whims of the big guys ebb and flow, but small guys are consistently doing a bit better.

Stop? Go? What?

Our friends at Sprint keep making bold announcements about wonderful future plans and new technologies, and then say they are going to lay off many people and pull back on the network deployment. It feels like the 1990s again.

Sprint has set a hard turn down date for its WiMAX service of Nov. 6. It's said that there still are some iDEN racks to be seen now and then, rusting in the rain. With my fan-of-infrastructure hat on, I'm rooting for these folks.

Verizon is proudly saluting its rural partners' build out of the LTE spectrum leasing deals they entered into three to five years ago. Verizon continues to deploy heavily in the urban areas.

The First Responder Network Authority (FirstNet) stated it will accept only a nationwide partner. That's not really a surprise to anyone who has been watching the request-for-proposal discussion. Why would FirstNet want to have to negotiate with multiple companies, execute complex deployment agreements and ultimately manage multiple companies? That would make no sense. Now, the challenge is to figure out what opportunities remain for smaller carriers to participate in FirstNet.



G. Larry Wells Jr.

It is sad to say goodbye to one of the industries' pioneers, G. Larry Wells Jr. of Chattanooga, Tennessee. I remember Larry calling me in the late days of the cellular industry, just before the personal communications service (PCS) industry kicked off. He was looking for propagation and engineering help. He wanted to start a business of sharing cell towers — building his own and renting them out. Those seemed like crazy ideas at the time. In those days, cellular companies would build sites right next to each other, trying to score a competitive advantage. Larry was a visionary, and I was fortunate to see him at a couple of industry events this year. Unfortunately, we say goodbye after 50 action-packed, but entirely too short years. Larry passed away on Sept. 27.



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Quick-Guide to Bracket, Mount and Hardware Companies

As a supplement to *AGL Magazine's* January Buyers Guide, a list of bracket, mount and hardware companies offers more detail to help you choose a vendor for your next project. Where shown, logos and company descriptions were provided by and paid for by each company.

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Steve Hopkins

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www.comsitehardware.com

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Alisa Reed

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www.ciwireless.com

Products: brackets, mounts, wire management

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Lance Craft

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Jerry Gustad

605.665.7532

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www.ehresmannengineering.com

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440.564.5484

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See ad on page 40

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www.hugheyandphillips.com

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See ad on page 35

mWave Industries

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Seth Hanson

207.892.0011

info@mwavellc.com

www.mwavellc.com

Products: replacement antenna mounts and hardware for Gabriel and Mark brand products



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Products: aviation obstruction lights, tower light monitors, NOC services

See ad on page 58

Unimar

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See ad on page 39

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800.851.4965
sales@ventev.com
www.ventev.com

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Wanho Manufacturing

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Requiring an Experience Mod of 1.00 Is Ridiculous

It is unreasonable for telecommunications companies and wireless carriers to require contractors and subcontractors to have a workers' compensation insurance experience modification of 1.00. It is neither a fair nor an accurate way to judge their safety practices.

By Bruce Eades, CIC, AAI

Large telecommunications companies and wireless carriers are contractually requiring their contractors and subcontractors to have a workers' compensation experience modification of 1.00 or lower. This is an unreasonable requirement because it doesn't reveal a true picture of a company's safety culture (notice I did not say safety program). Currently, most telecommunications contractors' (e.g., line and antenna, civil and tower modification) experience modifications are on the rise, and in large part, the rise is not their fault. Here are four issues that trigger the problem.

Calculation method: The National Council on Compensation Insurance has changed the method of calculating experience modification. The new formula, called the split mod rule, is fairly complicated, but basically the

first \$5,000 of a medical claim prior to 2013 is what really affects the experience modification. In 2015, the first \$15,000 of a medical claim drives the modification.

Governing code: The governing code for telecommunications has changed from 7612 to 7600. As an example, the rate for 7612 on average nationwide was approximately \$12 per \$100 of remuneration. Under the 7600 code, the national average is approximately \$6 per \$100 of remuneration. This is great for clients because they've seen their premiums drop. Unfortunately, this is causing their experience modification to increase because the expected loss rate factor is lower. This means that the expected losses are lower when comparing them with the actual incurred losses.

Not-at-fault automobile accidents: Automobile accidents

are quite frequent in the telecommunications industry. In the event of an automobile accident, often an injured employee will trigger a workers' compensation claim. Many of the accidents are not-at-fault accidents. The workers' compensation claim is filed against the telecommunications company. These claims sometimes are subrogated and sometimes not. Even if the claim is successfully subrogated, it may take years to resolve, which, in turn, will remain on the experience modification for years.

Waiver of subrogation: Large telecommunication companies and carriers require contractors and subcontractors to give them waivers of subrogation in favor of the large telecommunications companies and carriers. Even if the large telecommunications companies and carriers are responsible for an accident, it

creates a workers' compensation claim for the smaller contractor or subcontractor. They have to waive their right to subrogate against the large telecommunications companies and carriers.

The Bottom Line

It is unreasonable to require an experience modification of 1.00. It is simply neither fair nor accurate. If large telecommunications companies and carriers use the experience modification as a method to judge the safety practices of these smaller companies,

they should raise the requirement from 1.00 to 1.25.

Solution

A better method for judging safety practices is to look at each individual company's safety practices; historical loss data; formal pre-hire, post-hire, pre-claim and post-claim practices; its risk score; and whether it participates in the National Association of Tower Erectors Star Initiative.

The initiative is designed to help companies operate safely while recognizing tower erectors

that voluntarily adhere to higher standards. The Star Initiative emphasizes safety, training, accountability and reliability by asking participants to commit to requisite levels of training, site safety audits and the implementation of safety programs while adhering to industry best practices.

Bruce Eades, CIC, AAI, is a regional president of the Insurance Office of America. IOA provides insurance and risk management for the telecommunications industry. His email address is bruce.eades@iousa.com.



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How Local Governments View Wireless Infrastructure Regulation

Local jurisdictions are increasingly receptive to wireless facility development as economic advantages become apparent and as federal initiatives promote the granting of permit applications.

By Don Bishop

Several officials from membership organizations that represent local governments spoke at the Wireless Infrastructure Show earlier this year at a session led by Andy Rotenstreich, an attorney and shareholder with the Baker Donelson law firm in Birmingham, Alabama.

Julia Pulidindi, principal associate for technology and communications, federal advocacy, National League of Cities, said that the infrastructure that's required to support wireless services is a huge job creator.

Yejin Jang Cooke, associate legislative director, National Association of Counties, said a large turnover among local elected officials compounds problems for wireless facilities permit applicants. [Editor's note: Since the Wireless Infrastructure Show, Cooke left the National Association of Counties to become the director of government affairs for the National Association of

Chief Information Officers.]

Steve Traylor, executive director, National Association of Telecommunications Officers and Advisors, said that as cities and counties realize how important wireless communications services are to the

“Yejin Jang Cooke: “I always recommend a pre-application conference. That seems to be helpful, even just to get to know the players.” ”

communities, especially for economic development, they're analyzing whether they want economic growth and wireless services or whether they want to make deployment so difficult that wireless services won't come in.

City Priorities

Pulidindi said surveys the National League of Cities conducted of its members indicate that infrastructure and economic development are two of the main priorities that many local elected officials face. “Making decisions about infrastructure that also generate jobs is always a huge win for local governments,” she said.

She said available information indicates that mobile broadband investments between \$34 billion and \$36 billion will increase the U.S. gross domestic product in 2017 by 1.6 to 2.2 percent and generate as many as 1.3 million new jobs. “That is huge for our members,” she said.

“Mobile broadband also enhances the community,” Pulidindi said. “Many people check housing developments to make sure that they can get online and access the information they need. For the residents, it helps enhance health care. It helps enhance access to education. And it

helps grow their local economies by helping build an environment of entrepreneurship. In addition, it's a huge driver in addressing digital divide issues by allowing otherwise non-adopters to take advantage of technology and learn how to use it based on what their needs are."

Broadband Barriers

Pulidindi cited a 2009 Pew Center for Research report by John Horrigan that indicated the main barriers to broadband adoption are cost and relevance. She said wireless communications subscriptions and devices are cheaper for many people and therefore propel broadband adoption with Internet access. "We understand that a partnership with the wireless industry is important because our communities demand broadband communications for current needs and for economic growth."

The National League of Cities represents members who are local elected officials in 1,600 cities, and the league also works with city staff members. It represents large cities, although most of its members come from small to medium-sized cities. Through state municipal associations, it represents an additional 17,000 cities.

Pulidindi said the National League of Cities has been trying to show its members how the investment in telecommunications infrastructure leads to economic development. She said it would be helpful to League members if wireless facilities developers could help them to understand how the infrastructure can be used to meet community goals, make

residents happy and improve the way they deliver services.

Elections and Turnover

The National Association of Counties includes America's 3,069 counties, Cooke said. It represents mostly elected officials and also some staff members who work at local government agencies. She said when the elected officials have to explain to constituents what they did about wireless facilities siting and why, it

“Julia Pulidindi: “We understand that a partnership with the wireless industry is important because our communities demand broadband communications for current needs and for economic growth.” ”

presents a challenge to applicants for wireless facilities permits because it can take days, if not weeks, to schedule a public hearing. Dissatisfied constituents direct their attention to the elected official — the county commissioner — not the permit applicant. "That's sometimes difficult for the applicant because now you have to deal with a new county official when that person gets elected out," she said.

Reflecting the turnover, Cooke

said the National Association of Counties' executive director attended an Association of County Commissioners of Georgia conference where, of the 700 elected officials there, 400 were new.

"This kind of turnover means there are many newly elected officials who do not know the process, who do not know the wireless facilities permit applicants, and who have never seen you before," Cooke said. "When you come in to file a permit application, even though you may have been dealing with the county for several years on several projects, the new officials don't know you and may harbor some suspicion. I always recommend a pre-application conference. That seems to be helpful, even just to get to know the players."

Rural Counties

Cooke said that of the 3,069 counties, about 2,000 are rural. They may share resources among several counties in a region, with one person processing wireless facilities permit applications.

"These people may need some help and education; offer that," she said. "We don't always have the resources and we're not inclined to have the taxpayer pay for that education. If you can help and offer those resources, it can go a long way toward developing your relationship and getting what you need done."

She said one of the most important uses of wireless communications is for public safety, and wireless communications are also important for schools and libraries. "Rural communities are even more dependent

on wireless communications because it's the only kind of access they have," Cooke said. "That touches upon telemedicine and health care that depend on the ability for someone to travel long distances quickly. You can only do that over broadband, and wireless is often the only solution."

Cooke said the counties recognize that wireless is the future and they want deployment. "At the county level, I don't think you'll find too many people that would say, 'We don't want you all here. We don't need it.' I don't think you're going to hear that message. We understand

the value and we would like to work with you to make sure that as many people as possible can have access," she said.

Atmosphere of Cooperation

Traylor said National Association of Telecommunications Officers and Advisors membership is a combination of elected and appointed city and county officials, including city and county employees in cable franchising, planning and information technology,



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Andy Rotenstreich, attorney and shareholder, Baker Donelson law firm.



Julia Pulidindi, principal associate for technology and communications, federal advocacy, National League of Cities.

REGULATION

along with municipal consultants. The association covers communications policy and issues from wireless to cable franchising and video to public safety communications. He said the FCC's wireless infrastructure order can be used by local governments to develop an atmosphere of cooperation with the wireless industry.

"The proceeding began back in 2011 with a notice of inquiry," Traylor said. "Industry complaints were raised and many concerns of local

governments were raised. Over time, we came to work together as interested parties trying to achieve a common goal of increased deployment of wireless facilities."

Educational Materials

The National Association of

Telecommunications Officers and Advisors executive director said when work leading toward the FCC order began, people in local government said the wireless industry doesn't want to comply with building codes, that they don't care if things fall down, and that local

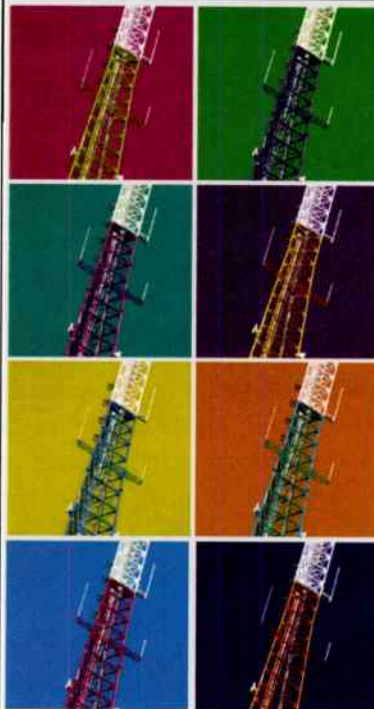


Yejin Jang Cooke, associate legislative director, National Association of Counties.



Steve Traylor, executive director, National Association of Telecommunications Officers and Advisors.

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government has to protect the public health and safety. "About 24 hours before the FCC voted on the order, which was a 5-0 vote, we were receiving phone calls from Commissioner Mignon Clyburn's office saying, 'She's really concerned with the 60-day time frame to act on 6409 applications. How about we get a commitment from PCIA and CTIA that they work with local governments to develop some educational materials?'"

"Out of that came a model chapter," Traylor said. "You can also call it a model ordinance. The reason we're calling it a chapter is because it's not the entire ordinance. It's something that local governments can drop into their existing code to address Section 6409, making it easier for localities to adopt it." The National Association of Telecommunications Officers and Advisors also put together a checklist that helps localities know what Section 6409 is all about and what they can ask for.

Using Model Chapters

"We have been getting feedback that some cities and counties are using them," Traylor said. "They're at least referring to them to make sure that process that they have in place complies with the requirements of Section 6409."

Cooke said the National Association of Counties first rolled out a draft version of the model checklist and chapter at its conference, and county officials had been waiting for the materials. "A few counties have already considered and examined our resources," she said. "Stearns County, Minnesota, took the ordinance that

we wrote and incorporated it into its existing set of rules. Other counties are adopting them outright with some conforming amendments. It has been helpful so far, and we'll only see increased use."

Pulidindi said National League of Cities members are looking at how to use the model ordinances. "Telecommunications is just one of a million things local governments need to provide, and this was eye-opening for them to help them realize how they may have been a roadblock or were perceived to be a roadblock in increasing wireless communications," she said. "They understand that residents complain to them when they can't get coverage on their cell phone. Our members are keen on trying to stop being a roadblock and on working with you to better connect their communities."

State Statutes

Traylor said proactive communities and a few states enacted statutes to address Section 6409. He's heard that they've been looking at the model ordinances to make sure that their current process complies with those types of rules.

Rotenstreich said many states already tried to address the matter with the help of PCIA. He said state wireless associations have obtained some of the state regulations, and some states support collocation by right. Meanwhile, Section 6409 served as a national effort to roll in the states that weren't willing to pass individual collocation legislation.

Some National Association of Telecommunications Officers and Advisors members have requested a

model application, Traylor said.

Communities that make it easier for developers to provide wireless services are the ones that are going to get them, Traylor said, noting he wouldn't say that some of them have themselves to blame for the services not coming, but they have to ask themselves what they are willing to do to achieve growth.

FirstNet

The Middle Class Tax Relief and Job Creation Act, of which Section 6409 is a part, created the First Responder Network Authority (FirstNet), which will be building a nationwide wireless broadband network for public safety employees and first responders. "We knew about Section 6409 when the legislation was going through," Traylor said. "Concerns were raised about Section 6409 and what type of effect it would have on local government authority over the rights of way." However, because the Act provided funding needed to start FirstNet, he said many local officials accepted the effect of Section 6409 in exchange for the improvement in public safety communications.

"We are concerned about FirstNet," Traylor said. "Some problems in Los Angeles affect how FirstNet might be rolling out. That's going to involve wireless infrastructure providers because it's a wireless project. You need to tell us what feedback you're getting and what roadblocks are still out there so we can address them and make sure that FirstNet is successful."

Photography by Don Bishop

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Integrated Wireless Networks and the Need for Higher Education

Engineers require expertise for designing integrated distributed antenna systems, small cells and upcoming 5G technology that universities should provide. Original equipment manufacturers are called upon to train technicians.

By Don Bishop

Connectivity Wireless Solutions' vice president of sales and marketing, Bryce Bregen, talked about the need for more education when speaking at the Wireless Infrastructure Show in April at the session "On the Edge of the Data Tsunami."

Don Bach, vice president of engineering at SAC Wireless, who led the session, asked how well trained the workforce is when it comes to handling technological advancements in LTE-A, LTE-B, and LTE-D, and what personnel and abilities existing DAS and small cell systems need.

Bregen answered that from an integration standpoint and from an end-user standpoint, the workforce doesn't have the expertise to design a network that incorporates DAS, small cells and macronetworks, let alone the coming changes expected with 5G technology.

"PCIA – The Wireless Infrastructure Association has taken steps in developing programs using the

Telecommunications Industry Registered Apprenticeship Program, but it leaves a large gap," Bregen said. "The folks in this room, PCIA and the HetNet Forum have a responsibility to universities' wireless engineering programs. They need to invest their time and their technology. We've been involved with Auburn University and Georgia Tech for the last four or five years. It really takes an investment of time because this is new."

Bregen said the engineering side has the biggest knowledge gap, and it's something that industry participants can do something about. "They understand the basic concepts of wireless, but they don't understand all of the technologies that need to be incorporated to make a seamless network," he said. "Spend time at your local universities and start working on it, because it's not just about the technicians. We have Building Industry Consulting Service International (BICSI)



Bryce Bregen, vice president of sales and marketing, Connectivity Wireless Solutions. Photo by Don Bishop

to help us understand what needs to be pulled and where."

BICSI is the standards community for low-voltage cabling, and Bregen has been involved with BICSI for five years. "A lot of the consulting community has taken advice for some of the DAS and small cell construction at their facility using these consultants. They go out there and they design these systems. Unfortunately for a lot of the consulting community and for our general contractors

constructing new buildings or new venues, this technology is not just something that you can, as I say, build a DAS in a box and try to out think both carriers and the technology itself four or five years before it actually comes out of the ground.”

Bregen said working that way presents a big challenge, especially from the engineering side. “We’re trusting a few folks from a consultant side to be able to design our networks, and we just don’t think that we’re there, yet,” he said. “I implore those who are specialists in the wireless industry to get involved in BICSI. Spend time with them and work with the consulting community to help us build a better wireless future.”

From the technician side, Bregen said it’s up to the original equipment manufacturers to train technicians early on to make them a part of the community involved with DAS, small cells and what’s coming with 5G technology.

Bregen spoke about the need for a DAS standard, too. “In our five years in the DAS industry trade for BICSI, we have yet to develop a DAS standard,” he said. “That’s just a shame. With the technology changing so rapidly, I can understand it, but in the future we’re going to have to get to a point where we can recommend and suggest that we have a strategy that’s going to make it work for everyone.”

As for wireless network technical strategy, Bregen said it’s necessary to get the base station antenna closer to the user’s wireless device. “It’s going to be a combination of macrosites and small cells,” he said. “We have some great engineering minds here. The challenge for the folks in this room and for our end users is going to be tied to how do the networks come up with a strategy that’s going to satisfy their end users. It’s the combination of things that’s going to make it happen, and the education side of it is going to be a big part because if we rely on the carriers to deploy all of this technology, I don’t think they have the budget to support it by 2020.”

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Software Aids in Decommissioning Telecommunications Antenna Sites



Part Three — Project execution, compliance and collaboration improve with software assistance for equipment decommissioning at cell sites. The software has applications well beyond the scope of such projects, too.

By Don Bishop

Laith Dahiyat, vice president of products, Trucker Path. Photo by Don Bishop

Software tools enable more effective project execution for decommissioning work at telecommunications towers. The tools enable tracking and auditing of work and project management. They track and audit business intelligence and the analytics that assist with decision-making. They track vendor performance and compliance, along with the successful execution of any program.

“Software vendors look at pain points,” Laith Dahiyat said, speaking to an audience at the Wireless Infrastructure Show in April. At the time, he was director of global strategy with Accruent, a company that provides site, lease, project, facilities, asset management and facility capital planning software and services that are designed for specific industries. Dahiyat has since become vice president of products at Trucker Path.

Dahiyat said the first decommissioning pain point to look at is the quality of project execution and associated data that result from field work. He was referring to documents and photos that need to be collected, time stamps and proof of completion for project tasks. He said that typically on large programs, complex vendor ecosystems have a relatively low quality of execution and data when tracking tools are not properly used. Speaking at the session “Decommissioning Aging Cellular Infrastructure” led by Rich Berliner, the chief executive officer of Red Wing Electric, Dahiyat said poor execution leads to slow and inefficient processes being repeated over and over again, sometimes across an entire country.

A second pain point is visibility and compliance. He said many program directors and vice presidents lack an

accurate picture of what goes on in large-scale programs. They even have a harder time drilling down into individual regions, markets and projects. Thus, they don’t have a true picture of internal compliance and sometimes vendor, contractual and regulatory compliance.

A third pain point involves complex collaborations that are common in the telecommunications industry. “You have operators, tower companies and a huge ecosystem of vendors running these projects in the field doing everything from electrical work to tower climbing,” Dahiyat said. “You need ways to enable a more effective collaboration. You want the right people out on the site at the right time doing work and working together, but also holding each other accountable for performance.”

Dahiyat said that companies can put increased visibility into programs,

improve the quality of execution and enhance collaborations. What follows is an improved, or shortened, time to market. He said for a variety of reasons, decommissioning programs need to be completed quickly and in a high-quality fashion. "The effective use of software tools can definitely enable that," he said.

Here are some examples of actions or activities that are streamlined, automated or made more effective through the use of program and project management software together with equipment and asset-tracking software.

Mobilized Workforce

"You want a mobilized workforce," Dahi-yat said. "You want all the different vendors in the field to be able to pull up a mobile device and look up what their project task is, the current configuration on the site and how to access the site. Any data that's typically stored on somebody's spreadsheet on their laptop or in an ERP

Decommissioning Article Series

September, Part One, Equipment: "How to Decommission Equipment on Cell Towers"

October, Part Two, Technology and Spectrum: "Carrier Mergers and New Spectrum Lead to DAS Upgrades and Decommissioning"

November, Part Three, Software: "Software Aids in Decommissioning Telecommunications Antenna Sites"

December, Part Four, Landlord Perspective: "What Owners Need to Know About Cell Site Decommissioning"

system behind their firewall in their office, you want to be able to pull that up in a secure fashion on a mobile device."

Employers want to be able to handle unplanned maintenance or trouble tickets that pop up while on-site. They want to be able to effectively manage the crews, and being able to pull up a mobile device, create trouble tickets and route

crews in real time using a geographic information system and geo-fencing helps with crew management. Employers want field crews to be able to document their work. The crews want to be able to take a photo of the work they've done, upload it to the system in real time from the field to track what they're doing, and then to get paid on time.



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Punch lists and close-out packages are important. Dahiyat said that without a reliable collection of data and documents, it could be difficult to pull together a close-out package.

Another matter involves site access and security in the world of access termination and site key management that can be streamlined through mobile applications and software.

Sometimes operators large and small have disparate systems, and sometimes they don't use the systems they have. For a mobile application to be effective, the right data has to be available, and that means having a central database for projects, tasks and documents. Dahiyat said many previous mobile apps lacked critical functionality such as offline capabilities for use in locations with no network access.

"And then there are also considerations connected with bring your own device and proprietary data getting downloaded to somebody's device, and then that person is fired, and yet they

have your whole program and proprietary information on their device," Dahiyat said. "It's a big issue, and it's a combination of things."

Consumer Uses

Software vendors are investing in apps that also can be used by consumers. Dahiyat said Android stores and iOS stores make available apps with geofencing technologies and social media check-in, check-out. Some consumer capabilities may appear in enterprise applications for field force mobilization for going to the site, checking-in, checking-out, and having accountability from a work crew perspective along with using GIS technologies to track who did what work, when and where.

For leasing and financial auditing, having a centralized tool that is automatically tracking critical data and financial obligations and, more importantly for decommissioning, a central storage for historical records of lease documents and legal documents is

critical when the network starts to get decommissioned, when assets are sold or when spectrum is refarmed and sold.

Accountability

Without an accurate record of what equipment is already on the site, accountability becomes a problem. "You need to know if somebody's removing something, what are they removing and when are they doing it," Dahiyat said. "Equipment loss is a huge problem not only in developing countries but also in the United States. Hundreds of millions of dollars' worth of generators probably go missing every year, let alone other pieces of equipment."

Software can help with asset retirement obligations, giving a holistic single system or record that indicates what steps the owner is obligated to perform when an asset is retired.

Software can be an enormous help with regulatory compliance. One example would be E911 filings. Dahiyat said that any time a change happens on a site, software can automatically and accurately update external systems and government websites to reflect the new state of the network and the new state of a telecommunications antenna site. Software can automate processes with governmental and regulatory websites to download forms, fill them in and re-upload them to FCC, FAA and other websites.

"Software with a searchable database that has integrity allows you to quickly slice and dice the day and look at your network and your infrastructure in many different ways," Dahiyat said. "It makes what seems like a non-manageable situation of thousands and thousands of sites and pieces of data a lot more manageable."



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Is the Tank or Tower Designed to Support the Extra Load?

Understanding the tank or tower's history, types of stress it has encountered, modifications made and maintenance conducted can help determine whether it can support an additional load.

By E.N. Henderson

Most tanks and towers are custom-designed for a specific purpose, but they also have the unique ability to provide a variety of services. For example, elevated water tanks are designed to store water, but because of their "high standing," some are also classified as landmarks. They can be good places for advertising. Some provide excellent structures for housing navigational beacons, public address systems, cameras and antennas. Demand for these other services may require the structure to support an extra load for which it was not originally designed. A structural analysis should be performed to determine if modifications are necessary to safely support the extra load.

Structural Analysis

A structural analysis should be performed on all tank and tower structures before mounting any accessories on them. A structural analysis is often performed to determine the current state of structural stability and specific characteristics of the structure's

design, such as bracing details, seismic requirements and wind loads. Most new tanks are designed to withstand 100-mph winds blowing in any direction, but some locations require a wind design load of more than 120 mph. If a tank is several years old, it may not have been designed to current standards, and the original drawings should be reviewed to verify the tank's design load. Several other types of

loads may also be considered for tanks: dead load, water load, roof design load, snow load, live load and eccentric load. Vortex shedding and the slender effect may be considered for single-pedestal tanks and standpipes.

The analysis can determine how many, if any, devices can be safely secured to the structure without compromising its structural integrity. An inventory of existing antennas and



other appurtenances, such as ladders, balconies, stairs, platforms, handrails, guardrail assemblies, catwalks and transmission lines, can help determine if their location and spacing are adequate.

According to Telecommunications Industry Association (TIA) standards, “The structural configuration and the size of all structural members must be mapped in order to calculate wind loading and member capacities. The quantity of antennas/items and the locations of each should be listed.” A checklist for maintenance, condition assessment and field-mapping of structures and appurtenances can be found in Annex J of the TIA standards.

The structural analysis may conclude that the structure is not capable of withstanding an extra load safely. Repairs or modifications may need to be made to accommodate the extra load. The good news is that almost every tank and tower can be modified to accommodate an extra load.

Modifications

The demand for additional load continues

to increase, but new construction sites are becoming more difficult to acquire. New construction will require time, planning, engineering studies, soil analysis, new foundations and new materials. But there is another solution — almost every tank and tower can be modified to meet new load or seismic requirements. Modifications require a fraction of new construction time, and savings can be significant. Foundations can be modified and more anchors added. Reinforcing plates and stiffeners can be added to increase and spread the load. Raising the elevation of a tank or tower can also provide additional space, but it is important to remember that all modifications should be performed only by trained professionals.

Safety

With any type of tank or tower service, safety should always be the top priority. The right company should provide necessary certification documents and licenses to perform the work legally and safely. The company’s total recordable injury rate (TRIR) and employer

modifier rate (EMR) should also be reviewed before hiring. A TRIR below the Bureau of Labor Statistics average for their industry should be maintained, and EMR should be below 1.0. All Occupational Safety and Health Administration (OSHA) regulations should be followed, and all crews should be equipped with proper safety gear and carry radiation meters to check for exposure. Access to the tank interior should not be permitted unless safety and sanitation precautions are taken to prevent accidents and water contamination.

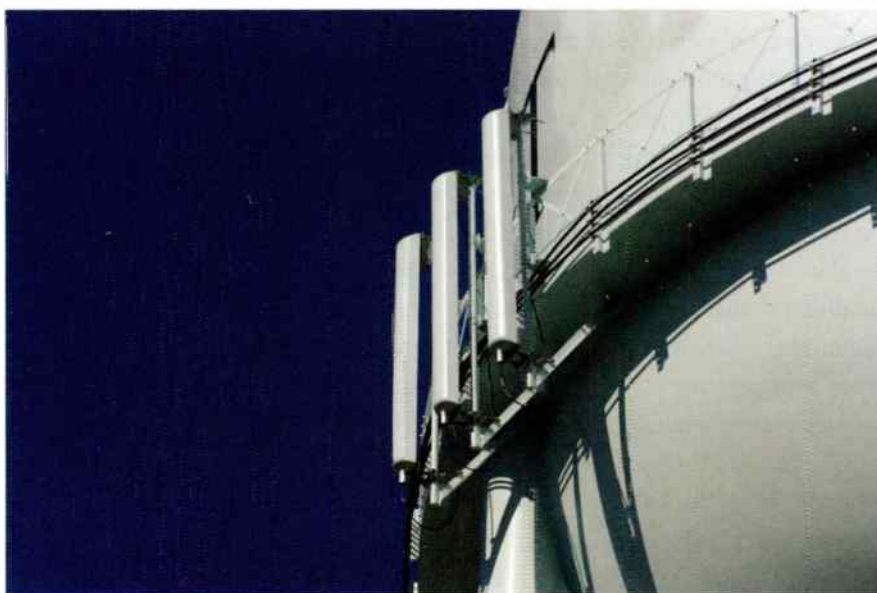
Schedule Inspections

Once the structural analysis is performed and the appropriate number of antennas and appurtenances are attached to the tank or tower, it should be inspected regularly thereafter. Regularly scheduled tank and tower inspections can inform the owner of structural, safety and coating deficiencies. When deficiencies are repaired in a timely manner, a tank or tower can be maintained indefinitely.

Water tanks and towers should be inspected at least once every three to five years, as stated in American Water Works Association (AWWA) and National Fire Protections Association (NFPA) documents. Self-supporting towers should be inspected at least once every five years, and guyed towers should be inspected at least once every three years, in accordance with EIA TIA 222G, Federal Aviation Administration (FAA), and Federal Communications Commission (FCC) requirements. Tanks and towers that have been subjected to extremely high winds or severe storms, or that have been struck by something, should be inspected immediately.

Antennas should also be inspected





regularly for proper azimuth alignment and for damage. Covers should be present and free from cracks or tears, and all antenna equipment should be rust-free, in use, and connected to the tank or tower properly in accordance with FAA requirements. Obstruction lighting may need to be installed or modified to meet those requirements. Antennas should also be placed where they will not be an obstruction to the maintenance crews. According to AWWA, "Access to antennas and related equipment should comply with Occupational Health and Safety Administration regulations. This may require a safety rail around the installation, anchor points on the tank roof for personnel tie-off, ladders, or other fall prevention devices. Antenna cables should be supported at regular intervals (about 4 feet [1.2 meters] on center) in exposed locations. Antennas and related equipment should not interfere with OSHA-defined access. For instance, cables should not be attached to ladders or obstruct manholes and platforms. Cable ladders or other commercially available cable support systems should be used."

During the inspection, precise measurements, test results and photographs must be documented. Drawings should be reviewed and verified with the inspection report. An inspection report should clearly state the structure's current condition and what repairs are needed to achieve optimal condition. Any damaged, loose or missing members, visible cracks in welding connections, or any platforms and catwalks that are not secured should be listed. Guy wires and windage rods should be tightened to proper tension. Emergency structural repairs, safety repairs and all deficiencies should be listed in the report with photographs and preventive maintenance recommendations.

All documentation regarding a tank or tower should be stored safely for easy access. Store all original construction drawings, specifications, inspection reports, analysis performed and documentation of any repairs and modifications to the structure. This information can help determine the deterioration rate of the structure, materials used during repairs and the



work performed. Understanding the tank's or tower's history, types of stress it has undergone, modifications made and maintenance conducted can help determine if it is designed to support an extra load.

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E.N. Henderson is a freelance writer with six years of experience in the tank and tower industry. Her email address is ENHenderson@HendersonWritingSpider.com.

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HAWTHORNE

HEIGHT

158 FEET

TOWER TYPE

WATER SPHERE

WIRELESS CARRIER

VERIZON WIRELESS

AT&T MOBILITY

SPRINT

OWNER

ELK GROVE VILLAGE

MANUFACTURER

CHICAGO BRIDGE AND IRON

YEAR CONSTRUCTED

1995

LOCATION

ELK GROVE VILLAGE, ILLINOIS

Photography by Don Bishop

Eight Habits Driving Highly Successful Wireless Deployments

When it comes to determining the best fit for in-building or outdoor wireless needs, it is best to discount the hype and really think about what you are trying to accomplish.

By Todd Landry

When deploying cellular solutions in a business, the starting point should be where the money is ultimately generated and real benefits are achieved for the business — the end users. The decision-maker within a facility is becoming increasingly responsible for ensuring that the wireless communications goals of mobile users in the business are met. When you look at most facilities, especially public ones, you find users with various types of mobile devices subscribing to different carriers. Considering what consumer wireless devices are in use is key because older hardware only supports certain technologies.

For example, iPhone 4 users do not enjoy the high-speed capabilities of LTE. Many enterprises are implementing a BYOD (bring your own device) strategy, so we are back to the same needs as a public venue.

These facts should drive your objectives for enabling a facility with tech-

nology that is flexible enough to address short- and long-term needs, such as enabling multiple operators with multiple technologies (e.g., 2G, 3G, LTE). More importantly, because mobile technologies are constantly evolving, you should take into consideration how the system will be ready to support newer technologies with minimal disruption. For example, there are forthcoming frequency bands such as AWS-3 or WCS that will

“Consider the flexibility of the system when delivering quality signal to different areas within your facility with baseband sectors. Antenna, power and quality of the solution are critical.”

need to be supported. You will need to ensure your network can easily support these changes without ripping out and replacing existing equipment.

Bars Versus Data

Be sure not to confuse having good coverage (all bars visible on the phone), or signal, with good capacity (data throughput). Ninety percent of mobile device use in a business or entertainment setting is driven by data exchange. This clearly indicates that a solution needs enough baseband processing within a given area to provide good data performance to a certain number of users. In the cellular world, these areas are called sectors, and the dimensions of a sector can vary based on the nature of the venue and the typical high-density locations. Multiple users will be connected to a single baseband processor. Its performance determines the number of active users — the more users, the lower performance per user. More importantly, if the baseband

processor for a given area has a limit on the number of active users that is below typical demands, the performance per user will drop off sharply.



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Providing Support by Standing Together

“The Nevada Wireless Association supports the efforts of the Tower Family Foundation and has made them a recipient in our annual charity golf tournament. Best of luck to the Foundation as you continue to grow and help those in need!”

Chris Wener
Nevada Wireless Association President

“As a climber with 17 years of experience, I've seen firsthand the hurt and the pain caused by the loss of a fallen friend and fellow tower climber. I am grateful and humbled to know there is an organization that has resources to assist tower climbers and their families during times of need.”

John Gates
Tower Climber from ATS

“I want to thank everyone involved for making this happen! Synergy Concepts will be donating to the Tower Family Foundation and encourages other companies in the industry to donate as well.”

Russ Chittenden
Vice President of Synergy Concepts, Inc.

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These facts should drive your objectives for reviewing the user base, its typical locations and high-density areas. This data provides the benchmarks for the number of users that need to be supported in an area. Keep in mind the baseband is different for each mobile operator and, thus, you also should consider estimating your users based on each one. Now, consider the flexibility of the system when delivering quality signal to different areas within your facility with these baseband sectors. Antenna, power and quality of the solution will be critical here.

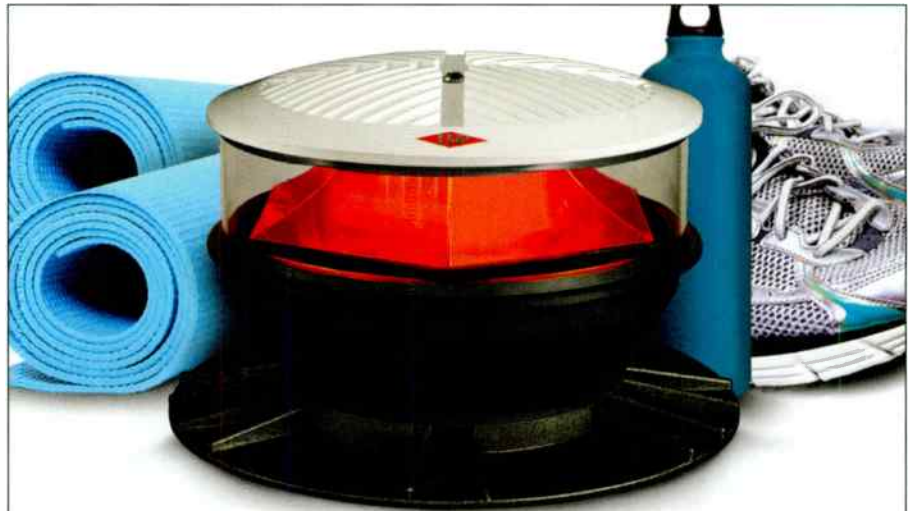
Noise Versus Audiophile

Wireless ultimately means signals in the air modulated with information. These signals are analog by definition. More importantly, the antennas that transmit them must be designed for your facility. For example, when signals overlap it creates interference; therefore, we must thread the edges of wireless cell service in a venue like a fine, detailed quilt. When the edges overlap too much, users are in a handover state from one signal (cell) to another. Performance is degraded during this time.

Furthermore, the quality of these signals is a critical element in the quality of the service (QoS). These signals are produced and delivered into the air via antennas, which are powered by amplifiers. In some approaches these two components are separate and can be mixed and matched based on a venue's needs. However, in others they are integrated, and your options to optimize are limited. In many ways, these elements are similar to the speakers and amplifier in your home audio

system. Your speakers come in numerous sizes to better articulate various sounds, and the amplifiers have different-quality specs to reproduce sounds accordingly. If you skimp on speakers or on your amplifier, how

well will your favorite track sound? Asking the right questions regarding signal production is a key data point. Keep in mind that a given set of antennas and amplifiers (known as remote units in a distributed



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antenna system or DAS) can be designed to support many different signals (or bands), thus enabling multiple mobile operators if designed correctly.

Now, one last thought on antennas. They operate much like balloons. Yes, balloons — or at least, they should. If you add air to a balloon, it will swell in a specific direction, based on the type of balloon. The air is like the cellular signal energy being delivered from the amplifier. The shape is determined by the quality of the antenna's phaser design. This shape is known as the antenna pattern, and some antenna designs can have strange artifacts such as back lobe or side lobe patterns that interfere with other antennas.

These facts should drive you to

ask detailed questions about how a system will reproduce the signals of multiple operators and support

“ Keep in mind that a given set of antennas and amplifiers (known as remote units in a distributed antenna system or DAS) can be designed to support many different signals (or bands), thus enabling multiple mobile operators if designed correctly. ”

all of their bands within the different areas of your facility. Include

questions on whether your supplier controls its own antenna designs and ask to see the 3-D image of the patterns. Be sure to look at them across a wide range of frequencies, because the characteristics may change and, hence, the performance. Amplifiers are either in the form of remote units or may be an integral part of a small cell unit. A vendor should also control its designs to ensure the best performance. Remote units should come in different power ranges and can be used with various types of antennas to support assorted combinations of room sizes, and both indoor and outdoor scenarios. Again, the selection should allow you to optimize the delivery of quality signal for multiple operators across all bands and within



At night, the BTSs at the C-DAS headend switch over to serve sports complexes. Graphics courtesy of ABI Research

different areas of your venue.

Centralized Versus Distributed

The choice of centralized or distributed equipment should be based on several environmental factors. First, the available space within your facility should be a key consideration. If you have to build out special space, then it will add cost and time to the project. If it is a space that can best be used to generate revenue, then using it for wireless equipment may not be the best option. The other factor to consider is how many facilities you are planning to service with wireless, and how end users throughout a given week use those facilities. Using a centralized solution in a lower-cost facility and

then dynamically allocating the wireless resources to different venues as you need them can be a much more

“ DAS solutions separate antennas and their amplifiers (known as remote units that include more than just an amplifier) to allow the beams of antennas to be selected based on the room size or shape and the amplifier to be selected based on the required power needed. ”

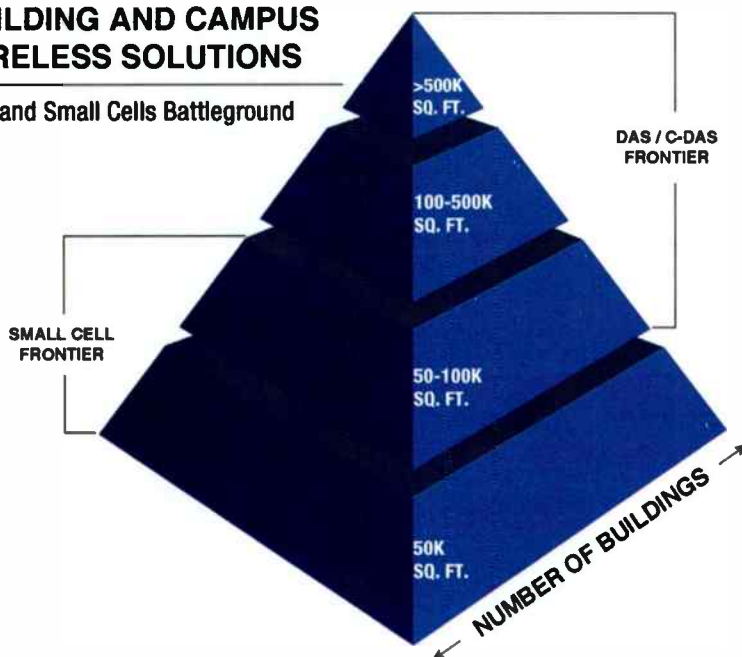
effective use of capital.

Furthermore, it is good to evaluate

options for bringing different operators' signals into your facilities. A good architecture will allow each operator to host equipment within different sites while converging them within your venues. One of the common terms today is C-RAN, with the C sometimes standing for cloud or centralized. The critical factors include the functions of the radio access network (RAN), which are off-site and have nothing to do with producing that quality signal within your venues. So, the question you still need to address is: What is the best way to deliver signal, even if derived from a C-RAN, into your facility? One of the approaches that achieves this and complements C-RAN is C-DAS or

BUILDING AND CAMPUS WIRELESS SOLUTIONS

DAS and Small Cells Battleground



Distributed antenna system (DAS) networks serve large buildings well. Small cells serve small areas and buildings well. The two technologies compete in the middle ground of buildings from 50,000 to 100,000 square feet. *Graphic courtesy of JMA Wireless*

centralized distributed antenna system architecture, which enables one or more C-RAN sites to deliver signal into venues in an extremely precise manner while reducing the on-site equipment footprint by as much as 85 percent. More importantly, C-DAS architectures also have the intelligence to shift cells (sectors) from one location to another, allowing a certain percentage of the C-RAN technology to be reused during the ebb and flow of end users across different venues and times.

These facts should drive you to look at the solution you need holistically, across the entire campus or metropolitan area. If you are a neutral host, consider how you may make use of a common site in a way that is more effective or productive in relation to its cost and the time required

to deliver solutions to surrounding businesses or entertainment venues. Moreover, it is critical to understand the flexibility necessary to achieve your multi-operator, multiband goals across numerous facilities or venues from a central location. If you have a large facility, such as a multitenant office building or entertainment complex, and if you have the data center

footprint to house the head-end equipment, this may be a good location to host it.

Small Cell Versus DAS

Perhaps the most over-hyped term today is “small cell,” and depending on whom you speak to, its definition will vary. The Small Cell Forum defines it as an umbrella term for operator-controlled, low-powered radio-access nodes, including those that operate in licensed spectrum, and unlicensed carrier-grade Wi-Fi. Small cells include femtocells, picocells and microcells and may deliver signal to a distance from 10 meters to several hundred meters. On the smaller side (femto and pico), a simple way to comprehend these is to consider them as little base stations for a single cell. Generally, each has the baseband capability, but they are always limited in three factors: the number of operators and bands they support, the number of active users within the cell, and the control over the antenna beam. Also keep in mind that each of these devices requires power, and most often they are connected via the Ethernet standard PoE (power over Ethernet), which has an inherent limit of less than 100 meters as well as limits on

The Eight Habits

- End user and venue needs
- Bars versus data
- Noise versus audiophile
- Centralized versus distributed
- Small cell versus DAS
- Infrastructure and operations
- Mobile versus desk phone
- Compatibility and future readiness

the power it can deliver. Another form is a remote radio head (RRH) that is connected via fiber to a central baseband unit (BBU), but these typically require a separate antenna and fit into the microcell category. These RRHs vary, but they are typically deployed on an operator-by-operator basis, so multiples are needed to create multi-operator coverage.

DAS platforms focus on redistribution of signal from a central location and do not have baseband technology integrated. The better DAS platforms support all mobile operators and all bands in a single system. As noted previously, DAS solutions separate antennas and their amplifiers (known as remote units that include more than just an amplifier) to allow the beams of antennas to be selected

based on the room size or shape and the amplifier to be selected based on the required power needed. Remote units are aggregated at a head-end called a master unit, the best of which can run over a single fiber-optic strand. Master units should allow multiple operators to be converged, including all the bands, and should allow for many remote units of varying power levels to be connected.

These facts should drive you to consider the nature of the venues being covered. If they are larger venues, greater than 10,000 square meters (107,600 square feet), and if you want multiple operators and bands to be supported, a DAS can accomplish this most effectively. If you want to cover more than one facility, including outdoor areas, and the rooms have varying

shapes that create signal blocking, then the flexibility of a DAS may be more suitable. If you have a small facility with open and consistently shaped rooms, a small cell may be suitable. However, even for a limited number of operators, multiple small cells may be required in each room. Keep in mind that in all cases, these require mobile operator cooperation, and none of these systems have evolved to the do-it-yourself level unless you have deep experience in RF (radio-frequency) engineering. Each requires some form of connectivity, either Category n wiring (CAT5, CAT6) or fiber optics. Fiber will inherently provide you with more capacity, and most multi-operator solutions that are well designed can minimize the fiber required. Using CAT5/6

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wiring that is already in a building is convenient, but unfortunately this limits the capacity and distance.

Infrastructure and Operations

Regardless of the approach you take, you will need to use existing infrastructure or add new hardware.

Similar to most IT systems, it will need to be optimized over a period of time and, typically, monitored and updated. You can look at two areas as you study the effect of a system on your facility — and both can drive costs and disruption. The first is the transport methods used to connect antennas into the mobile operator's network. Most often the solution warrants fiber optics to achieve the capacity to carry the RF signals.

Some systems are better than others at converging multiple bands of signals from multiple operators onto common fiber, thus reducing the amount you need and potentially allowing you to use existing fibers. Some will operate over CAT5 copper wiring, although it will have limited capacity and limited distance — again, you need to

consider the multi-operator and multiband requirements. Also, be aware that all of these systems require power and various additional power outlets, and consumption is required. The second area is the tools that are part of the system that help commission, monitor and adjust it over time. Some systems integrate automation techniques that eliminate the need for technicians to visit your businesses. Others include tools that are accessed remotely. Be wary of systems that require mounting of active and powered equipment in office ceilings or areas that will disrupt your workforce. A good system can be serviced from locations that will not disrupt your business.

These facts should drive you to create a set of questions about installation and infrastructure requirements. They should cover initial power, transport and mounting locations as well as servicing plans that avoid potential disruption. Ask about each component of the system in your facility and how and when it needs to be accessed. You will need to ensure technicians can access your facility. Inquire about the admin-

istration tools, reporting and monitoring capabilities. A good system should provide remote visibility of the RF performance and allow many of the adjustments to be handled remotely. This can save on costly repeat visits.

Mobile Versus Desk Phone

Yes, the mobile device has replaced your office phone system — whether your PBX team admits it or not.

Today enterprises spend millions of dollars on fixed, in-building telephone systems, many of which sit idle while users reach for their mobile devices to make and receive phone calls. The consumer industry has seen a mass exodus from the wired home phone with only 59 percent of U.S. households still using a landline and a cell phone. Now, enterprises are considering the same move. There are some areas, such as call centers, where fixed is necessary, but the majority of business users prefer mobile, and businesses can benefit from enabling an untethered workforce. Many organizations have moved to BYOD (bring your own device)



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These facts should drive you to consider your communications plan and program holistically. Perhaps making the move to an all-wireless, untethered business is a natural and innovative next step. Balancing in-building mobile coverage and capacity when reviewing the overall program and budgeting has become a key topic among CIO teams. There can be significant benefits, both economically and in productivity, when you make the move to a wireless enterprise.

Compatibility and Future Readiness

The only constant in the wireless industry is change. There will be new technologies you will need after you deploy your facility's system. Ensuring the proper end user experience is

crucial and, as a result, you should pay attention to how well a solution within your facility can support a range of current options and can also transform and support forthcoming technologies. As previously mentioned, systems that can be maintained (this includes upgrades) in a manner that is not disruptive to your business are important. However, you need to consider other factors such as how easily the system can be modified to support new modulations while using the same hardware. Can the technology be augmented to support multiple-input, multiple-output (MIMO) communications in order to increase the bandwidth per user?

If you are considering one or a subset of available mobile operators, then does the system easily migrate across them, or can you add other

operators if your business model changes? Recently, new spectrum was acquired by several operators, and you should ensure your system supports these changes.

These facts should drive you to take a good look at the different mobile operators and their supported technologies. This may be a challenge if you are not up to date on the latest technologies, but a good consultant can guide you. You absolutely should have your supplier walk through as many change scenarios as you can possibly think of to fully comprehend the additional costs for services and infrastructure and the potential disruption that will occur.

Todd Landry is corporate vice president of product and market strategy at JMA Wireless. Visit www.jmawireless.com.

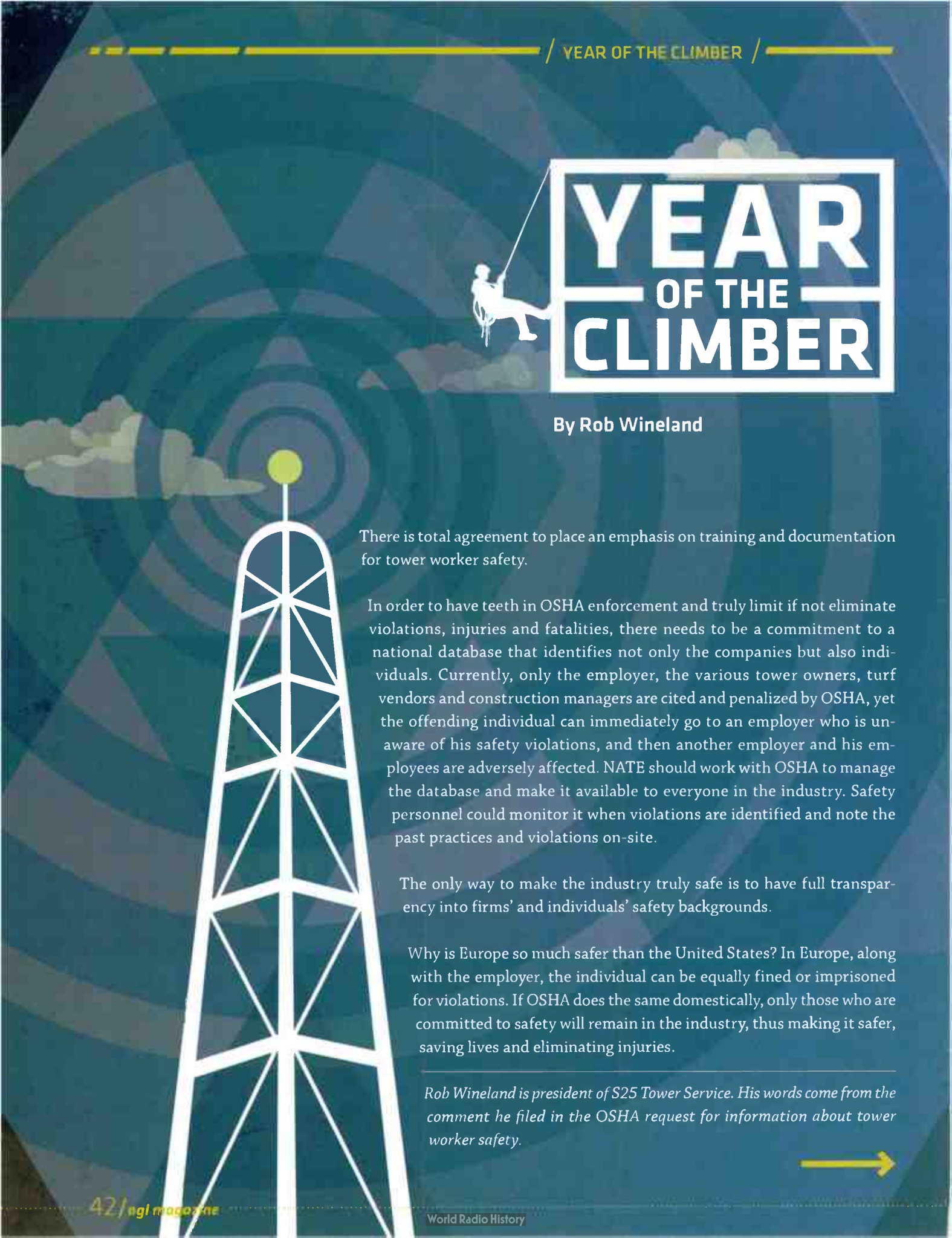
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YEAR OF THE CLIMBER

By Rob Wineland

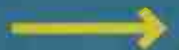
There is total agreement to place an emphasis on training and documentation for tower worker safety.

In order to have teeth in OSHA enforcement and truly limit if not eliminate violations, injuries and fatalities, there needs to be a commitment to a national database that identifies not only the companies but also individuals. Currently, only the employer, the various tower owners, turf vendors and construction managers are cited and penalized by OSHA, yet the offending individual can immediately go to an employer who is unaware of his safety violations, and then another employer and his employees are adversely affected. NATE should work with OSHA to manage the database and make it available to everyone in the industry. Safety personnel could monitor it when violations are identified and note the past practices and violations on-site.

The only way to make the industry truly safe is to have full transparency into firms' and individuals' safety backgrounds.

Why is Europe so much safer than the United States? In Europe, along with the employer, the individual can be equally fined or imprisoned for violations. If OSHA does the same domestically, only those who are committed to safety will remain in the industry, thus making it safer, saving lives and eliminating injuries.

Rob Wineland is president of S25 Tower Service. His words come from the comment he filed in the OSHA request for information about tower worker safety.



Federal Legislators Urge FCC to Enforce RF Safety Protocols



On Sept. 17, 2015, a U.S. senator and a U.S. representative sent FCC Chairman Tom Wheeler a letter expressing concern for the safety of people who work near cellular antennas.

By Richard Blumenthal and Anna G. Eshoo

Dear Chairman Wheeler,

We write with concern for the health and safety of the estimated 250,000 people who work each year in close proximity to cellular antennas and may be exposed to radio-frequency (RF) radiation in excess of the Federal Communications Commission's (FCC's) human exposure limits. Excessive exposure to RF radiation leads to well-documented potential harms, especially to workers who spend time near the antenna and in the line of the antenna's beam. At sufficient power levels and exposure durations, RF radiation has the ability to heat biological tissue. Thermal effects can include eye damage, sterility and cognitive impairments.

Even though the FCC recommends that wireless carriers control exposure to harmful RF radiation using safety protocols such as signs, barricades and training, it has come to our attention that these recommendations have not consistently been implemented to protect workers.

We urge the FCC and the Occupational Safety and Health Administration (OSHA) to work together to enforce exposure limits and ensure wireless carriers are taking the required precautions to protect the safety of all persons who may be exposed to dangerous levels of RF radiation near wireless towers.

To close gaps in their networks

and to satisfy the voracious consumer demand for their services, wireless carriers depend on leasing rooftop space and building access from property managers. As a result, cellular antennas are now found atop all kinds of buildings, including apartment buildings, schools, hospitals, places of worship, fire stations, communications towers and other public and private buildings. Even our nation's cellular towers, which are generally free-standing structures with restricted external access, also pose both RF radiation and climber safety occupational hazards that need to be addressed to protect the workforce.

Rooftop and building-mounted

antenna sites also endanger not only the wireless industry's trained RF technicians but also roofers, water proofers, electricians, carpenters, building maintenance personnel, HVAC technicians, painters, firefighters and other workers who may come in close proximity and be placed at risk of RF injuries.

While wireless carriers take important precautions, such as outfitting their employees with protective equipment, providing RF exposure monitoring units and even powering down antennas to eliminate the RF radiation hazard, their subcontractors and unaffiliated third-party workers are not regularly afforded these same protections. These subcontractors and third parties often receive no RF safety training and are left on their own to determine the existence, location and degree of the RF radiation hazards.

Further complicating the situation, RF radiation cannot be felt, and many cellular antennas these days are constructed in a camouflage style and made to look like part of the buildings they are attached to. Known as stealth antennas, they can be undetectable to the untrained eye. This practice further hinders efforts by even the most earnest workers to properly protect themselves. It is crucial that workers are able to take steps to safeguard themselves from the RF radiation.

A report last October from the *Wall Street Journal* revealed that

one in 10 antenna sites does not adhere to FCC guidelines for providing the appropriate level of awareness and control to workers who may be exposed to RF radiation above the limits for the general population. In addition, last year, Verizon Wireless and the FCC's Enforcement Bureau entered into a consent decree for Verizon's alleged violations of RF exposure limits at rooftop antenna sites in Hartford, Connecticut, and Philadelphia. It is unacceptable that RF warning signs have

“ It is unacceptable that RF warning signs have been found missing, mislabeled, unintelligible or out of date, and that strategies to control access (e.g., barricades, locks and fences) are in disrepair. ”

been found missing, mislabeled, unintelligible or out of date, and that strategies to control access (e.g., barricades, locks and fences) are in disrepair.

In light of these problems, the FCC has a responsibility to ensure the existence of — and compliance with — a comprehensive worker-safety framework.

We are pleased that the FCC's March 27, 2013, Report and Order reminds FCC licensees of their obligation to address worker exposure issues and clarifies that workers subject to the occupational limits

must be fully aware of and able to exercise control over their RF exposure. We have also noted that the Further NPRM advances new specific requirements for ensuring licensees comply with exposure limits under the different RF exposure categories.

We urge the FCC to move swiftly to finalize the Further NPRM and to consult with OSHA and others to ensure that the final rule is effective. We also expect that in the interim, the FCC, in collaboration with OSHA, will continue to proactively enforce all existing requirements, including tower-climber safety, and hold accountable all licensees that fail to implement the safeguards required to protect workers.

We look forward to hearing what next steps you have planned to make sure that the expansion of our telecommunications infrastructure does not come at the expense of the health and safety of hardworking Americans. Thank you for your attention to this very important occupational health and safety matter.

Sincerely,

Richard Blumenthal
United States Senate

Anna G. Eshoo
Member of Congress

Richard Blumenthal is the senior U.S. senator from Connecticut. Anna G. Eshoo is the U.S. representative for California's 18th congressional district.



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Telecom Industry Association Promotes Tower Worker Safety

For TIA, it's all about standards. Edited for length and style, the following information comes from the Telecommunications Industry Association's comment in the OSHA request for information about tower worker safety.

By Mark Uncapher

The Telecommunications Industry Association Engineering Committee TR-14 develops standards that affect the design, fabrication and production of antenna towers. TR-14's specifications allow carriers to effectively and reliably relay communications via antenna towers. As the industry's support structures continue to age, reliability and maintenance issues will be crucial to the longevity of the industry's infrastructure. The committee is also involved in developing standards for the minimum loading requirements for towers under construction, alteration or maintenance, and addressing specialized equipment such as gin poles, frames, hoists and the temporary supports necessary to safely complete those tasks under the supervision of competent persons.

One of TR-14's most well-regarded

standards is ANSI/TIA-222, Revision G, Structural Standard for Antenna Supporting Structures and Antennas. The standard provides the requirements for structural design and fabrication of new, and modification of existing, structural antennas, antenna-supporting structures, structural components, guy assemblies, insulators and

“TIA supports greater dissemination of contractor knowledge regarding the existence and use of previously developed design and construction standards.”

foundations. The standard is referenced in the International Building Code (“IBC”) and as such has acceptance by building officials. Its design philosophy changed to limit

state design from allowable stress design. It also considers topography that may affect structure performance with respect to wind, e.g., atop a hill or mountain. ANSI/TIA-222-G also expands on the safety requirements and received recognition from the IBC.

The objectives of TIA standards such as ANSI/TIA-222-G, ANSI/TIA-1019-A and ANSI/TIA-322 are to create a stable structure. TIA standards are developed via consensus from a diverse cross section of industry representatives or stakeholders. All standards are created in a transparent manner that incorporates member and public comments. Every TR-14 standard is subjected to continuous improvement that delivers revisions via addendums, new standard versions and, when necessary, public commentary from the TR-14 leadership via a

number of communication channels.

The current revision, G, of ANSI/TIA-222, became effective Jan. 1, 2006, and is the successor to the EIA-RS-222 standard introduced in 1959, developed by TIA's Committee on Microwave Relay Systems for Communications. It provided a uniform method of specifying and calculating tower designs. These standards applied to steel transmitting antennas and to supporting towers.

Here are some important existing ANSI/TIA-222-G requirements.

- Safety climb devices are required for all new structures greater than 10 feet unless otherwise specified due to interference with antenna systems.
- A standardized safety climb cable diameter (3/8-inch) has been stipulated to prevent climbing safety equipment mismatch. This has also allowed for consistency in training of employees.
- Acceptable climber anchorage attachments are illustrated in the ANSI/TIA-222. Climber anchorage attachments are not limited to engineered anchorages because many telecommunications structures inherently have additional anchorage features.
- Strength and dimensional requirements are provided for climbing facilities including engineered and inherent anchorage points.
- The means for a procurer to request additional anchorage points

exists. Language to clarify how to specify the type and location of additional attachment points is being reviewed for the next revision (ANSI/TIA-222-H).

- Climbing facilities dimensional requirements are a function of climber skill level. Requirements for nonskilled climbers (skill levels developed in cooperation with National Association of Tower Erectors representatives) are more stringent than OSHA 1910.268.
- ANSI/TIA-222 requires an engineer to complete an analysis in accordance with the standard, and the analysis must be rigorous

“If there is a movement toward certification, a transitional period to allow the education and training of the contractor and employees must be established, made uniform and supported.”

(comprehensive) prior to modification of the structure.

Work is underway within TIA Engineering Committee TR-14 to define changes for the next revision of ANSI/TIA-222. Planned changes are to align the standard with the latest version of ASCE-7. Use of 3-second gusts instead of fastest-mile wind speeds and the use of load reduction factor design instead of allowable stress design will be incorporated. Other anticipated changes include seismic loading considerations, safety

facilities, foundations and analysis of existing structures.

Although ANSI/TIA-222-G Annex I already outlines inherent fall protection anchor points for new towers, additional provisions for climber access and anchorages will be included in ANSI/TIA-222-H. For example, a modification to the design requirements to a monopole will increase the number and placement of attachment points at monopole ports, which will be issues in 2016 with an industry notification of any changes to be issued prior to publication.

As part of the continuous improvement process and in response to industry developments, TIA TR-14 is also working with the ASSE A10.48 committee to consolidate all means and methods criteria into an ASSE A10.48 Standard and all loading analysis and design criteria related to the installation,

maintenance and alteration of communication structures into the new ANSI/TIA-322 Standard. The development of these standards is ongoing and has been a collaborative process including the development of common terms, communication requirements and construction-related responsibilities. The net result of the publication of both standards will be an increase in appropriate content, a broadening of the scope of topics addressed and further clarification of the demands on and roles of industry participants.

Recommendations from TIA

In response to many of the questions posed by OSHA's request for information, TIA makes several general responses. First, better education and training are appropriate, especially regarding existing standards requirements. Second, documentation of contractor and employee competency would better ensure the existence of the necessary skill set. Finally, improved oversight, combined with better communications with relevant stakeholders, is appropriate.

TIA supports greater dissemination of contractor knowledge regarding the existence and use of previously developed design and construction standards. Similarly, contractors must be made aware of existing and developing construction hazards to ensure competency and accountability. There are existing licensing requirements that could be reviewed for adoption by the telecommunications industry. The state of Florida has an example of such a licensing scheme.

In addition, the U.S. Department of Labor has worked to establish the Telecommunications Industry Registered Apprenticeship Program (TIRAP) to establish the proper credentialing for new, apprentice and existing employees. In conjunction with NATE and other associations, the industry has established the National Wireless Safety Alliance, which is exploring and developing assessments to enhance tower safety.

The industry must continue to work to come together with these initiatives to ensure a proper understanding of the roles and responsibilities of all participants. If there is a movement toward certification, a transitional period to allow the education and training of the contractor and employees must be established, made uniform and supported.

More specifically:

- **Employee certification and training** — TIA supports requiring that each employee is competent to perform their designated role during the construction process.

“As the industry's support structures continue to age, reliability and maintenance issues will be crucial to the longevity of the industry's infrastructure.”

- **Outreach** — TIA has worked with TIRAP to review the interpretation of the standards and is currently working with TIRAP on a video series to improve the industry understanding of the standards.

TIA specifically recommends the following:

- o Every participant in the construction and modification process should understand the role of the standards. It is critical that the employee understand the specific requirements in the standards and have competency in the means and measures, such as

what a rigging plan is and when it should be used, and when an engineer should be consulted.

- o TIA firmly believes continuing education is needed for contractors regarding their responsibility for inspecting climbing facilities prior to work beginning, incorporating personal protective equipment (PPE) and tagging out deficient climbing facilities, along with providing proper notice to the structure owner.
- o Contractors should communicate with owners when a construction activity may affect the climbing facility and should participate in determining a safe course of action prior to construction.

- **Oversight** — TIA supports use of the existing consensus-based standards, i.e., requiring a rigging plan, qualitative review of contractor knowledge of standards and worker training. The

ANSI/TIA-222 standard is part of the IBC and has been adopted by local jurisdictions as the ruling standard for the design of telecommunications structures. ANSI/TIA-1019-A is not directly referenced in the International Building Code because IBC does not generally address means and methods related to construction. ANSI/TIA-1019-A should be considered for use by owners through their agreements with their contractors. A number of vertical real estate and build-to-suit companies are working diligently on this effort.

- **Notification processes** — TIA supports the appropriate recognition of structural hazards in work environments that are often not recognized, such as when to stop and consult a qualified engineer, or when to inform the owner of problems affecting climbing facilities. TIA urges greater communication and knowledge about operations issues.
- **Inspections** — Post-modification inspections need to be completed to ensure that the modifications are properly installed. In addition, it should be verified that the climbing facilities are not adversely affected by the installation of new equipment or other modifications to the structure.

Elevators, Booms and Davits

The RFI asks if towers can be designed and built with elevators for lifting personnel or materials. Although a number of tall towers, including broadcast structures, have elevators, it is less common for structures below 750 feet in overall height. The TR-14 committee is reviewing how the standards may accommodate other climbing-assist devices in cooperation with the leadership of ASSE 10.48. Future revisions will address obstructions and other issues that degrade access to the climbing facilities, including issues that contribute to climber fatigue.

The RFI also asks if towers can be built with booms or davits aloft to aid in hoisting materials. TIA has the following concerns and recommendations regarding the management and use of these devices:

- Contractor training on the proper use of existing portable equipment, as well as appropriate structural review and inspection, may be a better solution.
- Will the davits and booms be properly maintained?
- Will constant exposure to the elements reduce the function and reliability of the davit or boom when compared with portable equipment? There is a concern that fatigue as a result of constant exposure to wind will reduce the reliability of the equipment. Fatigue cracks can be difficult to discover without the appropriate level of expertise and experience.
- Locating a davit or boom at the top of a structure will not assist in work at lower elevations because of obstructions that may exist between the top of the tower and elevation at which the work is being engaged, thereby negating the access promised by the davit or boom.

TIA has additional concerns regarding whether elevators or davits affect productivity and efficiency, such as the amount of time spent on the tower. At lower elevations, which include the majority of structures, elevators would be of minimal benefit and could actually be a hindrance to construction. In addition, many existing structures are not designed for the loading of an elevator. As for whether elevators or davits address or cause any safety hazards at the site, in the majority of maintenance and modification applications, placing

a davit or boom at the top of the structure would require an employee to climb to the top of the structure and spend a large amount of time inspecting and rigging the davit or boom prior to initiating work that is often completed at lower elevations.

Using portable equipment positioned at lower elevations is more efficient and less time-consuming. Improving general knowledge about, condition, and use of portable equipment and rigging will have an immediate effect upon worker fatigue and safety. Permanent attachment of davits or booms may overload existing structures that were not designed to accommodate additional equipment.

Conclusion

TIA urges OSHA to act consistently with its recommendations. TIA is encouraged by the meeting it held with OSHA and invites OSHA to participate in the development cycle of the TIA standards and is open to all stakeholders directly or through the public comment period. The TIA TR-14 also offers an opportunity for all interested parties to submit TIA standards-specific questions for review.

Mark Uncapher is director of regulatory and government affairs at the Telecommunications Industry Association. TIA is a membership organization of information and communications technology manufacturers, vendors and suppliers. TIA writes and maintains open, voluntary, consensus industry standards and specifications, and formulates technical positions.

OSHA Should Help Workers Avoid Hazards Near Antenna Sites

NABTU has safety concerns for employees working in close proximity to nondedicated tower structures installed on structures other than communications towers. Edited for length and style, the following information comes from the NABTU comment in the OSHA proceeding about tower worker safety.

By Pete Stafford

North America's Building Trades Unions (NABTU), AFL-CIO (also known as the Building and Construction Trades Department, AFL-CIO), its 14 affiliated national and international unions and the 3 million members they represent encourage the Occupational Safety and Health Administration to consider in its next steps the related hazards faced by construction workers who work in close proximity to nondedicated tower structures.

Communications tower workers and other workers not employed in the telecommunications industry face hazards similar to workers "involved in working with communications equipment on nondedicated tower structures." [80 Fed. Reg. 20185, 20189 (Ap. 15, 2015)] The data demonstrates that falls from cell towers are a serious safety problem that industry has yet to address ef-

fectively. However, OSHA can draw on the construction industry's research and experience with falls to begin to address the problems in the cell tower industry.

NABTU is equally concerned with the potential health problems posed by exposure to RF radiation emitted by these cell towers. While we commend OSHA for taking steps to coordinate with the Federal Communications Commission during a 2014 workshop to better understand what needs to be done to protect workers directly involved in tower construction and repair work, we are concerned that the millions of construction workers who perform maintenance and repair work on the buildings and structures where nondedicated tower structures are located are being ignored. We encourage OSHA to expand its focus and its discussions with the FCC to ensure that construction contractors whose employees work in close

proximity to nondedicated tower structures installed on structures other than communications towers also have ready access to the information they need to identify potential hazards and avenues of recourse to protect their employees.

Addressing Fall Hazards

As OSHA notes in its request for information, falls are a leading cause of fatalities among communications tower workers. However, according to the National Institute of Safety and Health (NIOSH) Fatality Assessment and Control Evaluation (FACE) reports and comments posted by industry representatives and workers in response to the OSHA request for information, training on fall protection is not provided in all cases and, even when provided, it may not include specific training on fall prevention.

In the construction industry, falls

are a leading cause of fatalities and injuries. According to OSHA, each year in the United States, more than 200 construction workers are killed and more than 10,000 are seriously injured by falls. In 2013 alone, according to OSHA, there were 291 fatal falls to a lower level out of 828 fatalities in construction.

OSHA has engaged in a fall prevention campaign in partnership with NIOSH, CPWR — The Center for Construction Research and Training (formerly the Center to Protect Workers Rights) and other industry stakeholders, with a message that falls can be prevented and lives can be saved through three simple steps: plan ahead to get the job done safely; provide the right equipment; and train everyone to use the equipment safely. This message, lessons learned and guidance developed for the construction industry on the importance of planning, hazard recognition, training and safe work procedures could be applied to or adapted for the communications tower industry. In addition, the NIOSH 2001 Alert, “Preventing Injuries and Deaths from Falls during Construction and Maintenance of Telecommunications Towers” [U.S. Department of Health and Human Services (NIOSH) Publication Number 2001-156], provides specific recommendations to “reduce the risk of worker injuries and deaths from falls during tower construction and maintenance,” such as:

- Ensure that hoisting equipment used to lift workers is designed to prevent uncontrolled descent and is properly rated for the intended use.
- Ensure that hoist operators are properly trained.

- Ensure that workers use 100 percent fall protection when working on towers at heights above 25 feet.
- Provide workers with a 100 percent fall-protection system compatible with tower components and the tasks to be performed.
- Ensure that gin poles are installed and used according to the specifications of the manufacturer or a registered professional engineer.
- Ensure that tower erectors are adequately trained in proper climbing techniques, including sustaining three-point contact.
- Provide workers with OSHA-required personal protective equipment and training in its proper use.
- Ensure that workers inspect their equipment daily to identify any damage or deficiencies.
- Provide workers with an adequate work-positioning device system. Connectors on positioning systems must be compatible with the tower components to which they are attached.
- Supplement worker training on safe work practices with discussions of FACE case reports.

NABTU encourages OSHA to take NIOSH’s recommendations into consideration and, as appropriate, apply the lessons, information and guidance developed through the construction falls campaign to prevent falls during the construction and maintenance of telecommunication towers.

Fall Protection

OSHA asked what factors contribute to employees failing to use fall protection while climbing and working.

The construction fall-prevention

campaign emphasized the importance of training workers on when and how to use fall protection. However, both the NIOSH FACE reports and comments posted by workers and other communication tower industry representatives on *Wireless-Estimator.com* indicate that training on fall protection is limited and inconsistent in this industry:

“When I first started in 2005, my employers required no formal training. Just put on a belt and climb. I sought out formal instruction and convinced my employer to send us to ComTrain. I have attended several safety schools since, and my company has never given me any real problems when I request training. I will say this: Most tower climbing safety training is woefully inadequate, lasting only one or two days with very little hands on work. Two years ago, I completed my SPRAT Rope Access level 1 certification, and it was the best work-at-heights training I’ve ever gotten. The tower industry needs to seriously look at what the rope access industry is doing with their training and certification standards and copy it as closely as they can. There is a reason the rope access industry has such a good safety record and the tower industry doesn’t.” [April 24, 2015, Nathan, tower climber]

“We require one day of tower safety and rescue that includes site hazard analysis and RF

awareness, and then we spend a day on the tower performing hands-on training and verification of skills to perform a rescue.” [June 8, 2015, anonymous safety manager/trainer]

“A basic tower hand can take a two-day class and be certified to climb. They give you the information you need, but it isn’t reinforced thru repetitive training.” [June 3, 2015, Nathan Slattery, tower climber]

“Training and certification are not required at this time. Workers climb towers with little or no training, and there is no requirement in this area.” [June 9, 2015, Dr. Thomas P. Fuller, safety manager/trainer, Illinois State University safety program]

The lack of standardized training requirements for employees in the communications tower industry may be a significant contributor to employees failing to use fall protection or to use it properly. To ensure that workers in this hazardous industry have access to appropriate fall protection and receive consistent and appropriate training, NABTU urges OSHA to consider the recommendations in NIOSH’s 2001 Alert to require employers to “provide workers with a 100 percent fall-protection system compatible with tower components and the tasks to be performed” and to provide standardized, verifiable fall protection training to:

- Ensure that tower erectors are adequately trained in proper climbing

techniques, including sustaining three-point contact.

- Supplement worker training on safe work practices with discussions of FACE case reports.

Built-in Fall Protection

OSHA asked whether it should require built-in fall protection in new towers and existing towers, and whether such a requirement enhances worker safety.

Research-based evidence indicates that injuries and deaths can be reduced when a prevention-through-design (PtD) approach is used. A 2005 study of 224 fatality investigation reports found that “decisions made upstream from the construction site can influence construction worker safety” and showed that for 42 percent of the fatalities reviewed, “the associated risk that contributed to the incident would have been reduced or eliminated had the design for construction safety concept been utilized.” *Safety Science* published the study by M. Behm in an article titled “Linking Construction Fatalities to the Design for Construction Safety Concept.”

NIOSH’s May 2014 report, “Preventing Falls from Heights through the Design of Embedded Safety Features,” and some industry responses to the OSHA request for information also recognize the importance of building safety features into new and existing structures to prevent injuries and deaths.

“Fall protection is infeasible at the top of a monopole. There are almost never engineered anchor points. This

needs to be added in new tower builds, and it would be nice for existing towers to be retrofitted. OSHA should require enhanced safety measures. Engineers should design anchor points on structures. I give my employees additional straps, and we do the best we can to add whatever tools they need, but it would be a lot easier if we could count on anchor points and safety climbs to offer enhanced protection.” [May 4, 2015; anonymous safety manager/trainer, Elevated Services] (*WirelessEstimator.com*)

NABTU recommends that OSHA promote the use of built-in fall protection in new towers and existing towers because of PtD’s potential to reduce injuries and death.

Weather-related Hazards

OSHA asked about specific weather-related hazards to which communications tower workers are exposed.

Communications towers range in height from “100 to over 1000 feet.” [80 Fed. Reg. at 20186] Workers on these towers experience many of the same weather-related hazards faced by construction workers performing tasks on other tall structures, including exposure to very high and low temperatures, strong sunlight and windy conditions.

A study published in 2007 by *Safety Science*, written by D.J. Hsu, Y.M. Sun, K.H. Chuang, Y.J. Juang and F.L. Chang, “Effect of Elevation Change on Work Fatigue and Physiological Symptoms for High-rise

Building Construction Workers,” found that “the effects of extreme weather conditions, such as thermal or cold stress, strong winds on the performance and safety of high-rise building construction workers is greater than those of ground-level workers.” In addition, the study noted that “work fatigue among workers, as measured upon the completion of their shifts, became more severe with increasing elevations,” with heart rates and physical workloads increasing, and visual sensitivity decreasing. The study concluded that “as visual sensitivity is reduced and environmental disturbances such as wind velocity increase, high-rise building construction workers must be equipped with various protective measures to ensure their safety.” NABTU urges OSHA to take these findings into consideration when developing steps to protect tower construction workers.

Radio-frequency Emissions

OSHA asked about methods employers use to protect workers from overexposure to radio-frequency emissions (RFEs). It asked about health and safety considerations involved in working with communications equipment installed on nondedicated tower structures such as water towers, buildings, silos and electrical transmission towers.

Although OSHA’s questions focus on the health risks to employees working with communications equipment, there are thousands of construction workers who, while not working directly with the equipment, work in close proximity to these devices and are put at risk every day of

being exposed to potentially harmful levels of RF emissions. All workers — whether directly working on this equipment or working in proximity to it — need research-based evidence on the potential health effects of long-term or intermittent exposures to RF radiation and prevention methods to be fully protected from these hazards. However, construction workers face an additional impediment: Unlike workers employed in the telecommunications industry, construction workers and their employers do not have access to the information they need to identify and address potential exposures. As a result, they are left unaware and unprotected from the potential physical and mental harm this equipment can produce, while wireless workers — particularly those employed directly by a licensed provider (e.g., Verizon) — are provided with substantial RF radiation protection and mechanisms to prevent overexposure.

In order for construction employers to protect their employees and for construction workers to be sure that they are being adequately protected, they need to be able to identify RF radiation-generating devices, potentially hazardous conditions and the responsible party to contact to have the device(s) shut down if work must be performed within the hazardous area, and they need access to timely assistance when a licensee (e.g., the owner of the device, such as Verizon) is unresponsive to such a request.

At present, there are many gaps in the availability of this information and many gray areas surrounding which government agency is responsible for

filling these gaps, ensuring workers are not put in harm’s way, and intervening on their behalf.

NABTU urges OSHA to consider the health and safety of construction workers and their employees in its next steps, including identifying who is responsible for providing contractors and their employees with information on the location, power level, and ownership of RF radiation-generating communications equipment on structures where they will be working. There has been a proliferation of cellular equipment installed on rooftops, the sides of buildings and at other locations to meet growing service demands, but identifying the location of these devices is problematic.

- There is no central database that identifies where these devices are located, the power levels, who owns the devices, and whom to contact if a device needs to be shut down.
- Many of these are so-called stealth devices, which means they have been intentionally designed and installed to be unidentifiable. Although the FCC requires licensees (e.g., Verizon) to post signs alerting workers and the public of the presence of all types of devices and their potential hazards, there are limited resources available to ensure the signs are present, visible and maintained. In the absence of signage, there is no way for construction employers or construction workers to know if devices are present or if the workers are in a potentially hazardous area. Construction contractors and their employees therefore cannot be certain when they enter a work area

whether cellular equipment is present and whether they risk being overexposed to RF radiation.

In the absence of a central source for this information, NABTU urges OSHA to designate the owner of the building or structure where the construction or maintenance work will be performed as the host employer and require the host to provide construction employers and their employees with information on the location of all cellular devices present, their power levels, hazardous areas and the licensees and their contact information. OSHA has used this approach in the past when the workplace was controlled by the building owner. In the Asbestos Standard (1926.1101(k)(2) Duties of Building and Facility Owners), OSHA required

building and facility owners to establish "the presence, location, and quantity" of asbestos and to notify all employers and employees.

Agency Coordination

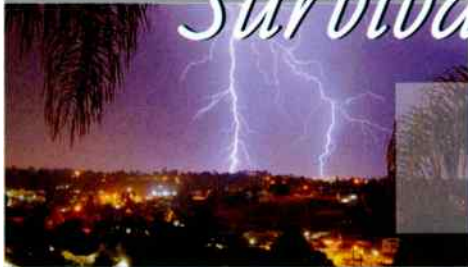
NABTU urges OSHA, as a next step, to work with NIOSH to address the gaps in information on the health risks and with the FCC to develop a system that ensures that construction employers and employees have access to the information and avenues of recourse to ensure work can be performed safely when these devices are present. Without a clear understanding between OSHA and the FCC about the scope of each agency's regulatory responsibility and without a commitment by both agencies to address these issues, our members and their employers will continue to be in the

dark about their potential exposures and therefore unable to take steps to ensure they are working safely.

For example, under FCC rules, a licensee's employees receive specific training and know whom to contact to shut down devices when they are performing work. This is not the case for construction workers and, even in some cases, tower workers. According to the FCC, if a contractor's workers must work in a hazardous area, the contractor should contact the licensee to have the equipment shut down. However, there is no window of time in which the shutdown must occur, and in many cases, the contractor may not even know that the hazardous device is present.

Pete Stafford is director of safety and health at North America's Building Trades Unions, AFL-CIO.

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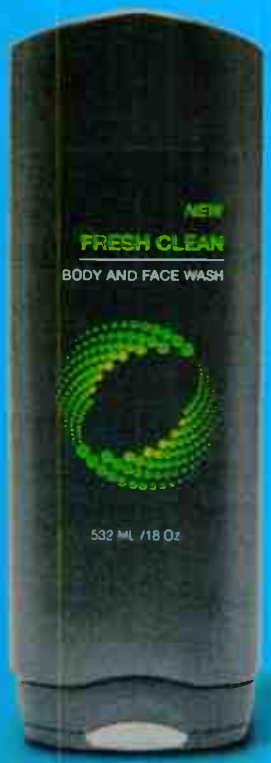
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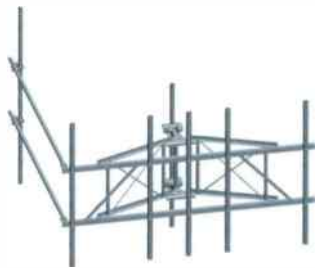


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Boom Gate

The CIW V-Frame boom gate from **Connect-it-Wireless** is a heavy-duty mount that can hold as many as five antenna mast pipes, plus an additional two on the V. Constructed of galvanized steel, the V-frame is designed to adhere to the most stringent building codes in the country, including the 2010 Florida Building Code, TIA-EIA-222-G-2 and ASCE 7-10. The maximum combined load weight is 650 pounds.

www.ciwireless.com



BOOM

Sabre Site Solutions' HD V-Boom

is designed for heavy-duty equipment loads. This 12-foot boom mount, with a 3-foot standoff, has the capacity to handle four 8-foot-by-18-inch antennas and eight radio remote units per sector. The boom mount was analyzed by a third-party engineer for 12 wind directions to ensure that it is strong enough to handle today's technology. Designed for ease of installation, the boom mount has adjustable connections to account for leg taper and azimuth.

www.sabresitesolutions.com



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The Qwikmount mounting system from **Comsite Hardware** uses water as ballast. The system is designed to eliminate the cost and hassle of transporting bricks, sand or concrete to the roof to ballast a mount. The system requires only a hose and a faucet. The shipping weight is less

than 160 pounds compared with 480 to 1000 pounds for other products. The segmented ballast tank of cross-linked HDPE material comes in three sections for easier shipping and handling, and it quickly bolts together to provide a stable support for antennas. One person can carry a Qwikmount in a freight elevator and have it completely assembled in as little as one hour. Qwikmount may also be used in groups to form array assemblies.

www.comsitehardware.com



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components are for tower, roof or wall applications and mount to 4½ inches OD pipe or angle. Each mount accepts two RRUs, two A2 modules, or one of each. For applications requiring multiple mounting positions, the T1500 series six-sided monopole mount fits poles from 15 inches OD to 60 inches OD and is engineered to the latest load-bearing and environmental standards. A chain system attachment is also available.

www.kenwoodtelecom.com

Monopole Platform

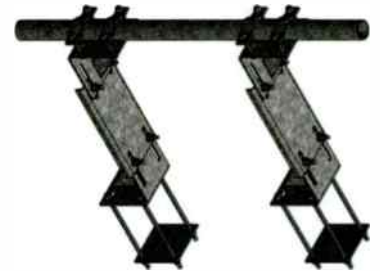
The Warrior Mount from **Engineered Endeavors** is a monopole platform designed for the most rigorous antenna/equipment loading. The platform



features greater structural capacity to meet the needs of the industry's increasingly demanding load requirements. The 12-foot, low-profile platform is purpose-designed to provide 7,700 pounds of vertical capacity without the need for kickers and braces found on other platforms. It can withstand a 120-mile-per-hour wind gust for three seconds with a 12-foot low-profile antenna. The

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www.wanho.com



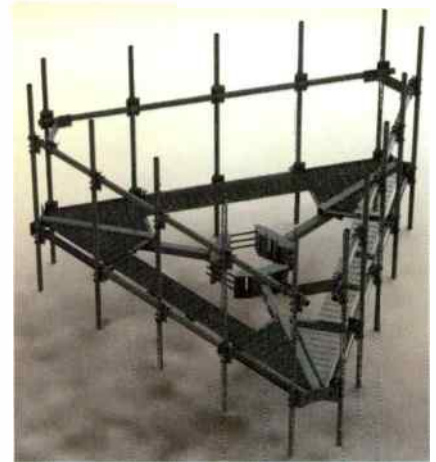
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per sector. The platform weighs 2,681 pounds. It includes adjustable platform widths, antenna pipe mounts, ring mounts and mounting hardware. It is made of hot-dipped galvanized steel.

www.ehresmannengineering.com



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