Erecting Towers on Bonded Roofs

Beams and towers can be put on roofs covered by insurance—if you know how. Protect yourself, the customer, and the insuring firm, and you'll get the job

By JAMES A. GUPTON, JR.

TECHNICIANS WITH EXTENSIVE EXPERIence in erecting antennas on houses, apartments and small commercial buildings often avoid jobs involving a "bonded" roof. There is no reason, however, why a good antenna installer can't do a perfectly good job on any roof—bonded or not. The only difference in the two kinds of jobs is that the bonded roof is guaranteed by a bonding company not to leak. All you must do is to be sure that you don't void that guarantee. The whole idea is to provide the building owner with protection against damage to his merchandise and the interior of the building. It's a kind of insurance policy.

The roofing contractor builds the roof to certain minimum standards, usually those set by the bonding company itself. The bonding company then inspects the finished job and certifies that it was completed according to specifications. It then guarantees the building owner the roof is sound and backs up the guarantee with a promise to pay damages if it fails. When installing an antenna on a bonded roof, therefore, all you have to do is conform to the specifications set by the bonding company and have the finished job inspected and accepted by the company's inspector. He will certify that the roof has in no way been weakened or damaged by your installation.

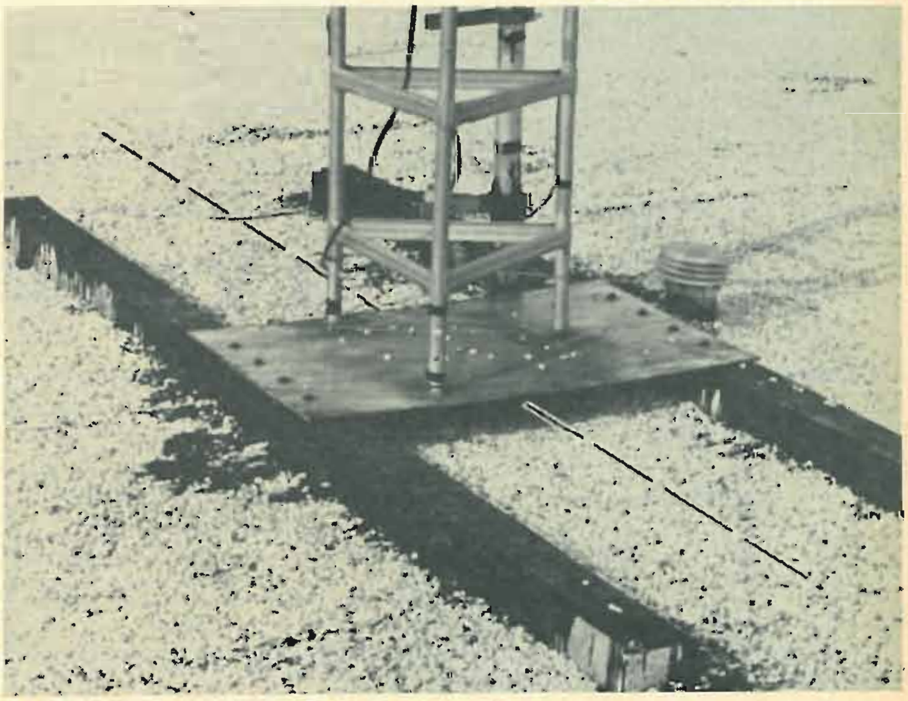
An important thing to remember is that if you have a written statement of acceptance from the bonding company inspector and have followed his specifications and recommendations, and can prove it, you will not be held liable. That liability is the responsibility of the bonding company. As in so many commercial agreements, cooperation is the answer to satisfied customers; that, and doing a first-rate job.

The Florence-Darlington Technical Education Center in Florence, S. C., is a good case for illustration. The problem was to install a 200-lb antenna tower on a flat roof. Guy-wire pull added more download, and the mast was climbable, so additional weight of workers on the tower also had to be considered. The installation then had to be formally approved by the bonding company.

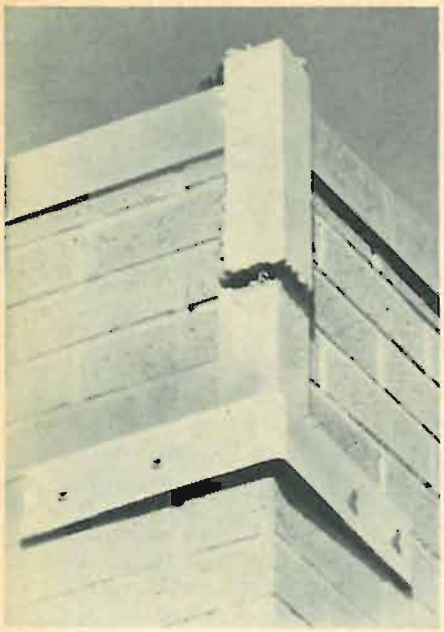
The first step was to determine the correct tower position. The bonding company required the tower to be placed on or astride a "load-bearing wall." This is a structural wall used to support roof members. There were several load-bearing walls at the TEC, and it was possible to find one at the center of the building. Having located the tower position, a suitable tower base was designed to assure a safe load distribution across the actual roof-contact area. The base consisted of two oak timbers joined by a steel cross plate on which the tower itself was mounted. The timbers were laid flat on the roof and distributed the weight evenly.

The two 4 x 4-inch oak timbers, 10 ft long, were chemically treated for protection from rot and insects. Half-inch lag screws were used to attach the 20 x 40 x ¼-inch plate to the timbers. Three 1-inch-diameter steel posts were welded to the plate to locate and anchor the tower legs. A ⅜-inch bolt was then passed through each tower leg and each base post.

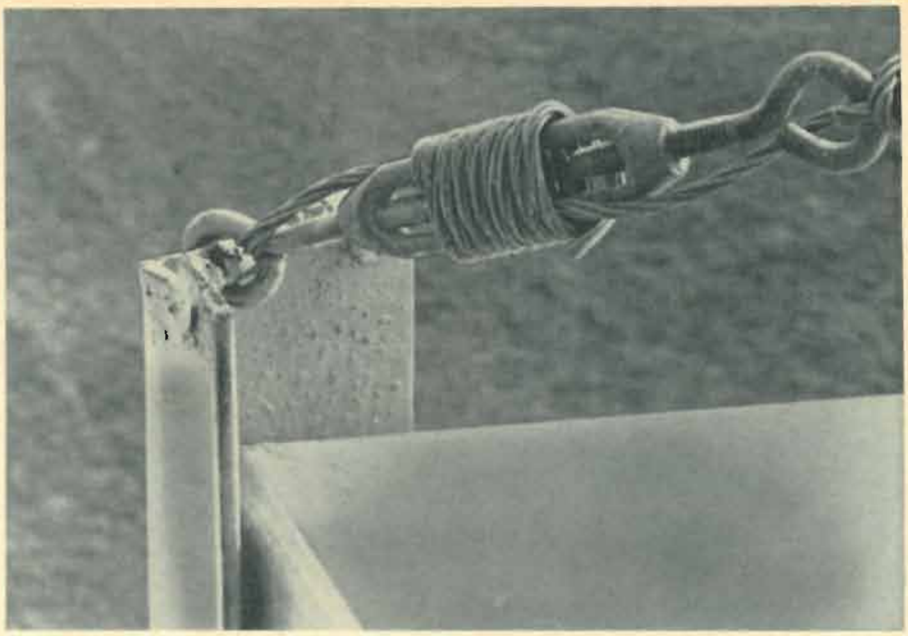
Two troughs were constructed of galvanized steel sheet to hold the timbers and provide a 1-inch clearance around the timbers. These "tar sinks" were then filled with tar which was allowed to overflow onto the roof itself, providing a tight bond. The weight of the tower and its antennas and its guy pull totaled 227 lb, and the base with



The tower base lies astride a load-bearing wall (indicated by the broken, dashed line) to distribute the tower weight evenly over a major structural member of the roof itself.



Mounted on the four corners of the building, the posts anchor guys firmly.



Detail of the turnbuckle mounting shows anchor bar passing through eye, welded to open end of the angle iron. Wrapping the buckle tightly keeps it from twisting loose.

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tar sinks totaled 100 lb. The total weight of 327 lb, when distributed over the roof-contact area of the base resulted in a contact load of 0.340 lb/sq in. However, this load is distributed over 4,800 sq in. of roof area, giving an overall roof stress of only .069 lb/sq in.

To mount the base on the roof, all stone was removed from the mounting area. The tar sinks were set directly on tar roof base. The "H" base was then placed in the sinks, and the hot tar was poured in. Replacing the stone completed the tower-base installation.

Before erecting the tower, four guy posts were constructed from 4-inch angle iron and 4-inch strap. A section of the angle iron 18 inches long was welded, as shown in the photo, to an L-shaped steel strap. The strap formed a base and was 24 inches along each leg. One assembly was bolted to each of the four corners of the building. A second 1-foot section of 4-inch angle was welded vertically to the first to provide clearance for the aluminum wall cap. A ½-inch steel bar was welded across the angle to hold each guy turnbuckle.

There are two acceptable methods of guying towers: where space permits, three wires spaced at 120°; for limited space, four wires spaced 90°. It's desirable, for single or midguys, to have 3 feet of base-to-guy-post distance for every 2 feet of tower height. On small buildings where the 3-to-2 ratio cannot be used, four-wire guying, with a smaller ratio, will provide sufficient support.

The four guy posts used at the TEC were bolted to the building walls with ½-inch lag screws driven into lead anchors inserted into the walls. The guy-wire turnbuckles were attached to each guy post by slipping the ½-inch steel bar through one turnbuckle eye before welding the bar to the guy post. After erecting the tower, the guy wires were tensioned, and regular guy-wire clamps were applied to secure them. Excess wire was then wrapped neatly around the turnbuckles and tied to prevent wind vibration from loosening them.

When the installation was completed, the bonding company arranged for inspection and accepted the job without question. Another satisfied customer and a still-safe bonded roof. END

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Conducted by E. D. CLARK

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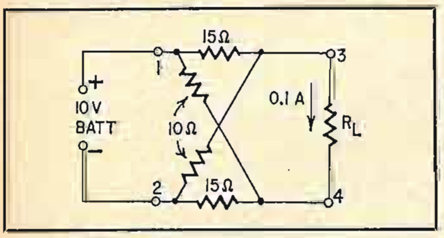
Answers to this month's puzzles are on page 87.

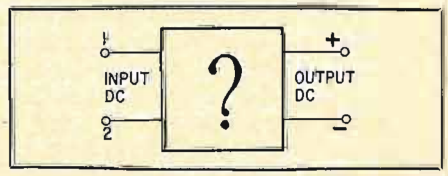
Network Problem



Given the above values, what's the value of R_L?—*Joseph P. Hallisey*

Polarity Straightener

Within a certain voltage range, output volts equals input volts in the above box.



No matter which way the input is polarized, however, output remains polarized as shown. Do you know what's in the box?—*David A. Hinton*