



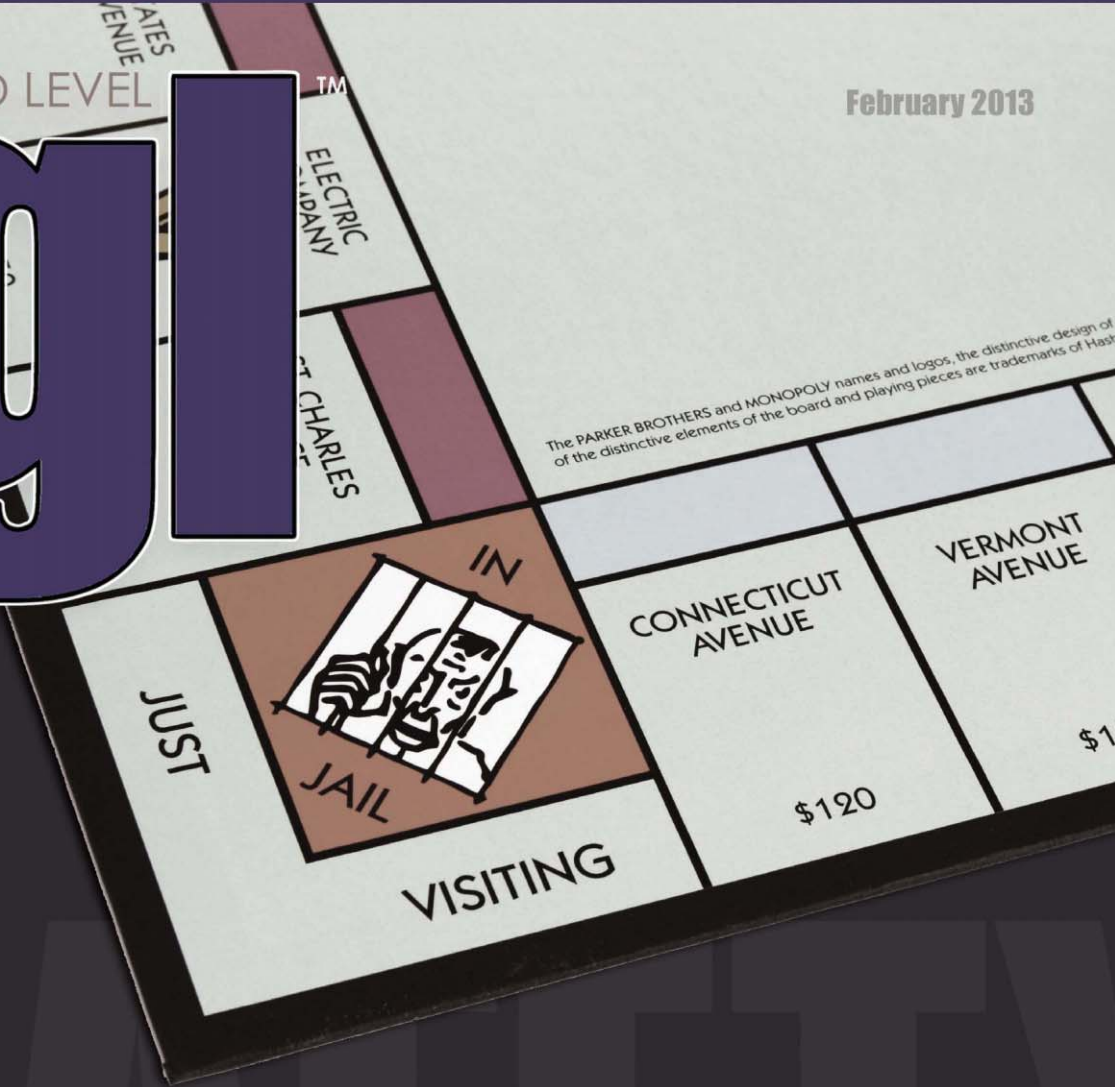
International Tower Business

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February 2013

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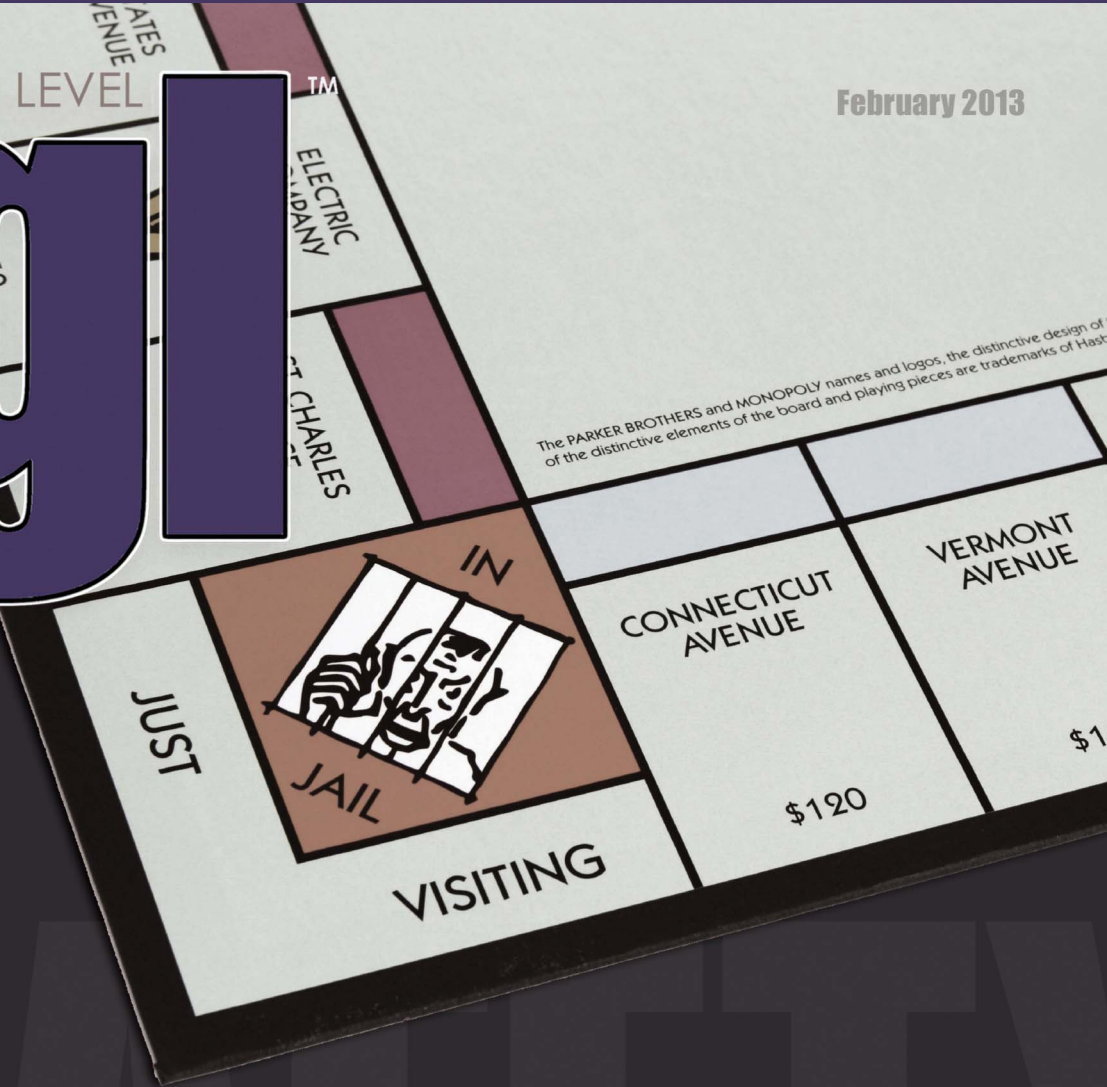
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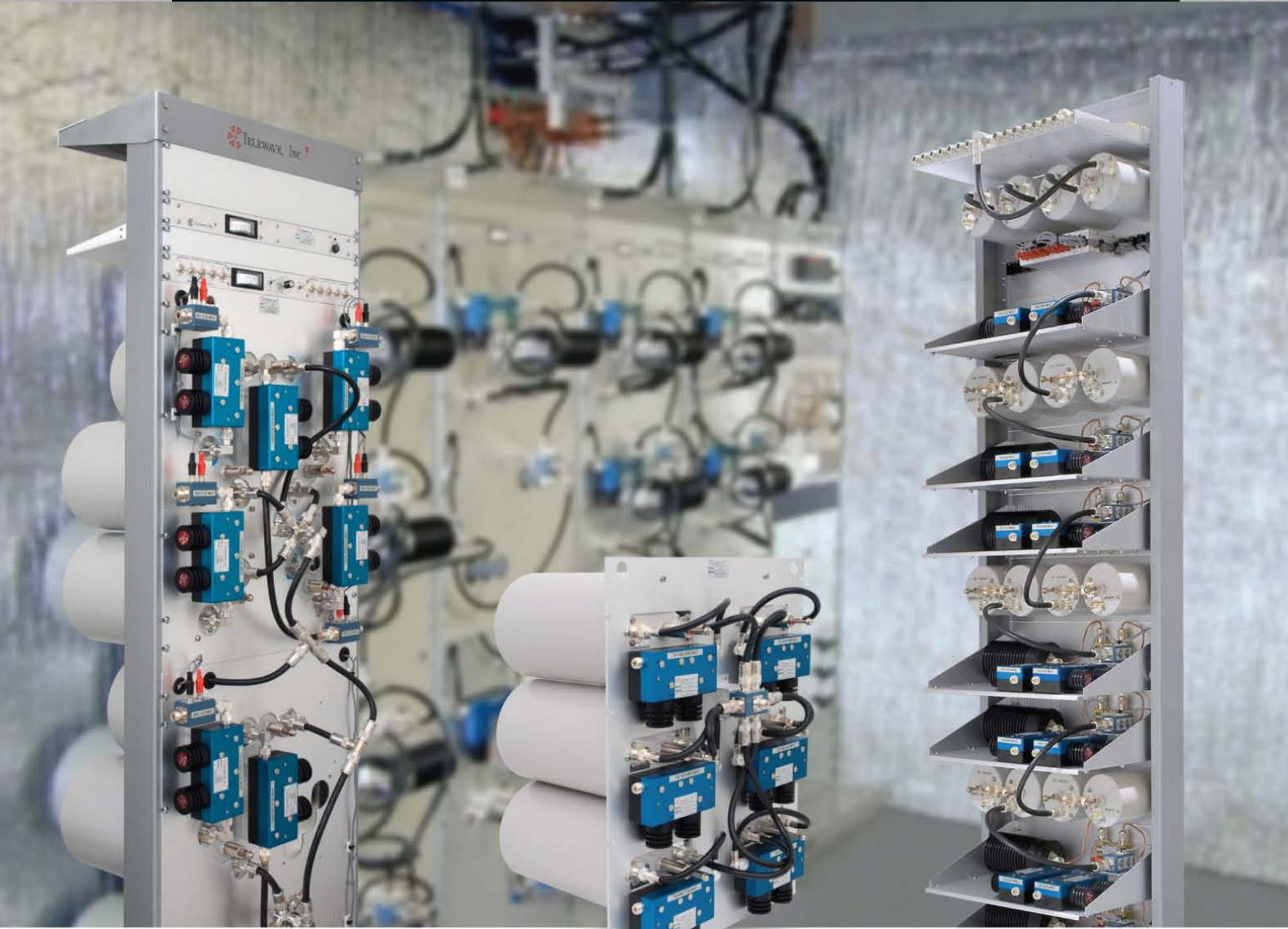
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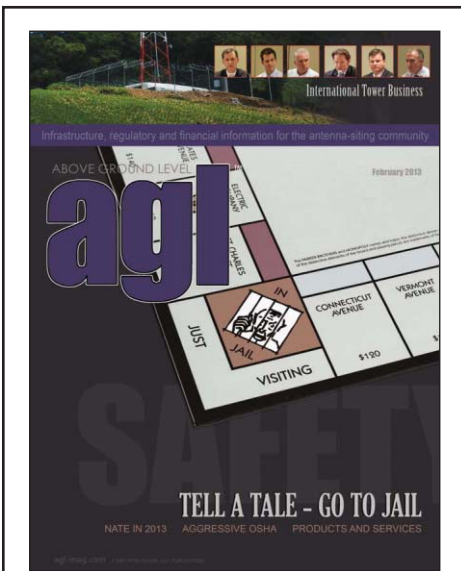
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on the cover

When an OSHA inspection follows an accident, what you say to an inspector may make you subject to criminal liability. Along with employers, managers and supervisors may be punished. "Tell a Tale — Go to Jail" explains the risk; turn to page 18.

Cover design by Scott Dolash

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Safety

Each year at this time, the National Association of Tower Erectors offers an opportunity to learn about equipment, work methods, supervision and planning associated with wireless communications and broadcasting jobsites, including towers and rooftops. With its annual conference and exposition, NATE provides education, marketing and networking for the tower erection, service and maintenance industry.



The conference and exposition offer opportunities to participate in recognized safety training by companies that train to or beyond the NATE Tower Climber Fall Protection Standard. Take advantage of the occasion and attend the conference and exposition in San Antonio from Feb. 18 to Feb. 21.

NATE also is offering training in localities across the United States in coordination with *AGL's* Wireless Infrastructure Conferences. The training will be conducted in the same locations the day before each Wireless Infrastructure Conference in the series of six *AGL* Regional Conferences this year.

Proper LTE installations

At three of the locations, NATE's educational programs will cover proper LTE installation methods. The LTE training teaches an understanding of the loading and forces generated by adding LTE antennas and radios onto existing antenna mounts that might not have adequate strength. The session leader explains what equipment is likely to be found on an existing tower, how towers are rated for strength, how they are engineered, how they may be abused, and what happens when conventional methods are used to add support.

By Don Bishop, Executive Editor
dbishop@agl-mag.com

LTE installations involve antennas, remote radio units, trunk and sector fiber, matching connectors, jumper cables, hangars, hoists and junction boxes all mounted on a structural support attached to a main structure. Managing the use of all of these components on existing antenna sector frames that are designed for smaller and lighter antennas and for less equipment is a challenge. Without a sufficient understanding of what's involved, tower technicians may put themselves and others at risk of serious or fatal injury.

TIA 1019

At the other three locations for *AGL's* Wireless Infrastructure Conferences, NATE's training leaders will explain how the TIA 1019-A-2011 Standard for Installation, Alteration and Maintenance of Antenna Supporting Structures and Antennas applies to the daily work of tower technicians.

The session covers the use of gin poles in tower erection, modification and dismantling activities. It also covers how to understand the rigging plan. Session leaders explain how to apply the standard in tower structure modification projects and the new training requirements for tower workers.

The speaker at NATE's session about TIA 1019 will explain how using the standard helps to level the playing field in the tower project bid process.

AGL Regional Conferences

As the new year gets under way, so does the new schedule of *AGL* Regional Conferences, featuring *AGL's* Wireless Infrastructure Conference. Take advantage of the low-cost, local alternative to national conventions with conferences that come to locations near you.

Turn to page 26 to learn how attending the conference could help you. Visit www.agl-mag.com/events for the latest program details and information about speakers and other attendees whom you'll meet. We hope to see you soon. ■



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Infrastructure, regulatory and financial information for the antenna-siting community

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publisher's note

Backhaul Woes and Other Things

From my recent experience, I can share some backhaul horror stories. In my little county in Northern Virginia, I see

smaller companies trying to find backhaul to support small WISPs. Backhaul seems to be the largest cost to these companies, and even if they wanted to buy it and were able to pay for it, they often can't find a company actually willing to sell them the service. Larger companies seem to



Photograph courtesy of mikofosterphotography.com

almost randomly pick some outrageous monthly figure just to get WISPs off their backs. And sometimes, to the CLEC's surprise, the WISP actually wants to order the service. The ILECs seem to use broadband availability as a competitive weapon in the wireless wars.

I'm trying to buy 10 to 20 megabits-per-second service for a farm owner near me and help out with a point-to-point microwave link. The terms and conditions to order and keep the circuit are pretty incredible. And in some other rural markets, I'm trying to buy simple DSL service at a number of locations. I'm knocking on the door with money in my hands, and I can't get anyone to agree to take it.

There is a big secret out there that few companies will ever acknowledge. Most Internet resellers are out of compliance with the reseller restrictions in the service contract. If anyone were to ever actually audit any of this, I think half of the world would lose Internet service.

Looking through municipal eyeglasses again for a moment, I've also seen a complete 180 on the attitude toward infrastructure providers lately. The coun-

ties, and in particular the one I live in, are actively seeking to engage providers to build the wireless and cabled infrastructure *before* the real-estate development arrives. *There* is some thinking.

A sign of things to come

For a long time, I've been betting that small-cell deployment will be the next sliced-bread mantra. Since I've recently actually moved my personal professional pursuits around to focus on small-cell deployment, I've had the chance to get up close and personal with the issues that will be encountered. In short: attachment rights and, yes, backhaul. No surprise, small-cell deployment faces the same issues that traditional macro sites do, just on a smaller budget and at one heck of a lot more locations. The problems are not that much different. They are just multiplied out!

Continue to keep an eye on small sites for infill and for 700-MHz public safety communications. I know, I've said that before; however, the public safety users are going to drive one frequency band, and specifically a channel plan, to become common across all phones. And then, finally, we'll have some standard to work from. Right now, with a common LTE band, there is no roaming, and there is no business model. We're in need of a harmonizer. Public safety will be that harmonizer. I'm a regular reader of *Urgent Communications*, and reading some of their fine work, you might get the impression that FirstNet is looking at an eight- to 10-year build out. So it could all still crash and burn.

Exciting 2013

I'll give a shout out again to NATE and some really exciting things it is up

to, with new outreach, education, scholarship and other initiatives. The entire *AGL* team is really looking forward to working with the fine folks there in the new year. Nothing could be so timely with the relative explosion in the industry. It is one of the most common calls I get from folks: "I've got immediate open positions for 900 tower crews! Do you know any?" Seriously, I've looked at this side of the industry from different angles. It is a risky business (equipment-, personnel- and expense-heavy) with few long-term contracts and intensive employee problems. NATE's issues are timely.

I'm anxious to have a chance to sit down with Jonathan Adelstein, PCIA's



new president and CEO. We're set for a lunch in a couple of weeks. I'll let you know how it goes. I'll have to practice using the right fork. Anyone have a tie I can borrow?

It is a love fest

Ah, Valentine's Day. The tradition dies hard. I know, some of us old-timers still do the flowers and card routine. But admit it — at least some of you younger folks are just going to text your amours and hope for the best. If I did that, I would be in the doghouse for the rest of the year! But good luck, and let me know how it goes. ■

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



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NATE: Initiatives for Safety in 2013

By the AGL Staff

During the AGL Regional Conference in Dallas, AGL interviewed Todd Schlekeway, executive director of the National Association of Tower Erectors (NATE). Here are his remarks, edited for length and style.

AGL: Tell us a little bit about the National Association of Tower Erectors.

Todd Schlekeway: NATE is a national trade association with 530 member companies directly or indirectly involved in tower construction and wireless infrastructure. NATE offers its members safety and education resources and programs. It is a top priority of NATE to work with everyone in the industry, from the carrier level, to the tower owners, all the way down to the sub-contractor level, to ensure that a culture of safety exists at every level.

AGL: And about yourself?

Todd Schlekeway:

I'm a South Dakota native who grew up in the state. That's where NATE has its headquarters. I served in the South Dakota State Legislature for four years, serving two terms, one in the House of Representatives and then a term in the Senate. South Dakota has a citizen legislature, so it is not your full-time job. I worked in the domestic energy industry doing public relations and government affairs work for seven years prior to joining NATE.

It's been an interesting transition as there are some parallels between the energy and the tower industries. I've enjoyed the telecommunications and wireless infrastructure industry during my first months with NATE.

AGL: What are some of NATE's new initiatives?

Todd Schlekeway: It's been a high priority of mine, working with our nine-member board of directors, to improve communication with members and stakeholders. I worked hard with our staff to upgrade NATE's website and social media platforms, and beginning in January, we rolled out an overhaul of *Tower Times* magazine.

Another early initiative is to be more

aggressive with participation and attendance at industry meetings, trade shows and events. We're excited to become a sponsor of AGL Regional Conferences.



We appreciate what you do, organizing events in different geographical locations, which is tailor-made for NATE because we have members in every region of the country. Expect to see NATE represented at more industry events in the future.

We are also working hard to establish stronger relationships with tower owners, carriers and general contractors. As busy as the industry is expected to be during the next five years, we need to continue to spread the safety message to make sure that the fatality count goes to zero and stays there. We won't rest until there are zero fatalities in the industry.

AGL: How can you make more carriers aware of NATE and the importance of training and safety?

Todd Schlekeway: It will continue to require a concerted effort on the part

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of NATE and the entire tower construction industry to have a unified message in order to continue to educate the carrier community on what constitutes a qualified contractor. The million-dollar question is: How can NATE can continue to play a vital role to ensure that every contractor hired is a qualified contractor? If carriers hire NATE member companies to work on their

projects, they are making a commitment that the work will be completed properly and safely. U.S. Cellular is an example of a regional carrier that has made a strong safety commitment by placing in its contracts that it will only hire NATE member companies to do its work. We need to continue to make strides in this area and ultimately get to the point where all of the national and

regional carriers follow this model.

We also need to remind the carrier community that during the current LTE build out rush, there are times when unrealistic deadlines are placed on contractors and subcontractors. This can be a safety hazard and so we watch this closely.

Everyone is in this for the same reason, to upgrade the networks. But we also need to remind them in an appropriate and respectful fashion that safety cannot and should not be compromised under any circumstances

AGL: How is NATE's relationship with OSHA?

Todd Schlekeway: We are excited about our collaboration and some of the recent meetings we have had with OSHA. A relationship with OSHA is integral to NATE. Our members are in a unique industry that requires a lot of education with government officials at agencies like OSHA.

In October, we had a tower site tour with seven OSHA officials in northwest District of Columbia, visiting tower sites. NATE's regulatory and legislative travel team, made up of NATE members, was with us on the tour. The OSHA officials asked many good questions. They were good sports, and they actually tried on our tower climber equipment, which can weigh 60 to 70 pounds. They could not believe what bogs down a tower climber. It was a huge win for our industry because it was a more tangible experience for the OSHA personnel on the tour. It wasn't just sitting around a boardroom telling them what the tower climber goes through every day. They were trying equipment on and at the same time looking up at a 1,000-foot tower. When you connect those dots we're making inroads with OSHA and we will continue to work hard at educating OSHA officials on the unique nature of our industry.

A short-term goal with OSHA is to get them to modify the compliance directive for riding the line. The current compliance directive states that you can ride the hoist line up to the work site only for new tower construction. OSHA never changed it to reflect maintenance

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and repair activities, and most of the work going on right now on the tower is modification and repair work. It involves a change of four words in the compliance directive. We are working

person meetings and testimonials from our members and tower climbers to drive the message home that it's safer to ride the hoist line to the work location than to climb 500 feet because there is so much repetitive stress involved for the worker during the climb.

Many of our members are also involved in the writing of an A1048 standard that

other government agencies ultimately better comprehend the unique nature of our industry. Writing such a standard takes years, but NATE is in the middle of it and we're continuing to make progress.

AGL: What about public safety communications upgrades?

Todd Schlekeway: Many of our members have been working in the public safety portion of the wireless telecommunications industry, upgrading to the next generation of 9-1-1 networks. We have many members who restored networks in the aftermath of Hurricane Sandy. The wireless industry is vital to the modern conveniences of everyday life. We all take for granted the ability to call 9-1-1 in an emergency and the ability to make a phone call while driving down the road. I appreciate NATE's members and others involved in the industry for providing us with these modern conveniences. ■



AGL Online Video

Watch Todd Schlekeway's interview online at www.agl-mag.com/aglvideos.

hard to get OSHA to upgrade this compliance directive. They shared with us that now that the administration is going to be here another four years, after the election, we now are close on that front and it will require a few more in-

will be the first of its kind that governs the entire tower construction industry, everything from personal protective equipment to RF safety to gin-pole rigging. It will be a comprehensive standard that should help OSHA and

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national association of tower erectors

Safety Remains #1 Priority as NATE Sets 2013 Programs

By Todd Schlekeway

This year is shaping up to be an exciting year in the tower construction and maintenance industry. As the executive director of the National Association of Tower Erectors, I have the privilege of having conversations with our members and industry stakeholders every day. The movement to upgrade wireless telecommunications networks with 4G/LTE capabilities continues to keep tower owners, carriers, general contractors and tower construction firms busy. In fact, many NATE members have informed me that their calendars are already full for the year due in large part to LTE-related installation and maintenance work.

One of the hallmark tenets of NATE is safety. Therefore, we are relentlessly focused on making sure that a busy 2013 remains a safe 2013 across the industry. With the record level of activity upon us,

it is imperative that everyone involved in the wireless infrastructure and tower construction chain doubles down to ensure that safety remains the number one priority in this industry.

NATE continues to pursue opportunities to work with tower owners, carriers, general contractors and subcontractors to ensure that communication on job sites is given the proper focus, and safety is not compromised with the flurry of work that is characteristic of multi-employer sites.

I want to make sure that stakeholders are aware of some of the outstanding safety resources and programs NATE is promoting to help make this a vibrant and safe year in the industry.

NATE's "Qualified Contractors Evaluation Checklist" provides a road map of guidelines for everyone

involved in hiring tower construction firms to follow in order to ensure that only qualified contractors are hired for work. With new companies springing up frequently in this industry, it is imperative that NATE's checklist is adhered to. The checklist can be downloaded and printed via NATE's website or by visiting <http://natehome.com/wp-content/uploads/2011/03/Qualified-Contractors-Evaluation-Checklist1.pdf>.

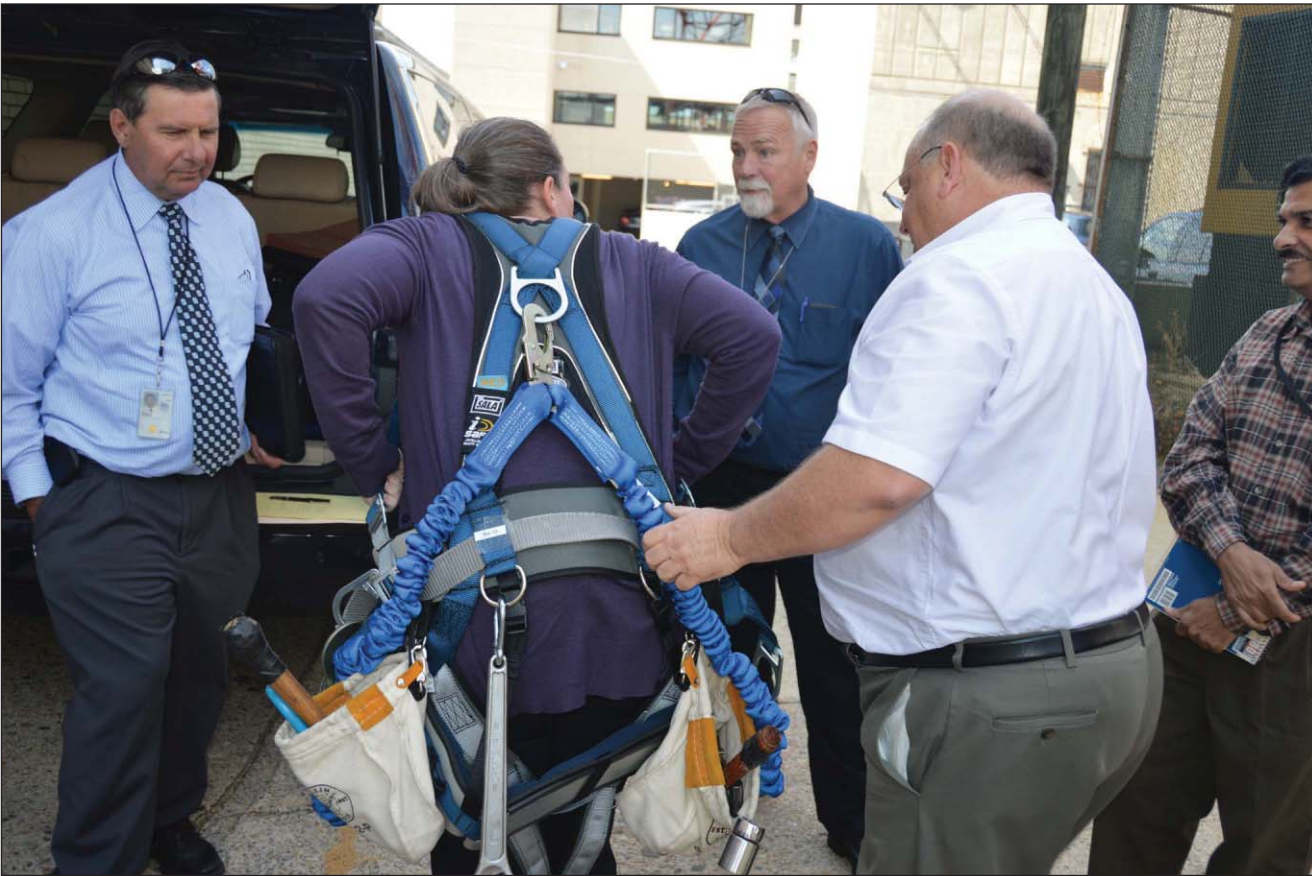
The association is also working hard to promote the NATE *Tower Site Hazard Recognition Guide*. Designed specifically for the on-site employees of carriers, broadcasters, owners, operators, general contractors and any others responsible for activities on a tower site, the guide was developed to improve industry safety. NATE has long believed that education is vital to improving safety on tower sites and it is the responsibility of all tower construction companies, owners and operators to contribute to the safety of on-site employees.

The NATE *Tower Site Hazard Recognition Guide* is available online and serves as a step-by-step guide for project managers and other employees to recognize and effectively address hazardous situations. The guide is free for everyone in the industry and can be accessed by visiting www.hazardrecognition.com or www.natehome.com.

Another program that continues to shape the industry from a safety standpoint is the NATE STAR Initiative program. It 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. NATE is proud to see continued



NATE and OSHA representatives attending the District of Columbia tower site tour were, from the left, front row, Dr. Tesfaye Guttema, Terry Sharp, Erin Patterson, Don Doty, Jim Maddux, Dean McKenzie and Gopal Menon, and from the left, back row, Jim Goldwater, Todd Schlekeway, Sherman Williamson and Paul Bolon.



Don Doty of Doty Moore Tower Services helps Erin Patterson from OSHA try on tower climbing equipment during the NATE-OSHA tower site tour in Washington, D.C., as OSHA's Jim Maddux, Dean McKenzie and Gopal Menon watch.

growth in the STAR Initiative program. A record number of program participants will demonstrate themselves to be industry leaders this year and beyond by ensuring that a culture of safety permeates industrywide. Visit www.natehome.com to view a list of companies that participate in the program.

The association will be unveiling the NATE Tower Climber Orientation program early this year. It will be a valuable educational and screening tool for employers to use when providing prospective tower climbers with important information on what a career is like in this field. The goal of this orientation program is to promote the profession inside and outside of industry circles and also to help employers determine which applicants are truly interested in this line of work before investing in training and preparing them to work on tower sites.

NATE looks forward to continuing to have meetings and dialogue with OSHA officials this year. OSHA relations outreach is one of the association's

core priorities and we have continued to make progress in terms of educating OSHA officials on the unique aspects of the tower construction and maintenance industry.

For example, NATE representatives recently organized and participated in a tower site tour in northwest District of Columbia with seven OSHA officials. To provide a deeper appreciation for the inherent dangers of tower work, the fatigue and repetitive stress injuries

that can result from climbing, and the need to provide a safer, more efficient means of ascending and descending towers, NATE offered OSHA staff the opportunity to try on the equipment that tower workers wear when accessing their work stations. This equipment, including the harness and tools, weighed over 60 pounds.

Having OSHA officials visit several tower sites and wear the heavy equipment worn by climbers provided a tangible

NATE Safety Resources and Programs

Safety Resources

- "Qualified Contractors Evaluation Checklist"
- *Tower Site Hazard Recognition Guide*

Programs

- STAR Initiative
- Tower Climber Orientation
- Presentations at AGL's Wireless Infrastructure Conferences

national association of tower erectors



OSHA's Paul Bolon tries on tower technician equipment as Don Doty explains the required equipment to OSHA officials during the NATE-OSHA tower site tour.

example to help the agency understand what tower technicians go through on a daily basis while performing work on telecommunications and similar structures.

NATE is also excited to be a sponsor and active participant in this year's *AGL*

Wireless Infrastructure Conferences. *AGL* has done a great job of recruiting local and national experts to speak on timely, relevant industry topics at these conferences. Representatives from NATE are pleased to participate as speakers and on panel discussions

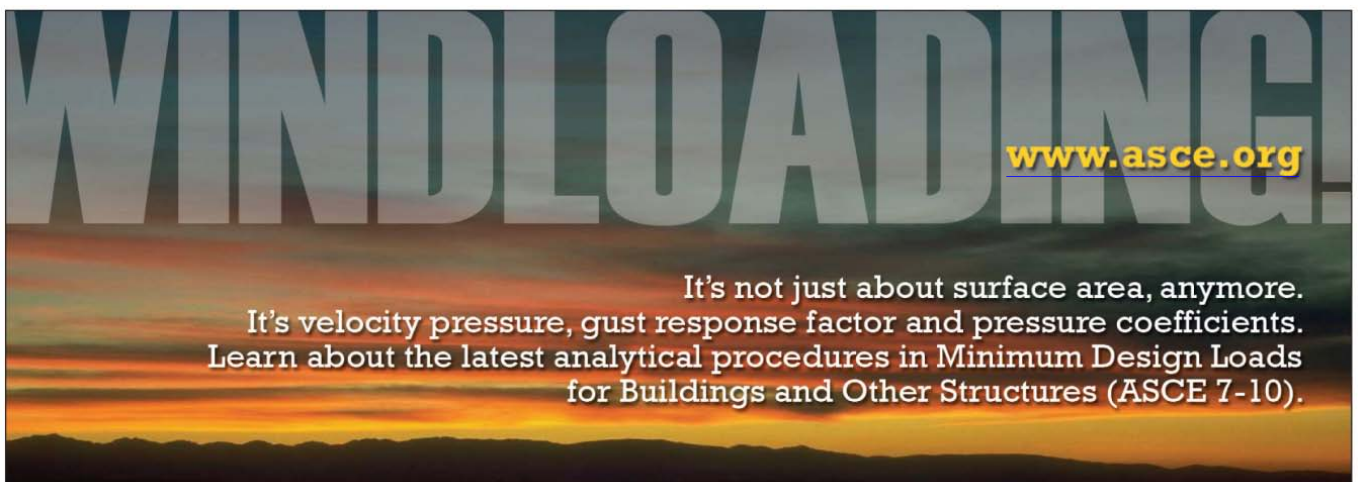
in order to promote our message of industry safety.

Finally, I would like to invite you to attend the 18th Annual NATE Conference & Exposition, which will be held Feb. 18–21 at the Fort Worth Convention Center in Fort Worth, Texas. NATE 2013 is shaping up to be the best annual conference and exposition in the industry to date. This is the place to be if you are involved in our diverse industry as a tower owner, carrier, general contractor, tower construction firm, tower climber, manufacturer, media member or an industry enthusiast.

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Todd Schlekeway is executive director of the National Association of Tower Erectors. His email address is todd@natehome.com.



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TELL A TALE — GO TO JAIL



When an OSHA inspection follows an accident, managers sometimes lose focus and attempt to avoid liability by responding to an inspector with less than complete information or outright misstatements.

By Mark A. Lies II

As most employers are aware, or should be aware, potential criminal liabilities are associated with occupational safety and health under federal law. These liabilities include not only those of the employer but also management representatives. The following information examines each of the liabilities in the context of a recent U.S. Court of Appeals' decision, *United States of America v. Maury*, F3d (3rd Cir., Sept. 12, 2012).

The United States indicted the employer, Atlantic States Cast Iron Pipe Company, and four of its managers, for various environmental crimes as well as violations relating to concealing work-related accidents at the workplace from OSHA. One of the accidents resulted in an employee death. The case was tried for eight months. A jury convicted the employer and the four managers.

An accident occurred in which an employee was killed when he was hit by a forklift driven by another employee. The OSHA inspector was told that the forklift that she inspected had not been touched since the accident and was in "perfect operating condition" before the accident, according to inspection reports. During the inspection, OSHA learned that the forklift brakes were in fact defective prior to the accident, that the inspection reports were falsified and that the forklift had

been repaired before OSHA inspected it. Hourly employee witnesses told OSHA they had been told to lie about the forklift or they would be fired.

During the inspection, OSHA learned that a supervisor had been struck by a forklift and had apparently broken his leg. The supervisor was told to lie about the accident and deny that he had broken



his leg and to say that he had returned to work the next day to full duty so that the injury would not have to be recorded on the OSHA 300 Log. OSHA eventually obtained medical records that indicated the supervisor had in fact broken his leg and been on restricted duty for 44 days, but no entry was made on the OSHA 300 Log.

OSHA learned about another accident in which an employee lost an eye when a

piece of a rotating blade on a saw broke off and hit him in the face. When OSHA visited the worksite and inspected the machine involved in the accident there was a protective shield and screen in place to protect the operator from the equipment, and OSHA was told it was in place at the time of the accident and for 16 years previously. OSHA later learned that the shield and screen were put in place after the accident and that employees were told to lie or they would lose their jobs.

OSHA learned that an employee had lost three fingers in a cement mixer accident when a co-employee accidentally started the mixer. The managers told the inspector that the machine was never equipped with a safety switch or interlock to shut down the machine when the access door was opened. In fact, OSHA later learned that these devices had originally been on the machine and had been removed because they slowed down production. Again, employees had been told to lie to the inspector regarding the presence and removal of these devices.

Sentences

The indictments charged the company, the plant manager, the human resources manager, the maintenance supervisor and the finishing department supervisor with environmental crimes as well as obstructing

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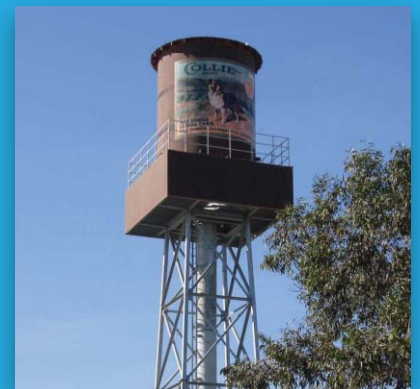
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tion of the lawful functions of OSHA in enforcing workplace safety. After the trial, the court entered sentencing on the crimes, which included the OSHA conspiracy crimes, as follows:

- **Company:** a fine of \$8 million, four years of probation, and appointment of a monitor
- **Plant manager:** 70 months of imprisonment
- **Human resources manager:** 40 months of imprisonment
- **Maintenance supervisor:** 30 months of imprisonment
- **Finishing department supervisor:** six months of imprisonment

Inspection risks

Obviously, the facts of this case reveal conduct that is not even remotely anticipated by any responsible employer or manager. Unfortunately, after a serious accident when a regulatory inspection oc-

curs, managers sometimes lose focus and attempt to avoid liability by responding to the inspector with less than complete information or outright misstatements. In such situations, there are serious risks of criminal liability for being less than truthful in the employer's responses.

Recommendations

In order to avoid these liabilities, it is critical to plan ahead for regulatory inspections so that the employer has a strategy for responding, together with safeguards to avoid admissions of liability or misstatements of facts that could lead to criminal liability. This planning should include:

- Designating a qualified employer point person to direct the employer's response to the inspection and act as the contact person for OSHA information requests
- Ensuring real-time involvement of

appropriate management representatives to review the agency information requests and develop accurate and timely responses

- Engaging competent legal counsel to advise management of the respective rights of OSHA, the employer and the employees during the inspection

Conclusion

If the employer plans ahead and executes its inspection response plan in a professional and honest manner, it will avoid the potential criminal liability for the employer and management that occurred in this case. ■

Mark A. Lies II is a partner in the Seyfarth Shaw law firm Chicago office. He has represented hundreds of employers in OSHA inspections, and he assists employers in developing plans, managing OSHA inspections and responding to citations. His email address is mlies@seyfarth.com.

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Goodbye Carrot, Hello Stick: OSHA to Continue Aggressive Enforcement in 2013

With OSHA issuing more citations and increasing penalties, an employer could easily find itself facing monetary liability well into six figures, without any accident or employee injury in the workplace.



By Mark A. Lies II and Stephanie C. LaRocco

Occupational safety and health concerns are not limited to the construction and general industries anymore. Over the past four years, OSHA has become increasingly aggressive in its enforcement practices in every employment sector, rejecting collaborative efforts with employers, such as partnerships, to enhance workplace safety in favor of enforcement with higher citation classifications and enhanced penalties. With the reelection of President Barack Obama and the understanding that Dr. David Michaels, assistant secretary of labor, will remain the head of OSHA for another four years, employers across the board can expect the agency to continue its aggressive enforcement tactics in 2013 and beyond.

Classifications and penalties

Frequently, OSHA classifies alleged violations of its standards as either “Serious,” meaning it believes there is a substantial likelihood of serious injury or death as a result of the violation, or “Other than Serious,” meaning that, although a violation, OSHA does not consider it likely to result in serious injury. However, OSHA’s findings that a violation is

“Serious,” which comes attached to a steeper monetary penalty, has been on a steady upward trajectory over the last four years. Moreover, between 2010 and 2011, the last year for which penalty information is available, the per-citation penalty for Serious classifications more than *doubled*. With OSHA issuing more citations as Serious and increasing the penalties for Serious citations, an employer could easily find itself facing monetary liability well into six figures, without any accident or employee injury in the workplace.

Further, OSHA has become more aggressive in placing employers into the Severe Violators Enforcement Program, which was created as a means of focusing on and heavily penalizing employers whom the agency believes have shown indifference to their safety and health obligations by receiving repeat or willful violations. An employer in the SVEP can expect increased and more comprehensive inspections — often enterprisewide — and substantial penalty and other abatement enhancements if violations are found. Between July 2011 and July 2012, the number of employers placed on SVEP doubled, and OSHA has showed no

signs of reducing the pace.

OSHA’s 2013 agenda

Employers in general industry can expect OSHA to continue to focus on certain favored projects, including:

- **Whistleblowers:** OSHA has primary investigatory responsibilities for 22 whistleblower statutes, from Sarbanes-Oxley to the Federal Aviation Act to the Affordable Care Act. The number of whistleblower claims and cause findings rose dramatically in 2012 and is expected to continue to increase in 2013.
- **Workplace violence:** While this hazard has attracted its attention for several years, OSHA has been particularly focused on the retail industry to ensure employers have policies in place and have properly trained their employees to recognize escalating situations and to seek assistance.
- **Ergonomics:** Using its General Duty Clause, OSHA is focused on industry-specific and task-specific guidelines to reduce and prevent workplace musculoskeletal disorders that are commonly the result of repetitive, forceful, or prolonged exertions of the hands or the frequent or heavy lifting, pushing, pulling, or carrying of heavy objects.

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- **Recordkeeping:** OSHA has also toughened its recordkeeping requirements including OSHA Logs, written compliance programs and certifications. Although typically classified as “Other than Serious” violations, OSHA has been increasing the instances in which it has found record-keeping violations to be “Repeated” or “Willful,” which carry with them a potential 10x penalty enhancement.

How to prepare

OSHA’s aggressive enforcement agenda shows no sign of slowing down. Employers should therefore revisit their safety policies and procedures and make sure that they are comprehensive, that employees have been properly trained, and that the policies are being enforced and discipline for infractions documented. This type of basic blocking and tackling will greatly reduce an employer’s exposure. Given OSHA’s current enforcement agenda, employers should in particular:

- Establish a stand-alone workplace violence prevention policy that advises employees that any type of violence or threatening behavior will not be tolerated, lays out the procedure employees should follow to report potential instances of workplace violence and directs employees to seek assistance in any situation in which they feel unsafe.
- Ensure that a whistleblower and anti-retaliation policy is in place that directs employees to report workplace concerns to a particular person or department, and have a procedure for documenting and investigating any complaint, including the responsibility for following-up with the complaining employee to let the employee know the situation has been addressed.
- Use a job hazard analysis, based on a review of the OSHA Logs and workers’ compensation data, that reviews work tasks to identify repetitive or cumulative trauma stressors and

identifies that any reasonable means to reduce repetitive stress have been considered and implemented.

- Confirm that the required compliance records are up to date, particularly if the employer has been cited by OSHA in the past for incomplete or missing compliance documents. OSHA requires some records, such as medical and employee exposure records, to be maintained for as long as 30 years after an employee’s separation, and employers should have a proper records’ retention policy in place.

Employers should take pre-emptive action to make sure their workplaces is inspection-ready. These recommendations can reduce future liabilities. ■

Mark A. Lies II is a partner in the Seyfarth Shaw law firm Chicago office. His email address is mlies@seyfarth.com. Stephanie C. LaRocco is a managing associate in the Chicago office. Her email address is slarocco@seyfarth.com.

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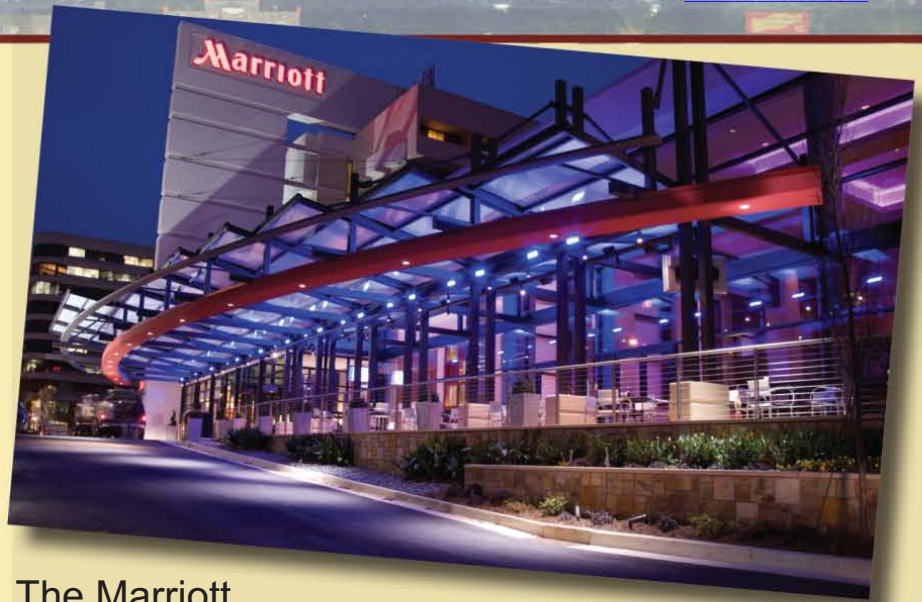
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tower construction

Tower Foundations: No More Guessing

Electromagnetic wave energy methods image concrete and facilitate data analysis to reveal details and give an engineer reliable information to determine a tower foundation's true capacity.

By J. Darrin Holt, Ph.D., P.E.

Retrofitting existing towers for multiple tenants is the current trend in telecommunications, given the public's sentiment for "not another tower in my neighborhood." Add to this a growing market, rising demand for coverage, and more stringent local zoning regulations, and you get an industry that faces increased pressure to install equipment on its existing vertical real estate in order to support expanding levels of service.

According to 2011 estimates, over 250,000 cellular sites exist in the United States. If you consider additional broadcast and emergency services, the estimates are significantly greater. In some areas, new tower construction is not always feasible. Thus the question becomes: How can existing sites be used for multiple tenants, and what is needed to be able to do so? Many times, costly tower and foundation modifications are undertaken where they may not be needed. Or, modifications may be needed, but insufficient information is available to make such decisions. Obtaining all necessary data regarding a site becomes paramount for both safety and economic concerns.

Whenever a tower needs to carry additional loads from new equipment or change-outs from older technology, a registered professional engineer typically performs a structural analysis. The outcome is expected to determine

whether the structure and any modifications meet safety standards. Conducting a structural analysis is especially important with towers at or near maximum design capacity.

Structural analysis process

A complete engineering analysis consists of both a tower (above ground) and foundation (below ground) evaluation. Aboveground data is typically obtained by qualified personnel and in-

Many times, modifications may be needed, but insufficient information is available to make such decisions. Obtaining all necessary data for regarding a site becomes paramount for both safety and economic reasons.

cludes geometric details, equipment and location so that building codes can be followed. Conducting the belowground evaluation, however, is more challeng-

ing and includes geotechnical (soils) information and the physical size and composition of the foundation. A common concern for tower foundations is how to determine their *in-situ* capacity if no original construction documents exist. Even if such documents exist, they may not reflect on-site design changes that often occur, given site conditions, contractor decisions or design loadings.

Foundations

Towers can be supported by many foundation types and classified as either shallow (e.g., mats, spreads, anchor blocks) or deep (e.g., piles, drilled shafts). Where reinforced concrete foundations are used for support, especially for drilled shafts, the engineer must determine not only the size of the concrete, but also the amount of steel reinforcement within the material. The amount of internal steel (i.e., size and spacing) is the governing factor in determining a foundation's structural capacity. If this information is unknown, a steel ratio is assumed based on past experiences or governing codes. In actuality, there may be less steel than the assumed amount, causing the foundation to be inadequate to support its intended loads. On the other hand, assuming the steel ratio is greater than what actually exists may result in unnecessary and costly modifications.



Figure 1. A source generates high-frequency electromagnetic waves that penetrate the concrete to a depth that depends on the frequency. Upon reaching the boundary of any metal or voids, the waves reflect toward the generating surface. A transducer records elapsed time and, using the dielectric constant of the concrete, one can estimate the depth from which the waves reflect.

tower construction

Over the past several years, FDH researchers have conducted laboratory and field studies on methods for determining a foundation's reinforcement details. This work has led to the development of a patented process that makes use of an ultra-high-frequency electromagnetic-wave propagation technique to identify steel location, spacing and the eventual size of the internal concrete reinforcement.

A source generates high-frequency electromagnetic waves that penetrate the concrete to a depth that depends on the frequency. Upon reaching the boundary of any metal or voids, the waves reflect toward the generating surface. A transducer records elapsed time and, using the dielectric constant of the concrete, one can estimate the depth from which the waves reflect (see Figure 1.)

Detailed graphical display

The output from this test can be converted to a graphical form showing the depth to the target of interest and its location. The data, being digital in nature, can be analyzed using digital signal processing to filter the data further and show even more detail (see Figure 2). A computational comparison from previously known steel echoes can be performed along with minor intrusive means, where needed, for verification. This technique can potentially eliminate the need for large-scale coring to visually identify the internal steel.

Upon gathering this information and performing digital signal processing, graphical software can detail the information in a three-dimensional format that an engineer needs for computations (see Figure 3). Similar results from imaging a concrete pad and pier foundation using this process can be seen in Figures 4 and 5 on page 34. For a vast majority of cases, assumptions are no longer needed because more conclusive details can be provided. This methodology works not only with foundations, but also has been used for other concrete elements such as beams and columns.

In the absence of accurate reinforcement data, the exact amount of steel present in the section (i.e., the reinforcement ratio) is unknown. In the case of a

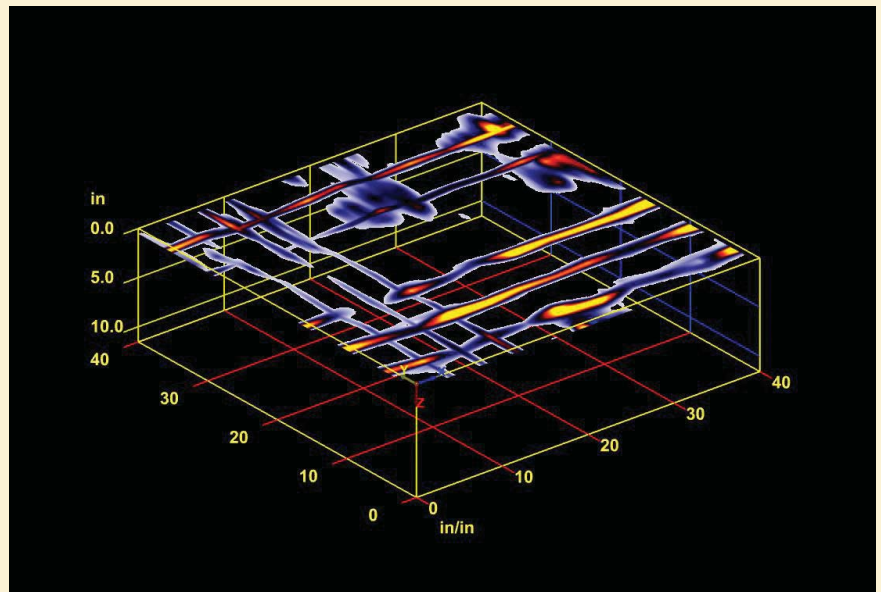


Figure 2. The output from scanning a concrete foundation shows the presence of reinforcing steel.

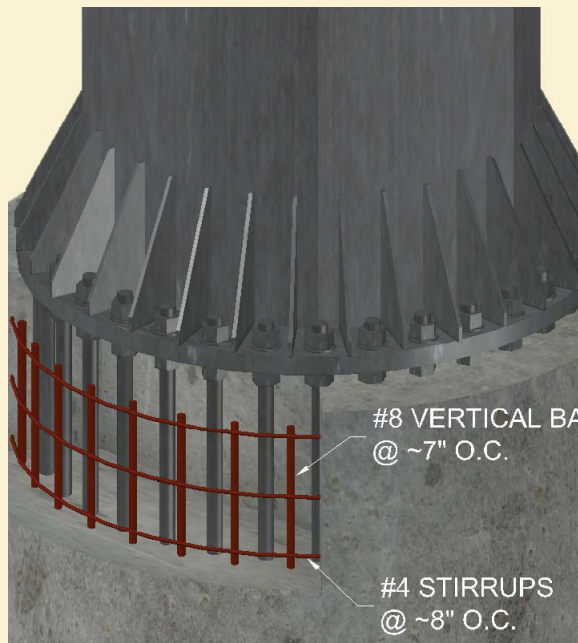


Figure 3. Reinforcement details obtained from a drilled shaft.

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tower construction

drilled shaft (caisson), as used for supporting a monopole tower, steel ratios may have to be larger than the American Concrete Institute code-prescribed minimum flexural steel-to-concrete ratio in order to carry the applied loads, depending on soils and foundation size. If the amount of steel is unknown, the presence of a minimal amount of steel may often be assumed. If the actual amount of steel is unknowingly larger than the minimum, then expensive and unnecessary modifications could follow. Where the steel present is less than the minimum required, a foundation could be inadvertently passed as being satisfactory when it is not.

Figure 6 on page 38 is an example plot compiled from actual reinforcement investigations. This plot represents the structural capacity of reinforced concrete sections in bending, but it does not take into account soil contributions because these vary widely according to locale. The horizontal axis in Figure 6 represents the percentage increase in steel above an American Concrete Institute 0.33 percent minimum amount, and the vertical axis represents the percentage increase in load capacity. As shown, small increases in reinforcement of only a few additional percentage points can offer a significant increase in capacity. In some cases, this additional steel, if confirmed to exist, could potentially make a difference between modifications or no modifications.

Summary

Concrete tower foundations pose a special problem to engineers charged with the responsibility, and liability, for certifying their capacity. Towers are now being required to support loads for which they were not originally designed. Oftentimes, complete information detailing the foundation support conditions is not available. It is therefore critical that engineers have at their disposal all available data, including the steel reinforcement inside the material. If minimum steel is used for calculations in the absence of actual steel, then a modification may be designed for towers

(continued on page 38)

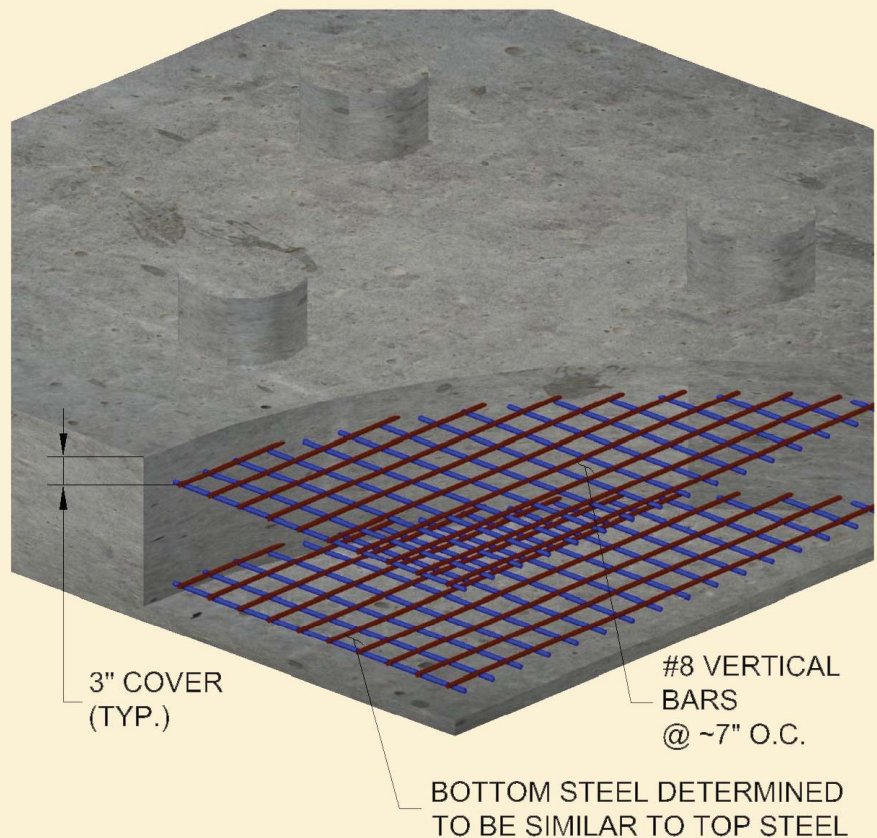


Figure 4. Reinforcement details obtained from a drilled shaft.

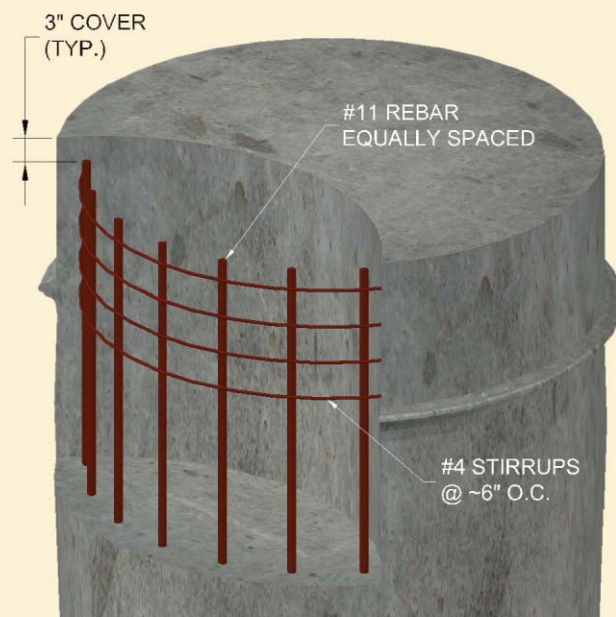


Figure 5. An imaged concrete pad — final data processing.

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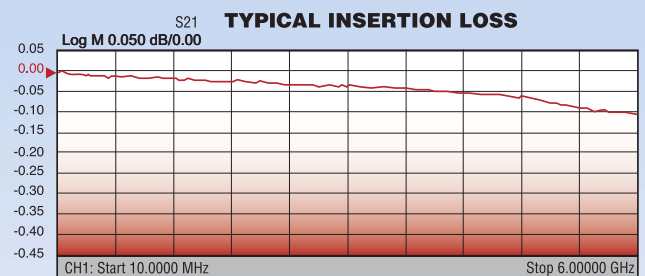
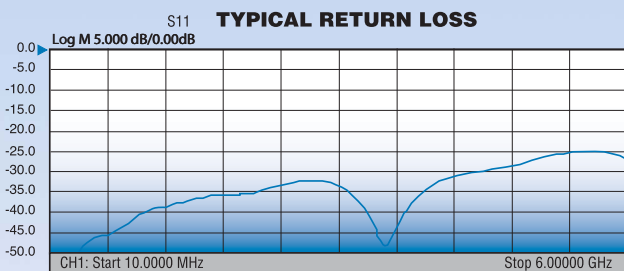
- Solid brass construction
- White bronze plating
- Fully weatherized housing

Versatile Design

- RF performance from DC - 6000MHz
- DC pass multi-strike broadband bidirectional design



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TOWER OWNER
MW Towers

SITE ACQUISITION
Telecom Realty Consultants

TOWER TYPE
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HEIGHT
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ARCHITECTURAL
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LOCATION
Harrisonville, Mo.

tower construction

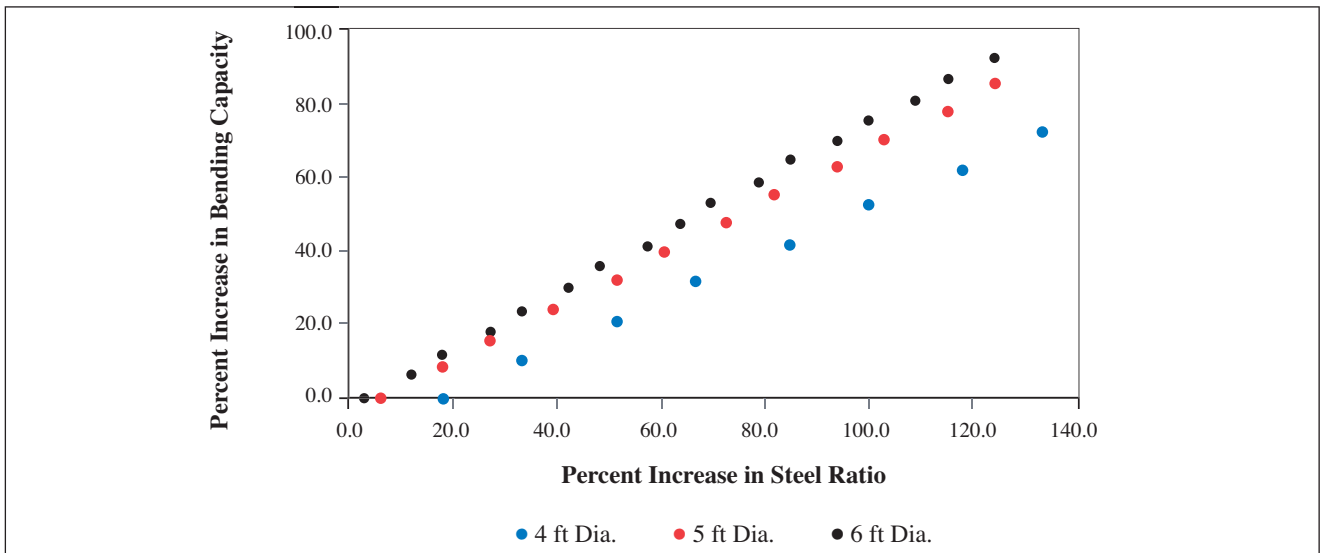


Figure 6. An example of the percentage increase in shaft structural capacity with a percentage increase in reinforcement (no geo-technical considerations).

(continued from page 34)
that in actuality require no modifications at all. This can significantly increase the project's cost. Electromagnetic wave energy methods have helped ad-

dress this problem through concrete imaging techniques and data analysis. These methods, which augment other inspection methods, can determine the details of a concrete element to give the

engineer reliable information to determine a foundation's true capacity. ■

J. Darrin Holt, Ph.D., P.E., is managing principal of FDH Engineering, Raleigh, N.C. His email address is holt@fdh-inc.com.

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The View from the Top: A Tower CEO Roundtable

Chief executive officers of four large telecommunications tower companies assess the state of the industry and make predictions for antenna site development and company operations for the year.

By the AGL Staff



Speaking in Orlando, Fla., on Oct. 3, 2012, executives of four large tower companies answered questions at a session named “The View From the Top.” The occasion was PCIA’s Wireless Infrastructure Show, and the executives were W. Benjamin “Ben” Moreland, president and CEO of Crown Castle International; James “Jim” Taiclet, chairman, president and CEO of American Tower; Marc Ganzi, CEO of Global Tower Partners; and Jeffrey A. Stoops, president and CEO of SBA Communications.

The first question was asked by Maria Scotti of Message Center Management, the sponsor of the session, followed by questions from PCIA’s former president and CEO, Michael Fitch. The following are highlights from the session, edited for length and style.

Maria Scotti: We’ve seen a huge transition since the late ’90s and early 2000s when product was

chasing consumers, and carriers were talking about the things that the products were going to be able to do. And we’re all going, “It looks neat. It looks interesting. It doesn’t seem possible.” But we knew what we had to do in the business. We knew it needed a lot of towers. It needed a lot of rooftops in traditional structures.

Today, the consumer chases the product. We have Wi-Fi. We have distributed antenna system (DAS) networks. We have other small-cell technology. Looking in your crystal ball, 10 years from now, what do you anticipate our industry product mix needs to be? What do we need to offer to the carrier so that it can continue offering product to the consumer?

Marc Ganzi: Asset prices have been fairly cyclical. Since the early ’90s, multiples have contracted and then expanded. That’s the history or nature of any industry. The point to which multiples have expanded today takes them to a place that we haven’t seen in many years. Some pretty significant mergers and acquisitions that

were announced or that have taken place during the past 90 days have taken us up to a level of multiples that we haven’t seen since the late ’90s.

The industry has fundamentally changed, and more importantly, the balance sheets have changed. In the late ’90s, when asset prices were high, leverage was commensurate with the prices. We had net leverage at 13, 14, 15 times, and today net leverage is 3 times to 8 times. Wireless infrastructure owners are much better positioned to handle the effects of asset prices going up because net leverage is not riding lock, stock and barrel with the price of those assets.

Much of the asset price movement is caused by scarcity. There aren’t many significant assets left for the four of us to acquire, and it makes it more difficult. Based on that scarcity, asset prices have risen and will continue to be expensive. We liked the environment better in 2008 when we bought assets at lower prices, but this is the nature of the industry.

We’ve witnessed three tower cycles where we had boom, retraction, boom, retraction, and right now we’re in a boom cycle for sure.

Let’s hope there’s not a retraction

Jonathan Adelstein, newly appointed PCIA president and CEO, looks on from the audience as his predecessor and the CEOs of four large tower companies speak from the stage. From the left, Michael Fitch, former PCIA president and CEO; Marc Ganzi, CEO of Global Tower Partners; W. Benjamin Moreland, president and CEO of Crown Castle International; Jeffrey A. Stoops, president and CEO Of SBA Communications; and James D. Taiclet, chairman, president and CEO of American Tower.

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any time soon. History has shown that asset prices fluctuate. What has been most consistent about this cycle is the effective health and the low-cost capital to balance sheets across all four companies represented here.

Michael Fitch: Do you see asset prices continuing to rise?

Marc Ganzi: It's a function of where interest rates are, where spreads are on our debt, cumulatively, as a group. And a lot of it has to do with organic growth. Wireless infrastructure companies haven't seen the kind of organic growth that we're seeing from our four big carrier partners since back in 1996 and 1997 when all four major national car-

riers were deploying capex at the same time.

As for leasing, we've never had collocation applications stacked up from all four major vendors deploying at the same time. And that deployment ramp is very long because 4G is not as simple as 2.5G and 3G. It's going to be a three-to-five-year build. It's going to require different infrastructure, antenna sizes and antenna heights. It is going to require delivering signals indoors, outdoors and underground. The wireless service environment has changed, and the wireless infrastructure companies are in a better position than ever to take advantage of that.

Michael Fitch: Ben, what do you envision as the future customer base? Does it change significantly?

Ben Moreland: The carriers' retail brands are well established, and consumer demand for the product is well known. The value the wireless infrastructure industry brings lies in continuing the efficient, expedited way we provide access to infrastructure. We are the low-cost provider to access infrastructure and that's done on a speed-to-market basis. Whether it's an existing structure, fiber in the ground or aerial for a small-cell or DAS network system, it is wonderful when we can provide an infrastructure that carriers can share. It is fundamentally more efficient for them to access infrastructure through us than on their own. That relationship will remain intact. It's good pub-

lic policy, it's good economics for both sides of the equation, and it's a relationship we want to continue to maintain.

Michael Fitch: Jeff, what potential do you see for additional acquisitions and the possibility of more sales of carrier assets?

Jeffrey Stoops: Acquisitions will always play a healthy role, given the asset-centric nature of what we do. We have the luxury in this business of having good systems and good people who together can take on the management of more assets. Acquisitions are integrated smoothly. The systems work together, and acquisitions can raise value.

As small cells become more predominant, are they truly shareable infrastructure? A reason tower companies have been low-cost providers is that we accept the economic risk of offering shared infrastructure. Are small cells going to be shareable? With small cells, what may work for Carrier A may not work for Carrier B.

As for carrier tower portfolios that might be available for acquisition, only a few have portfolios of substantial size: AT&T, Verizon and U.S. Cellular. I don't see the first two selling anytime soon. They view their tower assets more strategically. They like the operational control.

To my knowledge, in every carrier sale, whether it's domestic or international, there's been something of a financial need on the part of the seller to use the proceeds for other things. I'm not sure that's the case with AT&T and Verizon. Those two opportunities are not something likely to come up anytime soon.

Michael Fitch: Jim, could you

speak to the global evolution of the next 10 years?

Jim Taiclet: Ten years ago, the U.S. tower industry was a collection of startups. Everybody by definition was pretty much new to the industry. It's a great credit to the three gentlemen with whom I share the stage and to everyone in the audience that it has evolved into a professional industry with excellent operational characteristics. It serves a customer base well, a customer base that has migrated to the shared infrastructure business model.

Can we repeat that success on a global basis in the next 10 years? Our company absolutely believes that we can. Some of the pieces are coming together, such as a generational change from 2G to 3G in a lot of countries and even 3G to 4G in some others where there might be that financial need. You're seeing some of the global multinational telecom leaders like Telefonica, like MTN Group in Africa, Bharti Airtel in India and Africa, and Vodafone in different parts of the world thinking about or having already divested their towers. The domestic U.S. success story is something that we intend can be fully globalized over the next 10 years in selected countries, at least for our company. That will be the wave of the future.

Michael Fitch: Marc, as chairman of PCIA's board of directors for the past three years, you were involved in the legislative effort that resulted in the pre-emption language

in Section 6409 of the Middle Class Tax Relief and Job Creation Act of 2011. How do you view the campaign, the way it was waged, and its effect?

Marc Ganzi: The road to passing legislation like that is a long one. It began with Jim Taiclet going to Capitol Hill, Jeff going to the Hill, and then you dragging me to the Hill. It took six years to bring the legislation to where we wanted it to be. The story the industry had to tell was simple, that we have unique real estate that is infrastructure and that is shareable. When we brought the argument down to its most fundamental level, it was easy to convince members of the Congress and Senate

Jim Taiclet: "Ten Years ago, the U.S. tower industry was a collection of startups. Everybody by definition was pretty much new to the industry. ... It has evolved into a professional industry with excellent operational characteristics."

to back this in a bipartisan way.

The biggest benefactor of that legislation is our customers. Yesterday, I asked a customer, "How's the LTE deployment coming?" He said, "We're 80 percent of the way through our entire portfolio entitlements." He said such speedy deployment wouldn't have been possible without the new legislation. So, the impact for customers is like the difference between night and day.

With 3G, the carrier spent 80 percent of its effort on entitlements before even starting to install equipment. Now, it's spending 90 days to 120 days on entitlements, and the carrier is 80 percent of the way

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through its portfolio already.

With the legislation, the cost savings to our customers is significant. The deployment is quicker, which means we're all signing amendments quicker, which also means carriers are getting on the towers quicker, which further means earnings and cash flow are better. Carriers can focus on offering great handsets, products and service, and the whole ecosystem benefits. That was the epiphany for me, hearing

Marc Ganzi: "Tower companies have to keep thinking about how we can help our carrier partners, because we need to be a value-added part of the equation. We can't be an obstacle. We can't be perceived as the landlord that's the headache for the carrier."

a carrier say that its deployment experience is completely changed because of this law. From a tower company CEO's perspective, that's exactly what I wanted to hear. It validates the work done by those in this room and what PCIA has done as a trade association.

For the future, having access to Bureau of Land Management land

and federal General Services Administration buildings on a uniform platform on a uniform set of leases is going to be a significant change. It's going to give us access to public land like we've never had before.

Tower companies have to keep thinking about how we can help our carrier partners, because we need to be a value-added part of the equation. We can't be an obstacle. We can't be perceived as the landlord that's the headache for the carrier.

PCIA needs to be perceived as a trade association that facilitates wireless broadband connectivity for all companies throughout the country and not just in the urban core.

Michael Fitch: Ben, at the end of last week you announced Crown Castle's acquisition of T-Mobile USA's towers. Some said the price paid was at the high end of a range. Could you speak to that and the value the acquisition has for Crown Castle?

Ben Moreland: Crown Castle announced the acquisition of T-

Mobile sites, about 7,200, mostly in the top 100 cities. The objective was to position the company to grow in areas where capital spending will be the greatest during the next 10 years — the top 100 cities. We've all benefited during the past 15 years by providing shared infrastructure nationally as wireless networks were built. That is largely accomplished. Now, we're in the subsequent generations of technology and replacing the broadband Internet with the wireless broadband Internet. That's a different challenge as consumers use the product in ways never envisioned.

The predominance of the capital spend during the next 10 years will be different compared with the past 10 years. It will focus on large cities where more people live, where the disposable income is, and where product devices roll out. This acquisition strengthens our position in those cities.

The acquired towers are complementary to our existing portfolio. The sites are relatively young and relatively unloaded — 1.5 antennas per tower including T-Mobile as the anchor. It represents an opportunity to add leasing, add services for customers and make the sites available on a shared basis.



Michael Fitch: Jeff, you also had big acquisitions over the past few months with Mobilitie and TowerCo acquisitions. How do you look at acquisition choices and priorities?

Jeffrey Stoops: We look upon all acquisitions as financial transactions. Will shareholders be better off for value creation five years out? Strategic size benefits flow from these transactions, but they are not the primary reason, which is creating shareholder value.

When the AT&T/T-Mobile transaction was terminated, that affected the attractiveness of many tower assets. I'm not sure any of these three deals would have been done if the AT&T/T-Mobile transaction had occurred because it would have changed the way we looked at the future attractiveness of those assets and would have affected financial outcomes.

First and foremost, we take steps to increase value. But some strategic benefits result, such as the leveragability of back offices. We can take on these assets, which grow our portfolio in one year by more than 60 percent, and we can do that with little additional overhead and headcount. That's going to have a great impact on EBITDA margins and free cash flow.

The assets that we acquired will be particularly attractive in a 4G world where, once basic 4G services are deployed, carriers will come back and do what they've done historically, which is fill in capacity gaps. That's when these assets will really shine.

Michael Fitch: Jim, American Tower converted to a real estate investment trust in early 2012. Has the conversion changed anything materially in the company's operations or priorities?

Jim Taiclet: The conversion went as expected. The IRS previously confirmed that it would be an appropriate tax election for us. We spent 18 months preparing the company. We also introduced the recurring dividend in 2012, which was the third piece of the conversion for our shareholders. The conversion didn't affect our expectations, our strategy or aspirations.

We want to grow our business in the United States where the organic growth opportunity will be strong for several years, and we're eager

to take the success of this business model overseas. American Tower is the only global wireless infrastructure REIT in the world, which is an opportunity for some new investors that might come to us.

Jeffrey Stoops: "We look upon all acquisitions as financial transactions. Will shareholders be better off for value creating five years out? Strategic size benefits flow from these transactions, but they are not the primary reason, which is creating shareholder value."

Michael Fitch: Marc, Global Tower Partners' acquisitions have included rooftops and roadways. How do you evaluate them? How do they fit GTP's strategy? What is different about them compared with other assets?

Marc Ganzi: Capital allocation decisions stem from a competitive environment among our business units. The finite amount of capital that we can put to work every year requires that all of our groups use a disciplined approach and present opportunities that deliver the total return our investors expect. We



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look at buying rooftops, building towers and buying towers, we look at national, and we look at DAS deployments as the five fundamental ways to use the balance sheet.

With rooftops, we take a partnership approach with property owners that can mean acquiring an easement, using a master lease or helping them manage their antennas and income. The rights to place the antennas inside the buildings or on sides of buildings or on parking decks are essential to our investment in the urban core and predicting where customers will want sites.

When we get together with railroads or utility companies like Nevada Energy or Norfolk Southern, it involves where we believe 4G sites will be placed in the future — on smaller towers, lighter infrastructure and rights of way adjacent to subur-

and having unique rights of way closer to large residential areas and suburban areas will be critical for us to be able to replicate the cash flow growth our investors are used to seeing.

Michael Fitch: Ben, Crown Castle has expanded greatly in DAS holdings and capabilities. What is the role for DAS, small cells and other alternative technologies?

Ben Moreland: We started 2012 with a large acquisition in the small cell or DAS sector with NextG Networks. We're having a \$4 billion acquisition year.

The small-cell business is consistent with our acquisition of T-Mobile sites in urban areas. The small-cell or DAS architecture fits the shared infrastructure business model exactly the same as the tower business.

When we think about various architectures that can go on a horizontal piece of fiber whether buried or aerial fiber in an outdoor venue, we focus on the shareable elements. The fiber, the soft cost and the rights that it takes to

build it are expensive components of the overall system. That's analogous to the tower business. There is some unique franchise value and expertise involved in actually securing those rights, which we now have, thanks to our friends at NextG Networks.

We don't spend much time worrying about the electronics in the system because in many cases, the carrier owns it, and it is not share-

able in certain cases. Where it is shareable, we want to own it and provide sharing. The DAS or the small cell business is about 5 percent of our company. Nevertheless, we believe it will be a disproportionate contributor to growth, much larger than its relative small size today.

We're capable and willing to provide Wi-Fi access points, small cells, pico cells and shareable DAS nodes.

Michael Fitch: Jeff, is there evidence of a long-term trend in capital markets that offers opportunities for the business?

Jeffrey Stoops: This is about the best time in the capital markets that I can recall in my 15 years in the business. In 2012, we raised almost \$3.5 billion in debt and equity. On the debt side, it's about \$2.4 billion and we raised it at a blended rate of 4.5 percent with an average life of seven years of pro forma leverage of 7.5 times to 8 times.

Access to capital matters because, using American Tower as an example, Jim's company has already turned into a REIT, and the primary metrics for valuing REITs are the adjusted funds from operation per share, and the cost of debt really matters in that calculation. The cost of debt affects free cash flow. The cost and availability of debt affect appetites for acquisitions and prices people that are willing to pay. The role access to capital plays has been reflected in 2012 being an active year for acquisitions.

We may see low interest rates for many years to come, which will be good for our industry. As investors evaluate asset classes, companies and industries, the tower industry is always right at the top of the list for creditworthiness. The real thing to

Marc Ganzi: "Capital allocation decisions stem from a competitive environment among our business units. The finite amount of capital that we can put to work every year requires that all of our groups use a disciplined approach and present opportunities that deliver the total return our investors expect."

ban neighborhoods where we see the data crunch happening three to five years from now.

We're trying to predict places where we can use the balance sheet in an intelligent way and at the same time predict where we think infrastructure is going. The need for macro core sites is critical and will continue to be a big part of deployments. Being closer to the suburbs

watch out for is long-term interest rates, for which I have no prediction.

Michael Fitch: Jim, American Tower now has more international sites than U.S. sites. Has international growth been faster than you expected? How do you evaluate international opportunities?

Jim Taiclet: The United States is our home market where we develop the intellectual property to take this business global, and it's the heart and soul of the company. The U.S. market represents 70 percent of our revenue, even with all the international expansion. The United States holds some really great growth prospects. During the next five years, the traffic on U.S. wireless networks will rise by a factor of 25 times, and 70 percent of it should stay on traditional, classic, macro towers. Thus, for the bulk of the deployment, our expectation and our advisors' expectation are that it's

going to look a lot like past deployments. However, another 30 percent of the traffic will be offloaded. Of that 30 percent, we're all interested in the shareability of those offloads, and we're trying to figure out where they will be. That's a big focus of our U.S. team at this moment. The opportunities range from individual, stand-alone small cells, to indoor or outdoor DAS, to Wi-Fi. We participate in DAS, and we're looking at Wi-Fi.

Nevertheless, 70 percent of the deployment in the United States is likely to be made on traditional towers and rooftops. So, the United States is a great market, and we intend to grow organically and through acquisition as rapidly as we can.

We acquired 15,000 assets during the last year and a half and 90 percent of them are outside of the United States where the pricing is better and competition is less. We can obtain better returns for the

future by making those investments.

First come country selection and evaluation. If the country doesn't have geopolitical stability and economic factors favorable to foreign investment by U.S. companies, we don't consider it.

Second are the health and competitiveness of the country's wireless industry. We want to see at least three competitive wireless carriers.

Third is cultivating a counterparty or customer willing to be the launched customer either through a cell-site leaseback transaction of some scale, a big build agreement or a joint venture. We weave a fabric of attractive markets or countries and solid counterparties and customers that we can expand upon.

The next Wireless Infrastructure Show will be held in Hollywood, Fla., Oct. 7-10. For information, visit www.pcia.com.

Photography by Don Bishop.





A tower in Costa Rica, photographed by Ronny Ellis of Global Tower Partners, the company that owns the tower.

The International Tower Business: What's It Like Out There?

Latin America appears to be the hottest foreign market for investment by U.S.-based tower companies. Industry leaders explain the reason for investing in this and other markets and measure the success.

By the AGL Staff

During the Wireless Investors Conference conducted as part of the PCIA Wireless Infrastructure Show in Orlando, Fla., executives of tower companies and representatives of a bank and a financial services holding company spoke about the telecommunications tower business outside the United States. The conference moderator was Jonathan Atkin, a senior analyst and managing director of RBC Capital Markets. The remarks that follow were edited for length and style.

Marc Ganzi Chief Executive Officer Global Tower Partners

First and foremost, we look to invest in countries that are politically stable, where we would be able to perfect our property rights in the real estate because that's a fundamental underpinning to what we do. Global Tower Partners is a real estate investment trust. Once we find the characteristics that are resident

in real estate rights, and the political environment is safe, it is safe to invest and deploy capital in an intelligent manner.

We look for countries where the tower collocation model is generally accepted. Some countries have not ac-



Marc Ganzi, CEO, Global Tower Partners: "We like markets where there is transparency in getting the permits and where carriers understand that if you build a multi-use facility, on day one, you're going to have collocation resident."

cepted the collocation model broadly, such as Canada, where the carriers work together to build sites away from us. We like countries where infrastructure-sharing is promoted.

One such country is Costa Rica, where the laws about building towers are clear. They encourage collocation, and it's difficult to obtain permits. We like markets with high barriers to entry, where you get rewarded for spending two or three years developing permits. We have experienced a lot of organic growth in those markets, largely as a function of the governing bodies being willing to stand behind the permits and not allow sites to be built without permits. The Costa Rican government is requiring an independent tower operator without permits to take its towers down. Those are things we like to see. We like to see privity of location. As a consequence, we have a portfolio that is one year old that has nearly two tenants per tower. We have 1.96 tenants per tower across our portfolio.

We like markets where there is transparency in getting the permits and where

foreign investment

carriers understand that if you build a multi-use facility, on day one you're going to have collocation resident. We've struggled a little bit in some of these Latin economies with carrier portfolios because many carrier portfolios in the region are not built for collocation. There, you're buying assets that typically and initially look like a bond. You hope that if you invest with an investment-grade counterparty, you've made a good in-

vestment provided you bought it at the right price. But if you buy a portfolio that is only built for one carrier and your projection is to obtain two tenants in five years, you have to augment the tower, if you're lucky and have a lattice or guyed tower and have the money to spend on capital improvement. But, if it's a 60-foot or 80-foot monopole, you're dropping and swapping. You have to build a new tower. That doesn't feel like

an appropriate tower acquisition for us.

We like countries where we can replicate the U.S. tower model because this is the best market for towers in the world. I'd say Mexico is a close second, but we like to try to find places where we can continue to do what we do best, which is buy or build an existing structure and then put that second or third tenant on it without having to spend significant capex. That is the magic of the tower model.

What we discovered is that in many countries, particularly in Latin America, the tower model is present and it works. Carriers are sharing infrastructure and that's partly due to another U.S.-based tower company that did a great job blazing the trail and getting carriers to accept shared infrastructure, because that's

A particular view has developed in the tower investing community that it will be extremely challenging to take tower assets away from Chinese government control. No one on this stage has really tested that theory.

a model that has not been accepted in many parts of the world.

For comparison, our organic cash flow growth for two or three quarters in 2012 was 12 percent for our domestic business and 37 percent for our international business, three times the rate.

In 2005, we looked at investing in India and thought about joining one of the consortia of operators. We could not get comfortable with the regulatory environment, particularly the privity of building permits. That's not to say that the tower model doesn't work there, because India has independent tower companies that use the collocation model. But at the time, it was too easy to build assets. The

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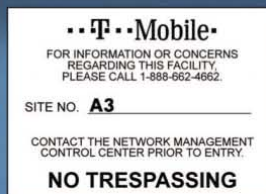
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environment was not right for us and for our investment thesis.

With China, I don't believe any U.S.-based tower company could say it would be likely to own assets in China anytime soon. A particular view has developed in the tower investing community that it will be extremely challenging to take tower assets away from Chinese government control. No one on this stage has really tested that theory. We've all taken trips to China, but I think it'll be a long time before any of us will deliver a succinct investment thesis for towers in China.

Brendan Cavanagh **Chief Financial Officer** **SBA Communications**

Our international operations are in Canada and five countries in Central America. We have 1,600 tow-

ers outside the United States, with most of them in Central America. The portfolio was grown through building and buying towers. Costa Rica has represented a purely new-build strategy in a special situation that may not exist elsewhere in the world. Two carriers are building out new networks from the ground up, Telefonica and Claro, and the incumbent network operator, Instituto Costarricense de Electricidad (ICE), which is the government-run carrier, is racing to keep up with them.

The cost of building a tower in Central America is much less than in the United States, and although the tenant rates are also less, the difference in the ratio is significant. Where you're spending 50 percent less to build the tower, you receive rent at rates 75 percent to 80 percent of the rates in the United States. Thus, returns on Latin American towers are substantially better than for domestic



Brendan Cavanagh, CFO, SBA Communications: "In some countries, we bought decent-size tower portfolios, some from the carriers. We've had tremendous success with them."

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In some countries, we bought



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foreign investment

decent-size tower portfolios, some from the carriers. We've had tremendous success with them. We bought towers from Digicell in Panama. As soon as those towers came into an independent party's hands, it was like the floodgates opened, and the other carriers were pleased to have somebody they could deal with to place antennas on those sites. It wasn't quite as easy prior to that. But a huge demand had been pent up.

We've seen great returns in those markets, and to the extent that we can continue to find markets that present the same characteristics, it's only natural that many U.S. tower companies will invest there. With the potential to acquire large portfolios of U.S. towers quickly dwindling, in order to sustain the kind of growth to which investors have become accustomed, including the investor base for the public companies, you have to look internationally.



Costa Rican tower photo courtesy of SBA Communications.

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When you join the Wisconsin Wireless Association, you help to make a difference.



Through donations to the General Federation of Women's Club's Wisconsin chapter, the Wisconsin Wireless Association helps to purchase pediatric jump bags for use by Wisconsin ambulances. Pediatric jump bags help to save the lives of small children because medical requirements for small children often differ from those of adults. The right equipment optimizes the care that the responding team is able to provide.

Wisconsin Wireless Association

Promoting awareness

The Wisconsin Wireless Association helps to promote positive awareness about the wireless infrastructure industry by representing the industry at the Municipal Treasurers Association Annual Conference and the League of Wisconsin Municipalities Annual Conference.

The Wisconsin Wireless Association is participating in the Public Service Commission of Wisconsin's development of a statewide broadband plan, "Wisconsin's Playbook for Broadband Progress."



Wisconsin Wireless Association

wisconsinwireless.org

ACTIVITIES

- April 11** Annual Telecom Education Conference in Madison
- June 26** Brewers-Cubs Tailgate Fundraiser in Milwaukee
- Sept. 19** AGL Regional Conference in Chicago
- Oct. 16** League of Wisconsin Municipalities in Green Bay
- Dec. 5** Holly Jolly Trolley Tour Fundraiser in Milwaukee

A public service ad from AGL
Photo courtesy of R&B Fabrications

foreign investment

Rod Smith Chief Financial Officer U.S. Tower Business American Tower

We have more than half of our towers outside the United States in India, throughout Latin America and in Africa. We see very positive growth signs in those markets. In the United States, car-

riers are going through their antenna-site deployments of technology, and that's exactly what's happening around the globe.

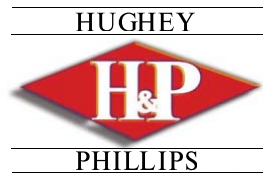
In emerging markets in India, Ghana and Uganda, carriers are ramping up penetration and building out voice networks, much like what happened in the United States 10 years ago. There is a lot of growth in those markets. Mature markets like Mexico, Brazil



Rod Smith, CFO, U.S. Tower Business, American Tower: "In emerging markets in India, Ghana and Uganda, carriers are ramping up penetration and building out voice networks, much like what happened in the United States 10 years ago."

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and South Africa have voice networks up and running, and carriers are beginning to transition to data deployments, spending capital on that. Those markets resemble the U.S. market of five years ago. Imagine the amount of growth left in those markets.

Spectrum auctions lead to growth. Mexico just finalized a 3G spectrum auction. Colombia and Chile just finished spectrum auctions. Carriers will begin to build out the new spectrum, leading to growth.

We see strong demand in the United States and internationally that we believe will continue. In the second quarter of 2012, American Tower did more new business in international markets than in the U.S. market, and this is an environment where the U.S. market is growing strongly with all four carriers active in network construction. Together with investments we've made internationally, that will be a big engine of growth for us.

Jay Brown Chief Financial Officer Crown Castle International

About 5 percent of Crown Castle's revenue and cash flow come from our business in Australia. The Australian

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Jay Brown, CFO, Crown Castle International: "Some foreign markets could be interesting. There may be investments over time that pay dividends, but the vast majority of the business value is going to continue to come from the United States."

market looks similar to the U.S. market. Telstra, Vodafone and Optus are deploying 4G networks. The deployment may be slightly faster than in the United States during the next couple of years. In addition, Australia has a partially government-funded national broadband network that is being deployed, a portion of which should be wireless. Our business in Australia is expected to show outsized growth relative to the past several years.

Nevertheless, what produces the majority of our cash flow is our U.S. business. As you look at where carriers are spending their capital, the United States has the fastest-growing capital spending in the world. Some have looked at the U.S. market during the past several years and almost assumed that the growth would be substandard or not be as good as what we've seen in the past. Yet, when you look at our cash flow per share over the last three or four years, without going to some of the emerging markets, we've been able to sustain in the United States an organic growth rate that looks similar to what's happening in the rest of the world. That's directly related to our focus on dense, urban areas where carriers are spending the most money.

Some foreign markets could be interesting. There may be investments over time that pay dividends, but the vast

majority of the business value is going to continue to come from the United States.



Ric Prentiss
Managing Director
Raymond James & Associates

We cover wireless around the globe, and for the first time in recent memory,

the United States is leading the world. The United States is really leading on 4G LTE. Europe used to make fun of us. They said, "Your voice penetration is low. Your data penetration is low." The United States really grasped the 4G LTE bull by the horns and has been running that scenario. Europe looks to us, now, as the leader in 4G LTE.


Latin America is poised for 3G growth in the coming years. One of the


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problems was that handset prices were too high. Latin America has a lower GP per capita. We see smartphones, particularly Chinese-manufactured smartphones, dropping in price to get to that \$100 magic price point soon, in the next several quarters.

Explosion of wireless data

By the second half of 2013 and into 2014, we expect to see an explosion of

wireless data, and 3G smartphones in Latin America are going to stress wireless networks that underbuilt, networks that are used to prepaid, low voice-usage rates. With 3G, this will be the first chance people in Latin American countries will have to use the Internet wirelessly to use Facebook and YouTube. The demand will be strong. But right now, the United States is leading the way on 4G LTE, with more to come.



Ric Prentiss, managing director, Raymond James & Associates: "By the second half of 2013 and into 2014, we expect to see an explosion of wireless data, and 3G smartphones in Latin America are going to stress wireless networks that underbuilt, networks that are used to prepaid, low voice-usage rates."

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Scott Gooch Director, Corporate Foreign Exchange Wells Fargo International

On the domestic side, wireless infrastructure growth will continue, with technology and industry consolidation. The international side has open markets where, for example, American Tower has almost half its towers. The four tower companies represented here took easy steps initially. You see this in most industries where international expansion starts with English-speaking countries. SBA first moved into Canada. Crown Castle is in Australia.

Then, you look elsewhere to see that the markets are politically stable, showing economic growth, and have easy market entrance. And that's where Latin America has grown during the past year. While wireless carriers are building out networks in the U.S. market, tower companies also are expanding into the Latin American market.

Ten years ago, Costa Rica was a

banana farm. The primary export was bananas. Today, it's computer chips. As Latin American markets grow with the global economy, their consumers are demanding new products, which are supporting wireless infrastructure growth.

There may never have been a period with more political stability in Latin America than at present, despite some problems in Venezuela and Argentina. Central America is stable, and the stability is pulling in global investment. Wireless infrastructure growth numbers in the Latin American market are stronger than in the United States.

Compare it with Europe. Europe has significant problems, and its expansion, R&D numbers and infrastructure numbers are down. European countries are struggling with debt. Thus, the U.S. market remains the main growth engine, but as you look globally, you will see more and more expansion. The risk/return numbers continue to favor the expansion.

India and China, two markets with growth potential, remain two of the hardest markets to penetrate. The barriers there are much stronger than what you see in other markets where U.S.-based tower companies focus, and they

affect many businesses. For example, Walmart is all over Latin America, and they have made a move into Africa. But you do not see Walmart focus on India and China because of the barriers.

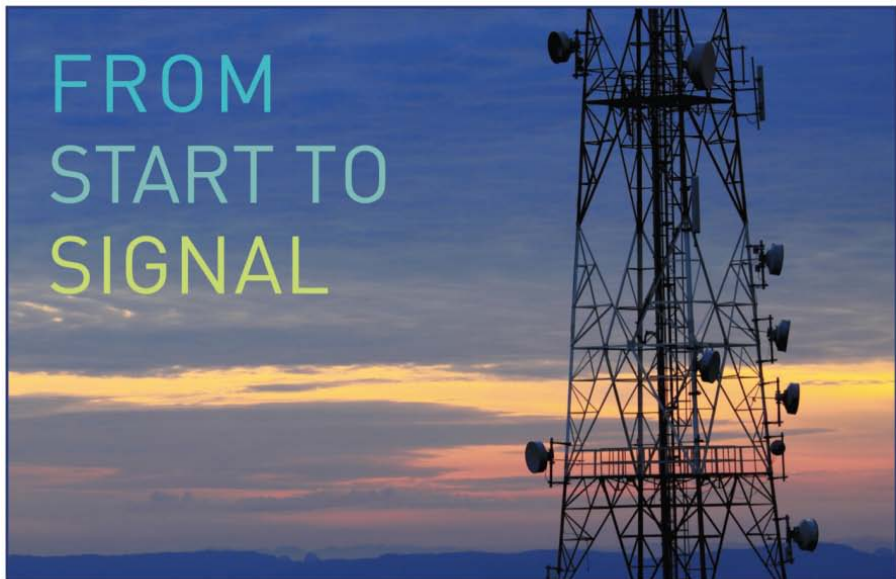
Expansion is part of an ongoing cycle. Profits in those markets eventually come from the tower build out, and then the profitability is reinvested. You're not bringing cash back; there are tax implications. It's about reinvesting and

finding more growth. If you look back at how long this industry has been growing in the United States and how some people believe the market is becoming saturated, and if you look at the foreign opportunities and the growth that has been achieved, the global markets appear to be even more open than ever. ■

The next PCIA Wireless Infrastructure Show is scheduled for Oct. 7-10 in Hollywood, Fla. Visit www.wirelessinfrastructureshow.com.



Scott Gooch, director, corporate foreign exchange, Wells Fargo International: "The four tower companies represented here took easy steps initially. You see this in most industries where international expansion starts with English-speaking countries. SBA first moved into Canada. Crown Castle is in Australia."



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Fall Clearance Calculator

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The **Miller** AirCore harness is a lightweight, full-body harness designed with breathable, open-core padding technology that provides airflow while reducing heat and moisture entrapment. The Miller DuraFlex stretchable webbing provides flexibility and comfort. The cam buckles on the shoulder straps provide ease of vertical webbing adjustment. The harnesses feature RFID-enabled technology for tracking, inspection and monitoring. They feature high-visibility color webbing, a removable belt on select models, quick-connect buckles across the chest and a 400-pound capacity. www.millerfallprotection.com



Personal RF Monitor

The FieldSense Occupational from **FieldSense USA** is a personal RF monitor that enables technical personnel to avoid areas of antenna sites where they would be in danger of RF overexposure. The unit monitors the operational frequency range of all bands commonly used for mobile telecommunications. Features include a bright LED indicator of RF field strength and a loud alarm that warns of EMF overexposure danger. The unit pinpoints and monitors active and idle antennas. It is calibrated to ICNIRP occupational reference levels. www.fieldsense.com



Vertical Rescue System

The DEUS GR33 tower escape and rescue kit from **Deus Rescue** meets climbers' needs for escape, self-rescue and assisted rescue from towers up to 330 feet. The kit combines the DEUS 3300 controlled-descent device with the DEUS RTU lifting and hauling kit and other accessories to support almost any type of rescue. The tower escape and rescue kit provides safe, reliable descent, using quadruple redundant braking to protect against free-fall.

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New Jersey Wireless Association donates fundraising proceeds to the Wounded Warrior Project



New Jersey Wireless Association members pose with a \$10,000 check for the Wounded Warrior Project.

From the left: Jim Kudless, Rob Ivanoff, Matt Bartlett, Peter Broy, Dominic Villecco, Tony Suppa, Gail Goldman, Michael Lee Foster

The mission of the Wounded Warrior Project is to honor and empower wounded warriors. The purpose is to raise awareness and to enlist the public's aid for the needs of injured service members, to help injured servicemen and women aid and assist each other, and to provide unique, direct programs and services to meet their needs. Thousands of wounded warriors and caregivers receive support each year through Wounded Warrior Project programs designed to nurture the mind and body, and encourage economic empowerment.

NEW JERSEY WIRELESS ASSOCIATION

Activities

March 14

Quarterly Educational Luncheon

June 18

7th Annual Charity Golf Outing
Forsgate Country Club, Monroe Township

Important Contribution

The New Jersey Wireless Association was instrumental in the enactment of New Jersey collocation legislation.

Award

The New Jersey Wireless Association received the Gold Medal in the 2012 State Wireless Association Program Olympic Games, a program created to encourage participation, communication and unity among state wireless associations.

A public service ad from AGL



newjerseywireless.org

product showcase — safety products and services

Climbing Harness

FallTech has expanded its TowerClimber harness line with Journeyman product features that include light weight, high performance, durability and comfort. TowerClimber products provide attachments and positioning devices to handle whatever the job demands. Based on the ComforTech and Journeyman platforms, TowerClimber harnesses feature the ComfortWrap sling seat design, twin O-ring lower assembly connectors with pivot action, a padded D-ring holder with integral shoulder pads and TPR outer shell, nine-position tongue-buckle leg closures, a 6-inch contoured ballistic waist pad and a heavy duty belt. www.falltech.com



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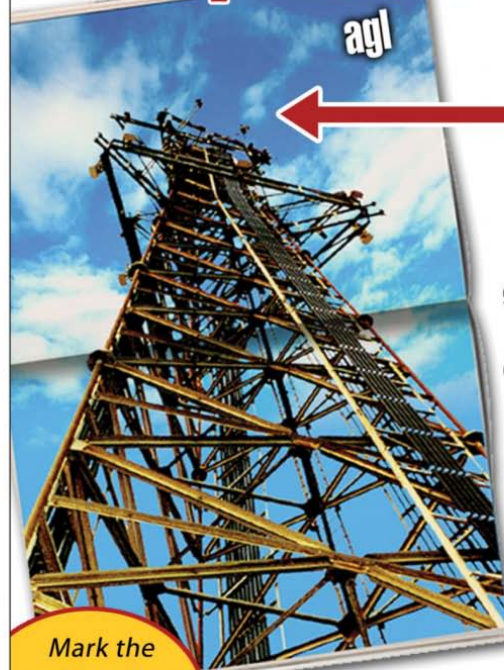


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product showcase — test equipment

Cable and Antenna Analyzers

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MIMO Channel Emulator Upgrades

Azimuth Systems offers an upgrade to ACE MX and MX2 MIMO communications channel emulators. The sixth release in Azimuth's series of ACE channel emulators features functionality upgrades including increased support for multilink and mesh networks, additional geometric modeling capability and an updated version of Director II test executive software, release 7.6, for enhanced functionality and ease of use. www.azimuthsystems.com



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Calibration Kits

Vector network analyzer (VNA) calibration kits from **Pasternak** are precise and convenient component kits designed to provide stable and accurate error-corrected measurements of a device under test (DUT) from DC to 26.5 GHz. The calibration kits contain plug and jack connector interfaces for performing two-port error corrections. The SMA VNA and type N VNA calibration kits are designed for equipment that uses the open-short-load (OSL) calibration method. Complementary in-series phase-matched adapters, armored test-cable kits and three-port field-calibration OSL devices are available individually. Calibration of a DUT using the kit allows obtaining the precise measurements needed to meet IEEE 287 standards. The calibration kits offer broad VNA coverage for the most popular models including Agilent, Anritsu and Rohde & Schwarz. The kits come packaged in a durable, protective wood box and include a preset torque wrench for type N or 3.5-millimeter and SMA connectors. www.pasternak.com

eICIC Mobile Test Platform

The **Aeroflex** LTE test mobile platform supports enhanced inter-cell interference cancellation (eICIC) and all LTE-A features of 3GPP Release 10. The test set helps to ensure enhanced inter-cell interference coordination to improve the overall performance of heterogeneous network deployments. Such networks implement cell-edge performance and coverage in HetNet deployments where nodes of different types — macrocell, microcell and picocell — have coverage areas that partially overlap. www.aeroflex.com

2013 Wireless Hall of Fame



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To obtain a nomination form, contact the Foundation's executive director, Liz Maxfield, at liz@wirelesshistoryfoundation.org.

Nomination forms and seconding letters are due by Friday, March 15.

A public service ad from AGL

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product showcase — test equipment

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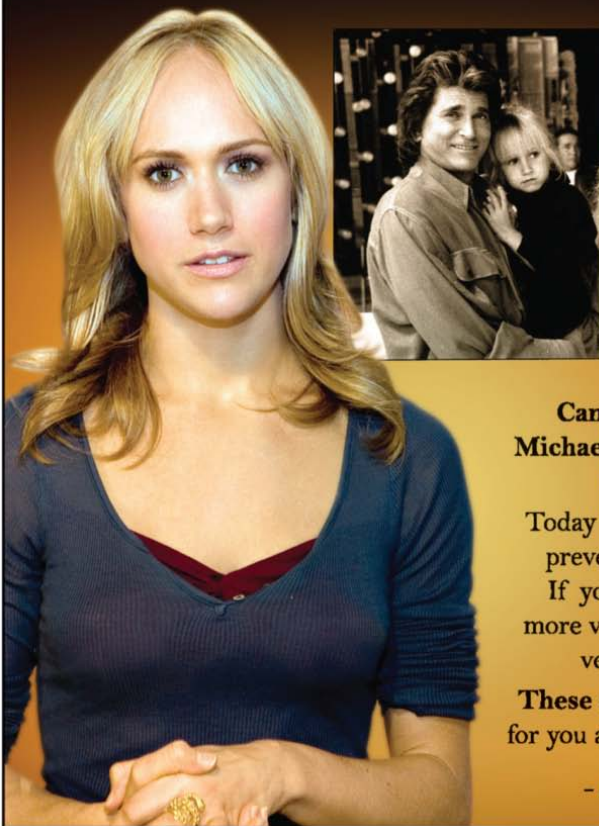


LTE-Advanced Test Equipment

The **Agilent Technologies** LTE-Advanced 8x8 multiple-input, multiple-output (MIMO) communications signal-generation and analysis technology introduces new methods and other enhancements to enable peak data rates of up to 1 Gbps in the downlink and 500 Mbps in the uplink. It supports a maximum bandwidth of 100 megahertz by aggregating up to five component carriers, each up to 20-megahertz wide, and improved multiple-antenna techniques in both uplink and downlink modes. For downlink, LTE-advanced modulation introduces transmission mode 9, which enables MIMO communications with as many as eight spatial streams and antennas. The multi-channel signal analyzer enables full analysis of LTE-Advanced standards on next-generation antennas, base stations and user equipment.

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The Site Master S331L from **Anritsu** is an all-inclusive, one-port cable and antenna analyzer covering the 2 MHz to 4 GHz range. The unit includes a built-in Insta-Cal module and a built-in power meter. The device is capable of measuring a number of cable and antenna parameters including return and cable loss, VSWR, distance-to-fault return loss and VSWR, and RF power from 50 MHz to 4 GHz.

www.anritsu.com

Handheld Analyzers

Agilent Technologies offers 14 FieldFox handheld analyzers. The instruments deliver benchtop-instrument accuracy in field-test environments. Designed for harsh conditions and hard-to-reach locations, the analyzers cover satellite communications, microwave backhaul, military communications, radar systems and a wide range of additional applications. The microwave analyzers can be configured as cable-and-antenna analyzers, spectrum analyzers, vector network analyzers, or all-in-one combination analyzers. www.agilent.com



Handheld Spectrum Analyzers

Tektronix H500 and **SA2500** handheld spectrum analyzers include DPX waveform image processor technology to provide a live RF view of the spectrum. The DPX technology, along with built-in mapping and signal classification, are housed in a compact, ruggedized package. The analyzers feature 10 kHz to 6.2 GHz frequency coverage, a 20-megahertz real-time bandwidth, -163 dBm displayed average noise level and a spectrum-processing rate more than 100 times faster than any conventional spectrum. www.tek.com

Microwave Transmission Path Test Solution

The **Path Align-R** test set from **Spectracom** is a high-performance test solution designed to quickly and accurately optimize the transmission path between two microwave antenna sites. The unit directly drives the site's antennas, allowing the optimization process to be done without the need for on-site radios, complex test equipment, ground technicians, on-site AC power, cell phones or two-way radios. The unit is a tunable, synthesized signal source and a narrowband receiver with a fixed output level of 0 dBm. The receiver's sensitivity and narrow bandwidth allow for accurate measurement of the received signal while providing a high rejection of adjacent signals. www.spectracom.com



Programmable Attenuators

The new **50P-1857** programmable attenuator from **JFW Industries** offers solid-state reliability and superior broadband performance. With an operating frequency range of 200 MHz to 6 GHz, it is ideal for wideband, variable, attenuator requirements including VHF/UHF, LTE and WiMAX testing applications. www.jfwindustries.com

Portable PIM Test Analyzer

The **Anritsu** line of six high-powered, battery-operated, portable passive intermod (PIM) test analyzers covers the upper and lower 700-MHz bands, 850 MHz, 900 MHz, 1800 MHz, 1900 MHz and 1900/2100 MHz. The **PIM Master MW82119A** analyzers incorporate DTP technology, allowing tower contractors, maintenance contractors and wireless service-provider field technicians to pinpoint the location of PIM problems, whether they are on the tower or external to the antenna system. www.anritsu.com



Multipurpose Analyzer

AEA's VIA Echo test unit covers the 4 MHz to 2.5 GHz frequency range and is a vector network analyzer, spectrum analyzer and frequency domain reflectometer. The unit weighs 2.2 pounds and is powered by a nickel metal hydride battery. It has S11 and S21 input ports. It performs cable null testing to eliminate test leads or feed lines and can graphically display any two test characteristics at a time. It can store 250 test results by name, date, time and test type for upload to Echo PC Vision software. www.aeatechnology.com



Mobile Backhaul Test Solutions

The **RxT** smart productivity test platform from **Sunrise Telecom** helps to facilitate network deployments for mobile backhaul and business services. The modules allow technicians to quickly verify proper operation of backhaul networks physical layer (E1, SDH/SONET). The module features the ability to analyze characteristics such as optical power and frequency to determine whether the circuit has been set up correctly and whether there are problems with the media. The device is ideal for maintaining high-quality synchronization in the wireless base station by ensuring smooth call hand-offs, thereby reducing the number of dropped calls. www.sunrisetelecom.com

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