Chapter 24, Inc.
Madison, Wisconsin

Society of Broadcast Engineers *June 2001*

TOWER INDUSTRY PART 6 - TOWER CLASSIFICATION

By Vicki W. Kipp

Tower classification is the topic for part 6 of a series of articles about the tower industry. Towers can be classified either guyed or self-supported.

GUYED TOWERS

Guyed towers (Figure 1) are held in place by the competing tensions of high-strength braided or stranded steel guy cables (Figure 2). The cables are strategically placed on each side of the tower to anchor the tower to the earth (Figure 3). Typically tall and slender, guyed towers are supported by one or more levels of guyed cables. As a general rule, the wider the face of the tower, the stiffer the tower is. Thus, a tower with a wider cross section requires fewer guy levels than a tower with a narrower face. A large tower may require more guy tension and greater guy sizes.

Guy cables are anchored to the ground at a distance from the base that is roughly equivalent to 80% of tower height. For guy cable calculations, tower height is considered the distance between the ground and the bottom of the top-mounted antenna. If the guy anchor radius (Figure 4) is shorter than 70% – 80% of tower height, then a greater guy wire size is required, and a greater stress is placed on the tower shaft and foundation (Figure 5) by the guy anchors. Guyed towers require much more land than a self-supporting towers. When a new guyed tower site is chosen, the soil type must be appropriate for holding guy anchors. A study of the subsurface soil situation will reveal frost protection requirements and buoyancy effects of close water tables.

While land costs for guyed towers are higher than for self-supporting towers, materials costs are lower because guyed towers require less steel

(continued on page 4)

Next Meeting:

Wednesday, June 20, 2001

Amateur Radio for the Broadcast Engineer

Dutch Treat Dinner at 5:30 PM

at J.T. Whitney's 674 S. Whitney Way

Meeting and Program at 7:00PM

In This Issue:

Dayton Hamvention 2001

By Phil Mikalofsky

This year marked the 50th anniversary for the Dayton Hamvention, which is proclaimed as the world's largest amateur radio gathering. Held 3 weeks ago, this was my 3rd time trekking to Ohio for the mother of all hamfests. It is not necessary to be an amateur radio operator in order to attend, but if you are at all interested in computers, radio, broadcasting, surplus government and military hardware, or wheeling and dealing on new and used gear–this may be the place for you.

Although buying and selling may be the major activity, there are other activities occurring throughout the duration of the Dayton Hamvention, such as: amateur radio licensing exams, educational forums, social gatherings & meetings, banquets, prize drawings, attempting to make radio contact with others on a clear channel, etc. There are other points of interest in the area as well. Several of my favorite off-site local activities would include touring the U.S. Air Force Museum located at Wright-Patterson Air Force Base & dining at the Spaghetti Warehouse.

The Hamvention runs Thursday through Sunday during the 2nd full week of May each year. Thursday is vendor set-up day and the gates are open to the general public Friday through Sunday. Preliminary attendance estimates for this year show 27,000 to 28,000 people through the gate, plus pets (dogs, birds, goat, etc).

Dayton, Ohio's Hara Arena Complex is home to the Hamvention, in which there are approximately 500 indoor exhibit spaces and 2500 outdoor vendor spaces on the surrounding parking lot surfaces. If you are scouring the flea market for deals, you would be

(continued on page 6)

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May Business Meeting Minutes

Chapter 24 of the Society of Broadcast Engineers met on Wednesday, May 23, 2001 at J T Whitney's Pub & Brewery in Madison, Wisconsin. There were 17 members in attendance, 13 of whom were certified, and one guest.

The meeting was called to order at 7:02 PM by outgoing chair Kevin Ruppert. Outgoing secretary Vicki Kipp had nothing to report. Minutes of the April meeting as published in the newsletter were approved. Treasurer Stan Scharch reported the chapter's bank balance was in the black.

Newsletter editor Mike Norton announced the deadline for articles for the June issue will be due at midnight, Friday, June 1st. The folding party will be held Wednesday, June 6th at WKOW-TV.

Membership chair Paul Stoffel reported that persons who did not pay their dues after the due date (April 1st) were deleted from the newsletter list.

Certification chair Jim Hermanson reported that five members of Chapter 24 recently passed their Network Technologist certification test. The national SBE certification program has celebrated its 25th anniversary. There was a program at NAB to recognize certified members, who will be receiving a screwdriver set. A seminar on 8VSB modulation was held in Milwaukee by Zenith which is good for one recertification credit for those who attended. A Dolby seminar will be held May 31/June 1. Next local exams will be held in mid-August, and applications should be in by the end of June.

Kevin Ruppert presented Jim Hermanson with a certificate of appreciation as certification chair of Chapter 24. The certificate was originally presented at the NAB convention, accepted for Jim by Steve Zimmerman.

Frequency Coordinator Tom Smith reported that new FM station WSUM is verifying data for a studio-to-transmitter link.

National Liaison Leonard Charles reported that SBE National is working on a web site for specifications for various types of equipment for projects. NAB has formed a task force for the 2 GHz broadcast auxiliary spectrum transition. SBE's membership drive continues through May 31st. Members who have not yet paid this year's dues are still in the grace period for renewal.

No old business was reported. In new business, Leonard Charles reported that the WBA Summer Engineering Workshop will be held in Milwaukee June 13-14 at the Pfister Hotel. Tom Smith reported that WBA is looking for volunteers to staff the WBA HDTV exhibit at the Wisconsin State Fair, August 2-12.

Kevin Ruppert offered thanks to the Chapter 24 nominating committee, and recognized the new officers: Chairman Tom

(continued on next page)

Meeting Minutes (continued)

Smith, Vice-Chair Vicki Kipp, Secretary Tom Weeden, and returning Treasurer Stan Scharch.

Jim Hermanson reported that three Chapter 24 members, himself, Vicki Kipp, and Bob Dischler, recently passed their General Class amateur radio written exam.

The business meeting adjourned at 7:23 PM. Denise Maney introduced Paul Stoffel for the program, who introduced Dave Janda from Dane County Emergency Management, who spoke on the Dane County EAS local plan.

Submitted by Tom Weeden, Secretary

SBE Short Circuits – June 2001

By John L. Poray, CAE
SBE Executive Director

SBE MEMBERSHIP DRIVE ENDS, PRIZES TO BE DRAWN IN JULY

The annual SBE Membership Drive has successfully concluded May 31 with more than 350 members joining since March 1. Dozens of prizes will be drawn on July 14 when the SBE Executive Committee meets in Indianapolis for its regular summer meeting. All member sponsors are eligible to win a prize and all will receive a $5.00 discount off their 2002 SBE Membership renewal for each new member (up to five) they have recruited.

The top recruiting chapters in large and small categories will also be recognized with special awards at the SBE National Meeting in September.

(continued on page 7)

AMATEUR RADIO NEWS

By Tom Weeden, WJ9H

• Thousands of hams descended upon Dayton, Ohio, last month for America's largest hamfest, the annual Dayton Hamvention. At Hamvention's FCC forum May 20th, a spokesman for the FCC's Wireless Telecommunications Bureau said that the days of Commission-imposed regulation are past. "Detailed regulation," said Bill Cross, W3TN, "is not in the picture. Rather, the FCC is shifting to strong and effective enforcement of truly necessary regulations." The FCC, he said, now plans to look to the amateur community to reach consensus on any new regulations it thinks it wants and needs. Before the FCC initiates any rulemaking proceedings in the Amateur Service to change privileges, Cross said it wants to see proposals involving the implementation of "new and more modern communications technologies," such as digital. In addition, he said, any future proposal "must include all licensees, and it must include all bands," and—most important—the amateur community must reach a consensus on the topic.

• AMSAT-NA (Amateur Satellite Corporation/North America) President Robin Haighton, VE3FRH, says his organization already is looking toward its next satellite project. Haighton said AMSAT's newest bird could be up and running within three years, possibly sooner. While AMSAT continues dealing with problems on the current AO-40 satellite, Haighton said design work on a new satellite is expected to get under way in earnest by this summer. "We would like people in apartments to have access to satellites with relatively small, easy compact equipment and not have to swing large antennas around," he said. As plans now stand, the new satellite might employ digital modulation capabilities that, Haighton said, could make the new satellite "probably at least 10 dB better than anything we're currently using." Like AO-40, the new satellite will have an elliptical orbit that Haighton said would be "very very similar to the current AO-40 orbit." The configuration would provide up to about 17 hours of usage out of every 24.

• The American Radio Relay League has asked the FCC to investigate and "take appropriate action" against several companies it alleges have been marketing so-called "long-range cordless telephones" via the Internet. The ARRL took the action in the wake of an interference complaint and numerous reports from the amateur community about sales of the devices, some operating on amateur VHF and UHF frequencies. ARRL General Counsel Chris Imlay, W3KD, said the League was seeking the FCC probe because the apparently uncertificated devices operate on amateur bands and are capable of interfering with amateur communication. He also noted that the devices are not likely to meet maximum permissible exposure levels for RF. Imlay said the ARRL also is looking into the marketing of products such as 434 MHz video surveillance equipment and other "apparently non-certificated devices" that use amateur frequencies but are being marketed in the US to non-amateurs.

(Excerpts from "The ARRL Letter")

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TOWER INDUSTRY PART 6 (continued from page 1)

Figure 1. Guyed tower.

Figure 2. Guy wires blend in with the skyline.

than self-supporting towers. The foundations for guyed towers generally cost less than foundations for self-supporting towers because the guyed tower foundation is smaller, using less concrete. Guyed towers tend to have a shorter construction period than self-supporting towers because they use less steel.

Anchors are another aspect of a guyed tower that should be

Figure 3. Large anchor connects guy wires to the ground.

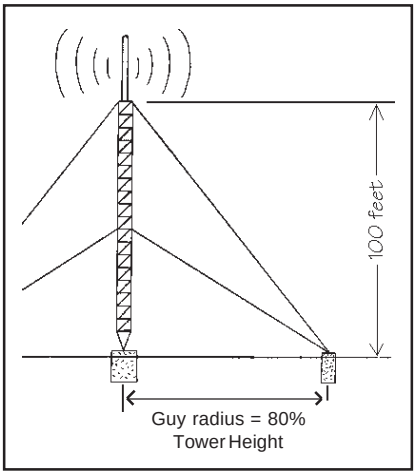

Figure 4. Typical distance from tower to guy anchor points.

considered. For maximum cost-effectiveness, towers up to 500 or 600 feet can be constructed with just one anchor point per tower cross-section. However, tower designers can protect against the risk of tower

Figure 5. Single point base of a guyed tower.

collapse due to anchor failure by placing multiple anchors along each azimuth.

Guyed towers require more recurrent maintenance than self-supporting towers. For example, guy cables need to be examined for proper tension and to uncover corrosion. When the guy tension is set properly, there will be minimal deflection of the antennas caused by tower twisting due to high winds and the tower will be supported properly.

Guyed towers are quite versatile. From less taxing applications (light-duty microwave, cellular, and land mobile radio) to extremely heavy functions (heavy cellular, medium-to-heavy microwave, and broadcast), they are capable of handling a broad range of loading conditions.

(continued on next page)

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TOWER INDUSTRY PART 6 (conclusion)

Figure 6. Self-supporting Tower. Photo courtesy of Wave Communications/Skyline.

Figure 7. Fluted Monopole.

Figure 8. Light pole monopole tower for cellular applications.

SELF-SUPPORTED TOWERS

A self-supported tower can be classified as either a steel-lattice structure or a cylindrical monopole. Typically, self-supported towers require much less land than guyed towers since they only require space for the base of the tower.

Self-supporting steel towers (Figure 6) have three or four sides, and form a lattice pyramid or box. Towers with triangular bases are usually favored over towers with square bases because they are lighter and less expensive to assemble. Triangular towers are ideal for lightweight applications such as mobile two-way radio and cellular, and situations where land space is limited and costly.

Monopoles, single-pole self supporting towers, can be either a tubular design or a multi-sided tapered pole. The monopole pillar can be smooth or a polygon shape with multiple faces (Figure 7). Ranging from 75 to 150 feet high, monopoles require far less land than other tower types. The cost of materials and installation for a monopole is higher than the cost for a latticed self-supporting tower. Steel is by far the strongest and most popular material for monopoles, but they can also be constructed from concrete, fiberglass, or treated wood. With a concrete monopole, there is the risk that the tower could shatter if struck by lightning due to rapid thermal expansion. Many zoning boards consider monopoles better looking and less obtrusive in the skyline than other tower types. Monopoles are generally used for cellular applications (Figure 8).

In conclusion, towers can be identified by their means of structural support (guyed or self-supporting) and their shape (steel-lattice or monopole). The next time you spot a communications tower while driving down the road, you should take a moment to classify it. Next month, we'll continue our discussion of the tower industry.

Information for this article came from the following sources: D.A. Keckler, "Monopoles" Site Management and Technology; "Tower Basics" TelecomClick, 2000; Ray Carnovale, "Towers: Not All Are Created Equal" Broadcast Engineering, July 1999.

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FCC Rulemakings

Compiled By Tom Smith

PROPOSED RULEMAKINGS

ET Docket No. 01-75; FCC 01-92
Revisions to Broadcasting Auxiliary Service Rules

The comment dates for the proposed rulemaking concerning revisions to broadcasting auxiliary service rules have been set. This notice of rulemaking was described in the April *Newsletter*, but the comment dates were not released. The FCC published the notice of proposed rulemaking in the May 24th issue of the FEDERAL REGISTER with the comment deadline being 30 days from publication which is June 25th; replies are due 30 days later, which is July 23rd. The notice can be found on pages 28,686-28,718 of the May 24th, 2001 issue of the FEDERAL REGISTER or on the FCC website.

ET Docket No. 99-231; DA 00-2317; FCC 01-158
Amendment of Part 15 of the Commissions Rules Regarding Spread Spectrum Devices; Wi-LAN, Inc. Application for Certification of an Intentional Radiator Under Part 15 of the Commission's Rules

The FCC is proposing to modify its rules concerning digital modulation standards for the license-free 2.4 GHz band (2400–2483.5 MHz). Currently, the rules require the use of spread spectrum systems in this band. The FCC is proposing the use of other types of digital modulation in the band along with changes in the requirements for spread spectrum systems.

The FCC would allow for bandwidth increases and a reduction in the number of channels a carrier would have to hop between in spread spectrum systems. They are also changing the methods for computing power levels for spread spectrum systems. These changes will allow for greater data rates.

The FCC is reversing a ruling concerning the denial of an application by Wi-LAN Inc. for the use of a system that uses wideband orthogonal frequency division multiplexing modulation (W-OFDM). The FCC rejected the application originally because it was not a spread spectrum system. The FCC is reversing the original ruling, declaring that this and other digital systems are similar in power and interference characteristics to spread spectrum systems. This will allow a number of modulation methods to be used in this band.

This notice was adopted on May 10, 2001 and released on May 11, 2001. Comments are due 75 days after publication in the FEDERAL REGISTER, with replies due 20 days later.

FINAL RULEMAKINGS

FCC 01-137
Implementation of LPTV Digital Data Services Pilot Project

The FCC is implementing a test project with 12 LPTV stations that will transmit digital data services, including wireless internet access and interactive broadcast services. This test is required by an act of Congress called the Digital Data Services Act.

The stations will be allowed on-channel repeaters and response channel transmitters from the subscribers home. These stations will operate at one tenth of the power used by the station for analog operations, and the response transmitters will operate with 10 watts for fixed stations and 3 watts for mobile stations.

The stations will be required to report the results of the test to the FCC on a regular basis and if they collect subscriber fees, they will have to pay a fee of 5% of gross revenues like full power DTV stations are require to do when providing subscriber services.

This notice was adopted on April 19, 2001 and was released and became effective on April 27, 2001. The notice was published in the FEDERAL REGISTER on May 29, 2001 on pages 29,040-29,046.

From FCC Releases (www.fcc.gov) and the FEDERAL REGISTER (www.access.gpo.gov)

Hamvention 2001 (continued)

well advised to bring your walkin' shoes. Since you are already in shape after cruising the NAB exhibits, this is a cakewalk.

There are a couple of Dayton-area frequencies one should monitor while attending the Hamvention. The Dayton Amateur Radio Association's 2-Meter amateur radio repeater on 146.940 MHz is used as the official 'talk-in' frequency for the entire weekend event and NOAA Weather Radio is available on 162.475 MHz for your flea-market forecast.

I hope to see you there next time and remember, *"if you can't find it at Dayton, it doesn't exist."*

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LOCAL LEGALS

Compiled by Tom Smith

PROPOSED

WIBU-AM Poynette, WI

Magnum Communications Inc. of Tomah, WI seeks FCC permission to transfer WIBU-AM to Starboard Broadcasting Inc. of Green Bay, WI. Magnum Communications Inc. (Lynn Magnum, President) also owns WBKY-FM in Portage and WDLS-AM/ WNNO-FM in Wisconsin Dells.

Lynn Magnum and David Magnum, her husband, own Magnum Radio Inc. which owns WTMB-AM, WBOG-FM, WUSK-FM and WUSK-LP (LPTV) which are located in Tomah and WZRK-FM in Nekossa, which is also being sold to Starboard Communications. They also own Magnum Broadcasting which owns WAUN-FM, Kewuanee and WSBG-FM in Sturgeon Bay. The Magnums also had an application for a new FM in DeForest and have filed an application for a new FM In Mt. Horeb.

Starboard Broadcasting Inc. (Stephen Gajdosik, President) is a not-for-profit corporation which is purchasing WJOK-AM in Kaukauna and WAUX-AM in Lake Geneva.

WIBU-AM is being sold for $1 million and WZRK-FM is being sold for $1.3 million. WIBU-AM operates on 1240 kHz fulltime with one kilowatt.

From FCC Mass Media Database (www.fcc.gov)

SBE Short Circuits – June 2001 (continued)

SPACE FOR LEADER SKILLS COURSE II AVAILABLE

There are still a few seats available for the SBE Leader Skills Seminar, Course II to be held in Atlanta, GA, August 8-10. "Expanding Your People Skills" will be led by Dick Cupka, who has presented management training to broadcast engineers for more than thirty years. The cost is just $490 for this outstanding seminar, which has helped prepare more than 1,000 broadcast engineers for management since 1965. Attendees must have previously attended Course I or any of the SBE or NAB sponsored Leader Skills five-day programs. To register or for more information, contact Angel Bates at the SBE National Office at (317) 846-9000 or abates@sbe.org. The deadline to register is July 6.

Thanks to WISC-TV for maintaining the web server for the Chapter 24 Web page!

Thanks to WKOW-TV for providing copying and folding facilities for the Chapter 24 newsletter!

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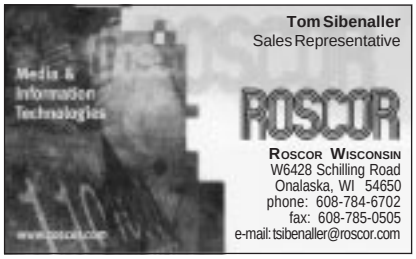

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FIRST CLASS MAIL

Newsletter edited on Pagemaker 5.0 by: Mike Norton
Contributors this month: Vicki W. Kipp, Phil Mikalofsky, Tom Smith, and Tom Weeden.
Thanks to Leonard Charles for his work on the Chapter 24 WWW page.

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JUNE MEETING and PROGRAM

Society of Broadcast Engineers
CHAPTER 24 MADISON, WISCONSIN
Wednesday, June 20, 2001

Amateur Radio for the Broadcast Engineer

WMTV Chief Engineer Tom Weeden will give a presentation on amateur radio, a hobby that got many started in their electronics careers. We'll also look at some brand new aspects of ham radio, and how even a busy broadcaster can earn that coveted license.

A short update on the Candelabra tower project will also be covered. We'll see you there!

Dutch Treat Dinner
at 5:30 PM

at J.T. Whitney's
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Meeting and Program
at 7:00 PM

Visitors and guests are welcome at all of our SBE meetings!

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