

STATE OF FLORIDA
DIVISION OF ADMINISTRATIVE HEARINGS

FLORIDA ENGINEERS MANAGEMENT)
CORPORATION,)
)
Petitioner,)
)
vs.) Case No. 00-1526
)
JOSEPH C. CASH,)
)
Respondent.)
_____)

RECOMMENDED ORDER

Robert E. Meale, Administrative Law Judge of the Division of Administrative Hearings, conducted the final hearing in Port Charlotte, Florida, on September 19, 2000.

APPEARANCES

For Petitioner: William H. Hollimon
Ausley & McMullen
227 South Calhoun Street
Tallahassee, Florida 32301

For Respondent: Joseph C. Cash
4422 Mundella Circle
Port Charlotte, Florida 33948

STATEMENT OF THE ISSUE

The issue is whether Respondent engaged in negligence in the practice of engineering, in violation of Section 471.033(1)(g), Florida Statutes.

PRELIMINARY STATEMENT

By Administrative Complaint dated January 6, 2000, Petitioner alleged that it is charged with providing administrative, investigative, and prosecutorial services to the Board of Professional Engineers, which is responsible for regulating the practice of engineering.

The Administrative Complaint alleges that on May 27, 1999, Respondent submitted an engineering detail to the Charlotte County Building Department for use in the Le Porin Residence project. The Administrative Complaint alleges that Respondent submitted the detail sheet as a plans change to correct a problem with truss straps.

The Administrative Complaint alleges that Respondent's corrective measures were deficient because they failed to specify the required nailing to the truss, they loaded the TAPCON anchors beyond the capacity permitted by the 1997 Standard Building Code, and they loaded the TAPCON anchors beyond the capacity recommended by the manufacturer. The Administrative Complaint alleges that Respondent therefore engaged in negligence in the practice of engineering, in violation of Section 471.033(1)(g), Florida Statutes.

Respondent requested a formal hearing.

At the hearing, Petitioner called one witness and offered into evidence six exhibits. Respondent called three witnesses

and offered into evidence seven exhibits. All exhibits were admitted.

The court reporter filed the Transcript on November 2, 2000.

FINDINGS OF FACT

1. Respondent has been licensed as a professional engineer in Florida since 1968, holding license number 18122. He is a member of the American Society of Professional Engineers and the Florida Engineering Society.

2. Respondent served as the engineer of record for the Le Porin residence in Charlotte County, Florida. This case arose from a complaint made by an official with the Charlotte County Building Department (Building Department) following the submission of what he concluded was an incomplete drawing by Respondent in connection with the Le Porin job.

3. The present case addresses the sufficiency of the strapping of the roof truss to the concrete block wall of the Le Porin residence. Petitioner does not challenge the sufficiency of the straps themselves. Petitioner challenges the sufficiency of the nails attaching the top of the straps to the roof truss and the sufficiency of the anchors screwing the bottom of the straps into the concrete block wall.

4. In response to the request of the Building Department official, Respondent submitted a "Correction Detail" on May 29,

1999, to the Charlotte County Building Department. The purpose of the detail was to address a concern of the Building Department official about missing or missed truss straps. The text accompanying the detail asserts that the actual lift-up value is 1482 pounds. The text adds: "Missed or missing truss straps with less than 1000 lbs. of up-lift . . ."

5. The diagram accompanying the detail shows an RT22TW retrofit strap extending from the truss down along the interior of two filled concrete blocks, which represent the uppermost two rows of blocks forming the exterior wall. The diagram depicts the strap as attached to the concrete blocks by three 3/16" x 2" tapcons: one is in the filled center of the uppermost concrete block, one is in the solid base of the uppermost concrete block, and one is in the filled center of the second uppermost concrete block. The portion of the strap abutting the truss reveals six dots on alternating sides of the upper portion of the strap, although it is unclear if these dots represent nails.

6. The diagram depicts the upper portion of the strap as running along the broad face of the rafter, but not extending across the top of the rafter and down the opposite side. Respondent supplied a sheet of specifications from the manufacturer of the strap, Hughes Manufacturing, Inc., which shows a strap extending along one face of the rafter, across the top of the rafter, and then down a short distance along the

opposite face of the rafter. The manufacturer's diagram depicts a strap with a stronger grip on the rafter than the strap depicted in Respondent's diagram in his correction detail, which shows a strap merely running along one face of the rafter. In the manufacturer's installation, nails are driven into both sides of the rafter; in Respondent's installation, nails are driven into only one side of the rafter. Evidently, the corrective nature of the retrofit straps precluded the installation of them over the rafters that had already been enclosed by the roof.

7. The manufacturer's specifications show that the RT 22 strap, which Respondent has proposed, is 14-gauge galvanized steel. The "TW" may refer to the fact that the strap is twisted by 90 degrees, so that it can be attached to the wide face of the rafter and the side of the concrete wall, which are perpendicular to each other. According to the manufacturer's specifications, the RT 22 strap, which is 22 inches long and one inch wide, contains at least 18 symmetrically spaced, 3/16-inch holes for fasteners to attach the strap to the surfaces being secured. The manufacturer's specifications state that the RT 22 strap requires 18 16d nails, assuming that both surfaces to which the strap is being attached are wood.

8. At least in a wood-on-wood application, the manufacturer's specifications provide that the normal design

load of the RT 22 strap is 1116 pounds and the uplift design load is 1782 pounds. The specifications note that the manufacturer has derived the design loads from the National Design Specification for Wood Construction, 1991 Edition.

9. By letter dated June 1, 1999, to the Building Department, Respondent provided additional information on the strapping of the trusses at the LePorin residence. The letter states that certain trusses were strapped with "one RT22TW (1484)" instead of a previously indicated strap and that the "remedial action is satisfactory when used with [three] 3/16 x 1 1/2 [long] (min.) Tapcons."

10. By Plan Review Correction List dated June 3, 1999, the Building Department cites, for two separate notes, the requirement of Standard Building Code (SBC) B 1606.1, which requires that all buildings must be designed to withstand prescribed wind loads. The first note acknowledges the use in the correction detail of three 3/16" Tapcons with straps to correct a problem of missing truss straps. The first note states that the attached specifications for Tapcons indicate shear values of 510 pounds (680 pounds x 0.25 x 3 Tapcons) for hollow block, and the note cautions that 510 pounds is insufficient for 1000 pounds of uplift. The second note requests a correction drawing for the missed straps showing a value of at least 1000 pounds. This latter note appears to be

in reference to the truss straps with less than 1000 pounds uplift, as described above in Respondent's correction detail.

11. By letter dated June 9, 1999, to the Building Department, Respondent included manufacturer's specifications from Concrete Anchor Systems for the Tapcons. Respondent explained that he used the strength design method for building design. He contended that using the 4:1 ratio as a safety factor, as sought by the plans examiner with whom Respondent had been dealing, would mix working stress design and strength design, which would be a poor engineering practice.

12. The June 9 letter states that the manufacturer rates at 1782 pounds uplift the RT22TW strap at 14-gauge thickness, one inch width, and holes of 3/16" diameter. The letter contends that this equates to 2004 pounds deformation load $(1-.1875)(.0747)(33,000)$.

13. The June 9 letter asserts that the manufacturer rates an HFTM strap using six 3/16" x 1 1/4 inch Tapcons as capable of resisting 1700 pounds of uplift. Doing the calculations for an eccentric strap, Respondent determined that the manufacturer's data yield a strength of 1037 pounds, which exceeds the design load of 1000 pounds.

14. Noting that strength design uses factored loads, not safety factors, Respondent contended in the June 9 letter that the three Tapcons for the 3500-pound concrete at 3/16" x 1 1/4"

is equal to $852 \times 3 = 2556$ (shear); $2556^{-1} \times 1000 = 0.4$; and $0.4 \times$ the yield stress is equal to the nominal stress.

Combining this with the factored load, Respondent contended, is good engineering practice and consistent with applicable codes.

15. Accompanying Respondent's June 9 letter is a June 9, 1999, letter from ITWRamset/Red Head, which manufactures the Tapcon anchors. The manufacturer's letter sets forth the "ultimate shear failure loads" of the 3/16" x 1 1/4" anchors; in 3000 psi concrete, the shear strength is 852 pounds. The manufacturer's letter adds that a safety factor of 4:1 (or 25 percent of this ultimate load capacity) is used for long-term static loads, not for short-term hurricane loads. The letter warns that the performance characteristics of Tapcon anchors are based on the embedment depth of the anchor and the base material into which the anchor is installed.

16. Accompanying materials describing the specifications of the ITWRamset/Red Head Tapcon anchors state that, for embedment in solid concrete, one 3/16" x 1 1/4" anchor provides ultimate pullout strength of 581 pounds. (As noted by Respondent in his proposed recommended order, 1 1/4 inches is the depth to which the two-inch anchors would be embedded in concrete.) The same materials describe the ultimate shear strength for one 3/16" x 1 1/4" anchor, embedded in 3145 psi hard rock concrete, as 852 pounds. A cautionary installation

note in the accompanying materials warns that "safe working loads for single installations under static loading should not exceed 25% of ultimate load capacity."

17. At the hearing, a state-certified general contractor testified for Respondent. He has worked extensively with Respondent for the past five years. Testifying that the general contractor is responsible for installing the straps, the contractor testified that he could drive six nails into the strap, but, if the strap had been wrapped over, he could have driven three nails on each side of the rafter.

18. Petitioner has proved by clear and convincing evidence that Respondent's proposed method of attachment of the strap to the rafter does not conform to the manufacturer's specifications and constitutes negligence in the practice of engineering. The inability of Respondent to wrap the rafter was exacerbated by his failure to specify the number, weight, and location of nails. Without regard to whether such specifications are required in typical situations, in this situation, involving a retrofit of straps where a contractor and carpenter might be unable easily to drive nails, the engineer's specification of the number, weight, and location of the nails was imperative.

19. At the hearing, a state-registered structural engineer testified for Respondent. Based on his analysis, the three Tapcon anchors could safely withstand 1000 pounds of uplift.

20. Respondent's calculations use strength-design analysis, not allowable stress design analysis, and there is a question, under the SBC, as to the use of strength design in masonry, at least for wind loads. At the hearing, a state-registered engineer testified for Petitioner. He explained that the use of masonry, in strength-design analysis, is of limited usefulness, except for earthquakes, because of the difficulty in using the correct load and resistance factors, and the preferred characteristic of wood, as for wind loads, to resist higher forces for shorter durations (as contrasted to steel and masonry, whose ability to resist loads is unrelated to the duration of the load).

21. Petitioner's engineer testified that the SBC employs a testing affiliate, which has determined that the allowable stress on each of the subject Tapcons is 183 pounds, so that three Tapcons of the type specified could resist 549 pounds. Even with the historical, although now controversial, factor increasing the allowable stress for these three Tapcons by one-third, they could still not resist a 1000-pound shear load.

22. Petitioner's evidence challenging the sufficiency of the three Tapcon anchors is persuasive, but not quite clear and convincing. As noted below, negligence in engineering is especially dependent upon applied engineering practices and principles, and the testimony of Respondent's expert is

sufficient to insulate Respondent from an adverse finding as to the Tapcon anchors.

CONCLUSIONS OF LAW

23. The Division of Administrative Hearings has jurisdiction over the subject matter. Section 120.57(1), Florida Statutes. (All references to Sections are to Florida Statutes. All references to Rules are to the Florida Administrative Code.)

24. Section 471.038(3) authorizes Petitioner, a Florida not-for-profit corporation, to provide administrative, investigative, and prosecutorial service to the Board of Professional Engineers.

25. Section 471.033(1)(g) authorizes the Board of Engineering to impose discipline for negligence in the practice of engineering.

26. Rule 61G15-19.001(4) defines negligence as "the failure by a professional engineer to utilize due care in performing in an engineering capacity or failing to have due regard for acceptable standards of engineering principles."

27. Rule 61G15-19.004(2)(m) provides that the minimum penalty for negligence is a reprimand, two-year probation, and \$1000 fine. Such a combined penalty would be disproportionate to the offense. Respondent has practiced engineering for many years, and the record discloses no prior discipline. The

demonstrated insufficiency in his failure to specify the number, weight, and location of nails, although significant, is an omission that, given a careful contractor or even carpenter, may well prove immaterial. The proper penalty is a reprimand.

RECOMMENDATION

It is

RECOMMENDED that the Board of Professional Engineers enter a final order finding Respondent guilty of negligence in the practice of engineering and issuing a reprimand.

DONE AND ENTERED this 28th day of December, 2000, in Tallahassee, Leon County, Florida.

ROBERT E. MEALE
Administrative Law Judge
Division of Administrative Hearings
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Filed with the Clerk of the
Division of Administrative Hearings
this 28th day of December, 2000.

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NOTICE OF RIGHT TO SUBMIT EXCEPTIONS

All parties have the right to submit written exceptions within 15 days from the date of this recommended order. Any exceptions to this recommended order must be filed with the agency that will issue the final order in this case.