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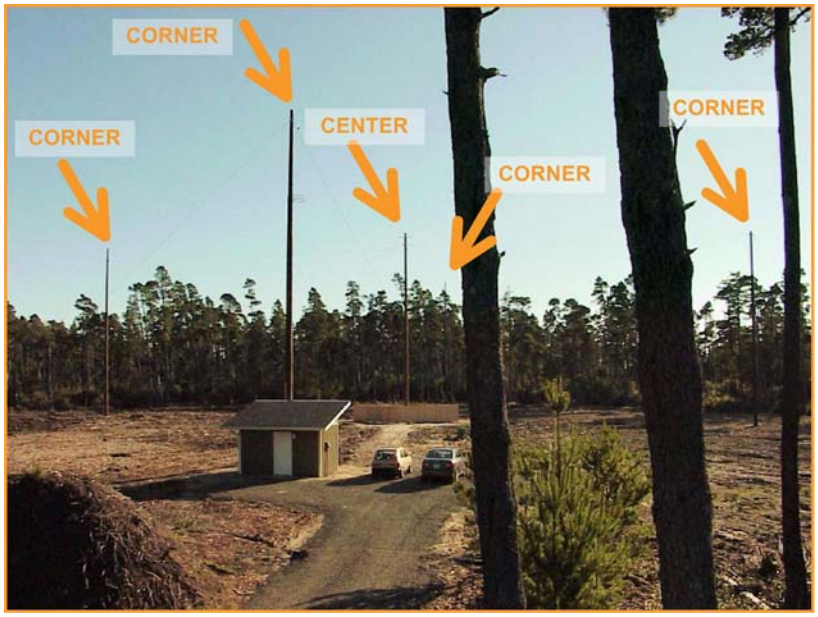
The Inaugural Installation of the first "Kinstar" Antenna

AM broadcasters who are unable (for whatever reason) to build tall antenna towers may want to consider using the "Kinstar" low-profile AM antenna for their facility. A session at the upcoming NAB Broadcast Engineering Conference (BEC, April 18-23, 2009, Las Vegas, NV – see below for additional information) entitled "*Antenna Solutions and Case Studies for Radio*" includes a paper, excerpted here, describing the application process, design, installation, final commissioning and Kinstar versus original series-fed tower comparative performance for the first on-air Kinstar antenna at KCST-AM Radio in Florence, Oregon.

INTRODUCTION – Historically any effort to produce an electrically short AM antenna resulted in an impedance characterized with a low resistance and high reactance yielding a commensurate narrow audio bandwidth with a radiating efficiency that was directly related to the electrical height of the antenna. The advent of the Kinstar AM low profile antenna with its wide audio bandwidth and high efficiency has significantly altered this understanding regarding short AM antennas.

FILING THE APPLICATION – Coast Broadcasting Company President Jon Thompson was faced with the need to replace an aging, series-fed, base insulated tower that was unsuitable to climb. The licensed height of this existing tower was 86.9° or 57.89 m with a daytime operating power of 1 kW and nighttime operating power of 0.068 kW, yielding a theoretical RMS daytime field strength of 309 mV/m at 1 km and nighttime field strength of 80.58 mV/m at 1 km. Realizing that the maximum height for any new tower structures was limited by local zoning regulations to 21.95 m, the KCST contract engineer, R. Sparks Scott, recommended to Mr. Thompson the Kinstar antenna, which would potentially result in an unencumbered zoning approval saving considerable legal expenses that would have been required to gain approval for a tower structure that would substantially exceed the zoning height restrictions. Due to the concern over the poor structural state of the existing tower and the need to replace it sooner than later, the decision was made to file for the Kinstar antenna.



INSTALLATION OF THE FIRST KINSTAR ANTENNA – the proposed site for the new Kinstar antenna was a forested area that required clear cutting of the trees followed by stump and root removal to facilitate installation of the five 25.9 m wooden utility poles and the buried 120-radial quarter-wave copper ground system. Following the clearing of the site and the arrival of the utility poles and antenna kit hardware at the site, a utility construction company from Portland, Ore. arrived for the installation of the antenna. The antenna installation was supervised by R. Sparks Scott, the KCST contract engineer. A backhoe with an extendable boom was used to prepare the mounting holes for the five poles. Screw anchors were driven into the ground to terminate the two support guys for the four corner poles as well as to terminate the four vertical elements symmetrically located around the base of the center pole. The installation crew arrived at the site at noon on the first day. The Kinstar antenna was completely installed by the close of the following day (see photograph); hence the total installation time was 1-1/2 days.

OLD VS. NEW PERFORMANCE COMPARISON – Prior to the installation of the Kinstar antenna the KCST contract engineer conducted a series of field intensity measurements using a Potomac Instruments FIM-41 field intensity meter for the original tower site operating with a transmitter input power of 1 kW. The comparative tabulated field intensity measurements made for the original tower site in the June 17-19, 2008 time frame and for the Kinstar antenna site in the January 19-22, 2009 time frame are shown in the table. These measurements are provided as a strictly qualitative measure of the comparative performance of the original tower site and the low profile Kinstar antenna site. Realizing the 100 watt transmitter input power difference, possible seasonal variations between summer and winter that could influence these measurements, as well as the fact that the new site is 2.09 km NW of the old site, a direct correlation between the two sets of measurements is not possible. These measurements do serve to confirm the relative change in the received field strength consistent with the distance and bearing of the new site relative to the old tower site. Based on these limited measurements we can safely confirm that the Kinstar antenna is yielding the expected coverage area consistent with the new location and input power level.

Location	Distance (old)	Bearing (old)	Reading (old)	Distance (new)	Bearing (new)	Reading (new)
Munsel Rd (old) Tx Site	N/A	N/A	N/A	1.30 mi	173°	N/A
Sunny Acres (new) Tx Site	1.30 mi	353°	N/A	N/A	N/A	N/A
Studio	0.40 mi	212°	230.00 mV	1.63 mi	182°	32.00 mV
True Value	2.50 mi	187°	15.00 mV	3.77 mi	183°	10.00 mV
East Woahink Park	5.70 mi	182°	2.35 mV	7.02 mi	180°	1.90 mV
Dunes City Hall	8.45 mi	186°	0.89 mV	8.82 mi	187°	0.54 mV
Cushman	2.90 mi	133°	5.60 mV	3.96 mi	145°	3.30 mV
Mapleton Boat Ramp	12.10 mi	082°	0.20 mV	11.9 mi	083°	0.18 mV
Greentrees East	2.37 mi	210°	12.25 mV	3.49 mi	197°	5.00 mV
Wildwinds	2.10 mi	215°	20.50 mV	3.18 mi	199°	9.70 mV
Sandpines	0.63 mi	229°	62.00 mV	1.03 mi	222°	31.50 mV
Mariners Village	1.36 mi	257°	35.50 mV	1.98 mi	216°	26.00 mV
Fawn Ridge East	1.81 mi	304°	11.80 mV	1.38 mi	258°	41.00 mV
Heceta Beach	2.76 mi	319°	8.50 mV	1.85 mi	295°	20.50 mV
Sutton Lake Boat Ramp	3.01 mi	358°	5.80 mV	1.72 mi	001°	25.80 mV
Baker Beach Park	5.50 mi	348°	1.97 mV	4.17 mi	346°	4.40 mV
Bender Boat Ramp	1.26 mi	111°	31.00 mV	2.19 mi	142°	12.00 mV
Portage	3.11 mi	075°	4.15 mV	3.20 mi	099°	5.80 mV
Minerva Ranch	7.89 mi	058°	0.38 mV	7.43 mi	067°	0.37 mV

This paper is co-authored by Brian A. Herrold, Vice President of Engineering, Star-H Corporation, Tom F. King, President, Kintronic Labs, Inc., Bob McClanathan, PE, Bob McClanathan and Associates, Inc., and R. Sparks Scott, contract engineer. It will be presented on Tuesday, April 21, 2009 starting at 4:30 p.m. in room S226 of the Las Vegas Convention Center. It will also be included in its entirety in the *2009 NAB BEC Proceedings*, on sale at the 2009 NAB Show Store and available on-line from the NAB Store (www.nabstore.com) after the convention. For additional conference information visit the NAB Show Web page at www.nabshow.com; a complete listing of the radio-related BEC conference sessions, papers, and presenters can be found in the February 2, 2009 issue of Radio TechCheck.

Radio TechCheck will not be published on January 16, but will return on February 23, 2009