

The Leaning Tower: A Timely Dilemma

(Case 1001)

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The Case:

A medium-sized town in the Northeast derived the bulk of the local income years ago from shoes manufactured in an extensive mill facility on the banks of the river running through the town. The mill had originally been located on this site in order to use water power as the primary energy source for running the mill equipment through a vast array of belts, pulleys and reduction gears. However, because of the site location adjacent to the river, the soils tended to be loose and/or moderately compressible, requiring deep foundations for heavier portions of the structures.

One of the most prominent mill structures was the original tower which was in excess of 15 stories in height, and over the years the large clocks on all four sides of the tower became the standard reference for correct time in the local community, even after the mill became defunct and lay idle for more than 35 years. Recently however, the region has realized an increased growth due to a demand for computer software development for industrial, medical and personal uses. MegaBite Unlimited, a nationally known computer software development firm, surveyed a number of sites in the state and decided that because of the semi-rural atmosphere of the town, the above-average educational background of most of the residents and the attractive tax incentives offered by the local improvement board, they would design and build a new corporate facility in the town.

The prime site for the new facility was the abandoned mill and clock tower. Since the mill buildings had been left without maintenance for such a long period, it was decided to demolish them and build an efficiently designed complex of structures which would complement the colonial decor of the area. The local planning commission concurred with this decision, but insisted that the original 15-plus story clock tower be retained as a symbol of the prosperity the town once enjoyed, and would now experience again.

During the design of the new facility, MegaBite Unlimited's architect retained I. B. Stout, a structural engineer from a nearby city, to do the structural engineering and design such systems as might be necessary during demolition of the old structures in order to protect the old clock tower, if necessary. Stout's review of the available records showed that the heavy clock tower was supported on a 48-foot square mat at a depth of about 18 feet below ground surface, and the mat in turn was supported on wooden piles driven to some depth below the water table to pick up additional support in the underlying soils. Based on this information, Stout designed a shallow retaining system for support of the sides of the excavation which would occur during demolition of the adjacent mill buildings approximately 50 feet away.

The plans and specifications for the demolition were completed, along with the design documents for the proposed new facility, advertised to contractors for bid, and the job was let to Colonial Construction Company, a general construction contractor in business for more than 60 years in the local area. Since Colonial had the necessary heavy equipment, they proceeded with the demolition work as one of the first stages of the project. About the time that the demolition excavation had come to approximately 100 feet from the old clock tower, one of the construction crew noted that the tower seemed a bit out of plumb, but thought little of it, since the tower was so old. However, as the excavation progressed closer to the tower, it became apparent that the tower was tilting at an increasing rate, and toward the demolition excavation.

Colonial stopped work over a weekend to consider what steps, if any, should be taken with regard to the clock tower. Upon returning to the site on Monday morning, new survey measurements indicated that the tilt at the top of the tower had increased to six inches. At that point Colonial called W. E. Holdem, Inc., a specialty ground modification subcontractor, and asked for their assistance in correcting the situation so that the demolition could be completed to the extent originally planned. Realizing the seriousness of the problem, Holdem in turn called in Jonathan Turnbuckle, an engineering consultant in the Midwest who had an excellent reputation for coming up with innovative, cost-effective solutions to construction problems requiring ground modification. Holdem knew of Turnbuckle because they had worked together on a number of projects over the past several years in other areas of the country.

Turnbuckle was quick to respond; visited the site; assessed the problem; devised a solution with a reasonable chance of success; conferred with the architect, I. B. Stout, the architect's geotechnical engineer, MegaBite's representatives and the town's building officials and the mayor, and explained the solution. He also made recommendations for standby cranes and other safety precautions should it not be possible to implement the proposed ground modification scheme in time to save the clock tower and avert potential property damage and possible personal injury.

The entire group cooperated in expediting the standby equipment and procedures. Holdem mobilized on the site within two days and initiated the remediation procedure devised by Turnbuckle, successfully continuing the process and averting the collapse of the clock tower. It took a period of about 70 days to continue the process until the adjacent demolition was completed and the excavation backfilled, with constant monitoring on the site and analyses being required for at least the first 45 days. No one, including I. B. Stout whose original design had allowed the problem to occur, was sued.

About three weeks or so after the remediation procedure was initiated by Holdem, Inc., Jonathan Turnbuckle realized that since the solution he had devised was an engineering design, he should have permission to practice in the state, if only for a temporary period. He then contacted the state's Board of Registration for Engineers and Surveyors, requesting a temporary engineering license. He was told by the Board that although many states do have a provision for such a temporary or short-term permit

for engineers licensed in other states, this particular state had no such provision and he would have to make a full, formal application for registration as a professional engineer in the state.

Turnbuckle obtained the necessary forms, filled them out (including references to the professional engineering registrations he held in 17 other states), and turned them in to the Board within a couple of days. Approximately three months after the remedial construction had been completed and the clock tower saved, he received notice of his acceptance by the Board as a registered professional engineer by reciprocity. Since the project was complete as far as Turnbuckle and Holdem were concerned, they each went on to other projects in other areas.

Recently, Turnbuckle has received a registered letter from the state Board of Registration for Professional Engineers and Land Surveyors notifying him that I. B. Stout, the structural engineer for the MegaBite project, has filed a formal complaint against him for practicing as an engineer during the time of the clock tower incident without a license in the state. Furthermore, Turnbuckle is advised that Stout is prepared to carry the matter to court, where Stout intends to sue Turnbuckle for a substantial sum of money, claiming that too many out-of-state engineers do designs for projects within the state without being licensed, and that practice is financially detrimental to Stout and the survival of his practice.

Is Turnbuckle at fault for not having a professional engineer's license in the state during the design and implementation of the clock tower remediation? What should he do, or have done?

Alternate Approaches and Survey Results for “The Leaning Tower, A Timely Dilemma” (Case 1001):

1. Realizing that he was not registered in the state, Turnbuckle should have declined the request to devise a remedy for the potential imminent collapse of the clock tower right away.

Percentage of votes agreeing: 6%

2. Before accepting the assignment, Turnbuckle should have contacted the Board of Registration for Engineers and Surveyors to request a temporary license. Upon learning that the state had no provisions for such a temporary license, and realizing that he would in fact be providing an engineering design without a license should he continue, he should have declined the assignment. Colonial Construction and W. E. Holdem could have found someone else who was a registered engineer in the state to come up with a design to save the clock tower. In any event, the matter would be out of Turnbuckle's hands, since he would be complying with the legal requirements of the state.

Percentage of votes agreeing: 30%

3. By placing the health, safety and welfare of the public (NSPE Code of Ethics for Engineers) above the strict legal requirements of the Board of Registration, Turnbuckle should be supported for the action he took. In addition, he did make application for a temporary license in good faith, and should not be held responsible for the fact that the Board had no official mechanism through which to grant him a license, even though he was registered as a professional engineer in 17 other states.

Percentage of votes agreeing: 64%

Forum Comments from Respondents

1. I firmly believe that all current registration programs need reevaluating. In my opinion, all disciplines should have a national registration, much like AIPG. Once registered through a state board, individuals should be allowed to practice in all states in the US. At present, state boards have too much power and in some instances abuse that power for their own gain. The actions taken against Turnbuckle are an example of protectionism. I. B. Stout did not adequately plan out his portion of the project and should have been investigated to determine if he was negligent in his appraisal of the situation. In such a case as this, a national certification with reciprocity would have eliminated the protectionism and in-fighting.
2. The owner and the architect should have brought I. B. Stout into the process as soon as the problem was noted. As a consequence, Turnbuckle could have been brought in by Stout as an advisor, with Stout being ultimately responsible for the design.
3. While solution #3 is ethically the correct answer, Turnbuckle could have worked closely as a consultant with a qualified engineer registered in the state, who would in turn provide the final design recommendations, although the final design could therefore be somewhat different than that proposed by Turnbuckle. Turnbuckle's change in role from designer to consultant is (1) not ethically necessary; (2) not necessary to provide an adequate design; and (3) more costly. However, it does allow Turnbuckle's vast successful experience to be utilized, is legal, and is ethical.
4. If Turnbuckle was required to sign his name as a registered professional engineer in the state, his contribution to the engineering problem can be viewed as only consulting advice. Therefore there is no legal liability basis upon which to sue.
5. When Turnbuckle was first contacted by the contractor, he should have referred to the chart in the new book produced by NSPE entitled, "Engineering Licensure Laws: A State-by-State Summary and Analysis" (NSPE Pub. No. 2015), which would have told him that he cannot apply for a temporary license in that state. As a result, he could have told the prospective client that other arrangements would have to be made due to the registration laws in that state.

Epilogue

In fact, none of the design consultants associated with the project was willing to become involved with the remediation of the problem, even though it was shown that it was not physically possible to construct the original design. Despite his timely response and recommendations which averted a real disaster, Turnbuckle was subsequently fined \$500 by the State Board of Registration. In addition, he was required by law to notify each of the other 17 states in which he holds professional engineering licenses of the action taken against him. Having done that, only two state boards acknowledged receipt of the information. In the interim, I. B. Stout has discontinued his pursuit of monetary relief through court action against Turnbuckle.