A Patent Rights Problem

by **Dr. Edward J. Monahan,** *New Jersey Gamma '58,* P.E.

There is, I believe, a damaging absence of legal protection for the patent rights of small inventors, a "patent protection gap." The principal purposes of this article are (1) to ascertain the extent of the problem by polling Tau Bates, (2) to seek the help of members toward effecting a remedy should the extent of the problem warrant, and (3) to provide useful information (and caveats) to young Tau Bates about aspects of the patenting process — as viewed by a small inventor who has been there.

By no means do I consider myself expert in patent matters. I do suspect, however, that there is likely a higher concentration of small inventors (existing and potential) in Tau Beta Pi than in most organizations. There are also many patent attorneys in Tau Beta Pi whose first degrees were in engineering.

First let me explain what I mean by *small* inventors. I have in mind those who pursue standard engineering work and conceive original ideas that may be patentable but are not job related. If an idea is job related, a contract usually exists wherein any patent awarded would become the property of the employer. In such common cases, the legal work of patent acquisition would be done by in-house staff lawyers of the employer company. To further refine the definition, a small inventor would be someone who would have need to retain the services of a patent attorney to do the legal work associated with the process, initial patent search (for "prior art"), patent preparation, and patent application (should the search suggest successful outcome). In effect, I'm referring to the *lone wolf* occasional inventor who does not rely on inventing as his/her sole source of a livelihood. Full-time inventors would of necessity have a patent attorney or firm do all legal work on some sort of contractual basis in support of his or her continuing efforts towards patent acquisition, with all necessary legal advice and protection.

The patenting experiences that I had and will describe started while I was a civil engineering professor. I was not involved in any funded research at the time (being much more practice oriented — more encouraged then than now!). I simply got an idea for a novel alternative method for foundation construction in areas underlaid by weak, compressible soils: use foam plastic as a backfill to obtain a *weight credit*.

The process by which this idea evolved extended over an incubation period of several years and culminated in one of the most extraordinary experiences of the mind that I expect I will ever undergo; I might call it my Eureka/Gadzooks experience. I had been a geotechnical specialist for more than a decade, had obtained an M.S. and Ph.D. in soils and foundations, and had never heard or read of anyone doing what I had in mind, so I thought I might have conceived of a patentable method. That's when the fun began! I located an attorney, had the idea searched, and applied for and received a patent on the method. (I conceived of the idea in 1969, filed on Feb. 12, 1970, and was awarded the patent on Dec. 14, 1971. I later obtained a second patent, a continuation-in-part, on July 24, 1973. This C.I.P. specifically covered lateral weight credits that would result, for example, when one used foam plastic backfills behind walls or bridge abutments. One practical effect of this was that the 17-year period of proprietary rights was extended to July 24, 1990. Since my original patent did not specifically deal with lateral earth pressure weight credits, my attorney advised that I *lock up* the method by obtaining the C.I.P.)

Integrity and Excellence in Engineering

I noticed in my first correspondence with our editor that the phrase immediately above appears on the envelope of Tau Beta Pi's stationery. I do not recall this specific statement from my active days in Tau Beta Pi many years ago, but it is now the official motto. It is appropriate for what I will now address. I will cite no names, organizations, or other information that would allow easy identification, but I would hope that none of the players is a member of Tau Beta Pi.

Upon receipt of my first patent, I proceeded to seek ways to inform appropriate people of my means and potential applications by the usual methods of publication and speaking in various venues. After some consideration of the ethics involved, I even included the methods in a graduate course I regularly taught in shallow foundations, reasoning that it was a perfectly acceptable alternative method for solving certain difficult foundation problems. Simultaneously, I also decided not to be the engineer-of-record for any job where the method would (or might) be used, since I stood to gain royalty

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payments if the method were to be chosen, an obvious conflict of interest if I were to participate in design decisions.

I also sought the interest of material suppliers and made contact with a major national firm that produced foam plastics for a wide variety of applications. My patent attorney helped me in obtaining a nonexclusive invoice-licensing contract with the company. This is a procedure in which the company would add the royalty to its invoice, collect the money from the purchaser, and pass the royalty to me, a nice arrangement to say the least! During the negotiations preceding the signing of the contract, I was contacted by the company's representative, who described a construction job near its headquarters that was made to order for application of my method. He requested permission to pursue the job with written immunity from infringement from me, arguing that a successful job would be a major plus for the prospects of future jobs. My attorney thought I should hold out for my royalty, but he saw no potential harm to the future validity of my patent rights. I decided to give the permission and did so.

One night early in 1974, I arrived to teach my graduate course in shallow foundations and was approached by one of my students who was by then familiar with my patent methods. He displayed for me in an open magazine an article that described the job for which I had recently given written immunity from infringement, complete with photos of which I already had copies. There was no mention of me or of the fact that the method was patented. I was flabbergasted! I arranged a meeting with the editor of the magazine. He got the file out, and as he turned through the documents, my eyes fell upon many letters with the distinctive and immediately identifiable logo of the company I had given written immunity to pursue the job. Whatever the as-yet-uninvented pejorative of flabbergasted is, that is what I felt at that moment. The author is an engineer for an organization other than the company I granted immunity, a firm with which my lawyer was, at that time, negotiating an invoice-licensing contract that would cover a long and mutually fruitful period of business dealings — at least so I thought! The author not only omitted any reference to me or my patent but also gave no indication or credit otherwise, clearly inferring that the design concept was his own. Here we had corporation perfidy and plagiarism all in one fell swoop!

I did not reveal my business association with the firm to the editor. Instead we talked about how some correction could be made. He seemed genuinely sympathetic and willing to make amends in some way for the damage done to me, of which he was completely innocent and unaware. By coincidence, I had had an article accepted for publication in the same magazine on a subject having nothing to do with my patent methods. He agreed to publish a block note and my photograph (big deal) with an explanation of the omission in the previous article concerning my patent rights. I agreed, figuring it was about the best I could do or expect. Believe this or not, the magazine gave the offending firm editorial rights to the block note copy that I prepared. Three months later, my article was published. Half of the last sentence in my block note was simply lopped off, making the last "sentence" gibberish. This was the part about the firm's request and my granting of written immunity. My best guess is that the corporation felt its image would be diminished if it were revealed that it sought permission from someone to do anything. The message here is that if a little guy ever gets into a battle with a major corporation, the little guy is very likely to lose, regardless of right and wrong.

I spoke with my lawyer about possible legal action, and was told two things: (1) you must prove specific monetary damages, and (2) the cost of litigation in federal court, the *only* venue available for patent infringement litigation, would be "in the six figures." Being unable to prove the future and not having the six figures, I was quickly disabused of the idea of suing.

Despite my understandably changed attitude toward the firm, I resumed my business activities with it and successfully concluded the invoice-licensing contract. I made visits to the company's offices, where attention to the development of my patent methods became a substantial priority, with the effort elevated to project status. A new project was to be established with a *WC* designation (for weight credit), and a sales manual (with extensive photos from the infamous first job) was developed and distributed to dozens of its salesmen around the country—all this and an invoice-licensing contract! Then it happened. The project was canceled, and the corporate executives ordered "no more foam plastic in the ground."

The "it" that happened was a major traffic accident in a northern state, caused by what came to be known as differential icing. To explain, I must refer to my original patent application. The application was rejected on the basis of a prior patent that had been issued in 1966 for the use of foam plastic on highway subgrades to protect or prevent a well-known phenomenon in highway pavement behavior called frost heave, where ice lenses would grow in certain frost-susceptible soil types in subgrades and cause heaving of the pavement structure. It was thought that the insulating properties of foam plastic would minimize or prevent this action, which they did. Unfortunately, an unforeseen potential for a far worse problem was created. On a sunny day, with the air temperature hovering around freezing, the subgrade would derive heat from two sources, the unfrozen soil below and the sun from above. This would be true on stretches of untreated highway, but on a section underlaid with three-inch slabs of foam plastic, heat from the ground would be negligible, and the pavement surface of treated sections, if wetted by a shower, could freeze, while untreated sections would remain wet but unfrozen: differential icing.

I was never able to get a full report on this, but I did piece together part of the story. A major accident occurred involving serious injuries. Investigation led to the discovery of the foam-plastic treatment, and a lawsuit resulted in major culpability on the company that supplied the material, the same firm that then canceled the weight-credit project.

I tried vainly to convince the people I dealt with at the company that differential icing was not even a factor in almost all of my weight-credit applications, but my arguments fell on deaf ears. I guess no one wanted to argue with those who made the executive decisions.

For the next few years, I got my modest annual contractual minimum check along with the cover letter stating "no activity this year." I was busy with my academic career, so I did not pursue arrangements with other suppliers, in hindsight a major mistake (nature abhors a vacuum). In the late1970s, I received a copy of an article that appeared in an international geotechnical magazine describing construction projects in a European country using my methods. Let's agree to call it Muldavia, consistent with my pledge to reveal no pertinent information of identification potential. I wrote a letter to the engineer who authored the paper. It was a cordial letter in which I stated early on that I held no foreign patents and wished merely to exchange information that would be helpful to both our efforts. I never got an answer. Subsequently I learned that the engineer I wrote to was doing graduate work in the United States during and after the time period my patent was filed and issued.

In 1993 I was invited to be the lead speaker at a national meeting dealing with construction over soft soils. The session moderator was adjusting the microphone before introducing me as the first speaker when a person approached the moderator from the audience. He handed a packet of documents to the moderator, turned, and returned to his seat. As he passed me, I viewed his name tag. It was the Muldavian engineer! I was able to obtain a copy of the document he brought, and it turned out to be a description of a number of projects completed in *Muldavia* in recent years, all using my patent methods. To this day, that engineer has never contacted me or mentioned my patents or my publications in his own published works dealing with foam-plastic fills.

Two other engineers, whose activities I would come to know, were in the audience that day. One of them (let's call him Sal from Brooklyn) had a discussion about my paper published in the proceedings of the conference, in which he offered some corrections and criticisms, most of which were picayune or incorrect. One was an assertion that CFC gases were produced in the manufacture of the particular foam plastic described in my paper, such gases having been identified as being harmful to the earth's ozone layer and thus a serious environmental hazard. Being aware of a solution to that problem by the manufacturers, I made a phone call for verification purposes and was assured that the problem had been solved some years ago. In my published closure, I reported this information. My article, the discussion by Sal, and my closure were all published together in the proceedings.

Since then I have learned that Sal has become one of the most prolific authors of articles dealing with geofoams (as they have come to be known). He modestly bills himself as the "leading civil engineering expert in the U.S.A." and a "leader in worldwide geofoam technology transfer." He routinely cites the Muldavians as the pioneers in the development of geofoam applications, despite having been advised repeatedly in published letters that my patents preceded Muldavian applications. In addition to this omission, he has never cited my patents or my published works.

The second engineer in the audience that day (let's call him Roy from Troy) recently published an article in a national magazine describing his work (much of it research) with geofoams. Sure enough as I privately predicted, a letter from Brooklyn Sal was published shortly thereafter listing no fewer than 11 itemized corrections, one of which was that the production of XPS foams (extruded polystyrene) produced CFC gases that were "not without environmental controversy." This was precisely the criticism he made in his published discussion of my paper in 1993 and which I refuted in my closure! One of his *corrections* asserted that "XPS absorbs water . . . decreasing its thermal efficiency." What he failed to mention is that EPS, the material (and industry) he seems to represent, absorbs *far more* moisture than does XPS foam. (EPS is an expanded polystyrene foam that is produced in bead form and sold to molders, who convert the beads to the familiar solid form.) Here we have an engineer who, in his zealotry to promote his position, seems to believe only what he prefers to believe and which suits his purposes of self-promotion, even to the extent of publishing information that he knows to be false or misleading. Or does he just "forget"?

My last example of engineers-behaving-badly relates to the opening sentence of this article, underscoring the need for some new method for the protection of patent rights. In 1989 an engineer sought my advice about my patent methods for a job in which he was involved. After our phone conversation, I sent him a letter reiterating and adding to my oral advice, including some specific commentary about my royalty requirements so that he could pass this information on to the appropriate parties funding the project. Considerable time passed, and I forgot about the contact. (Over the years, I periodically got inquiries about my methods.) A year or so later, there appeared an article in a national magazine describing the successfully completed construction project. The engineer-of-record was the same one with whom I had spoken and corresponded. He had not informed me or the "funding people" about my patents and patent rights/royalty requirements, a blatant infringement of my patent, it seemed to me.

I located a patent attorney who agreed to review the entire history of potential infringements of my patents, with an eye toward litigation on a contingency payment basis. The principal target was the project described in the previous paragraph. It was identified by the author of the article as the largest job done in the United States. I estimated that my royalties would have been about $50,000. Since it was fairly obviously a knowing infringement, the potential recovery would be treble that (a specific feature of patent law). With earlier infringements (probably some of them innocent or unknowing violations), the total potential for recovery was about $200,000. The attorney seemed amenable to pursuing the case. However, a couple of days later, I received a phone call from him that senior partners had overruled him because *the recoverable amount was inadequate to cover costs of litigation*. Upon subsequent reflection, I recalled my attorney's comment of 20 years earlier: "cost of litigation would be in the six figures." Factoring in the 20-year inflation, cost of litigation must now be in the middle-to-upper six figures, let's say $700,000. Taking five percent as a reasonable royalty figure, that means that project costs or revenues (for an invented product) would have to exceed $14 million to make a lawsuit financially feasible. This would pertain only to small, independent

inventors who would not have a law firm on retainer. That's quite a gap! Unscrupulous people and corporations who are experienced in the modern world of inventions and patents are, I am sure, quite aware of this gap and regularly take advantage of this opportunity to steal with impunity. (Recall the case of some years ago when one of the major auto companies was convicted of patent infringement on the invention of intermittent windshield wipers. The poor guy who invented and patented the device spent decades suing and ruined his health in the process. The amounts here were probably in the hundreds of millions, so litigation was an obvious course to follow. This was, I think, a rarity. Most inventions do not generate the revenues compatible with legal costs of suing, and therein lies the gap.)

Before concluding with a request for feedback, I would like to offer some speculation about possible reasons for the extraordinarily bad behavior of people and corporations that I have observed in connection with my patenting experiences. In my interactions with engineers on a one-on-one basis over a 40-year career, I have not observed similar behavior patterns. Quite the contrary: I have mostly observed engineers to be, on the whole, an ethical and honest bunch. How does one explain what I've described herein? Is my experience unique?

An experience I had many years ago may provide a clue. I was invited to give a talk on my patent methods at the New York Academy of Science's engineering division. After my talk, I was approached by a person who irately intoned, "You can't patent that!" He went on at length, stating excitedly that engineers had been using lightweight materials for their designs since DaVinci (or words to that effect). I believe I recall him adding that "Your concept is obvious." I let him vent for a while and then calmly replied, "I *did* patent it." I then explained a concept that I do not think he understood about patentability, and that is that patents can be awarded if the inventor makes a case to the examiner that his/her method is an orders-of-magnitude improvement over existing methods. I argued that while lightweight fills were commonly used by soils engineers, such lightweight fills weighed typically about 70 pcf (cinder ash, for example), whereas foam plastics weigh as little as 1-2 pcf, thereby yielding a weight credit of unprecedented amounts — an order-of-magnitude improvement and thus patentable. Obviously, the patent examiner agreed.

As to the notion of obviousness, I have pondered this over the years (not having had a good, immediate answer for my "friend" at the academy lecture). I contacted the Society of the Plastics Industry and ascertained that foam plastic had been invented by the Germans in the early '30s. (One of the early applications was for mosquito bombers.) By coincidence, this approximately coincides with the beginning of the development of soil mechanics by the late Karl Terzaghi, considered by many to be one of the great engineer/scientists of this century. Subsequent to that, there were four decades of soils and foundations practitioners who dealt with foundation construction on a rational, systematic basis, none of whom thought about the idea of using foam plastic as a fill material until it occurred to me. So much for being obvious.

Even though I think the preceding constitutes a strong argument for the novelty and originality of my idea, I suspect that other engineers may share the feeling expressed by the engineer at the academy lecture. Some may extend that to the opinion that because of its obviousness I do not deserve a patent on its use. Such an attitude could explain the seemingly universal refusal of engineers to acknowledge my patents or my work related thereto. (For example, in the 29-year period since I conceived of and patented the methods, the only citation of my work that I have ever seen was in a 20-page pamphlet dealing with geofoams, sponsored by the Society of the Plastics Industry. Its author was Roy from Troy. It is a society document , i.e., not widely published or distributed, and it was copyrighted in 1997 — 26 years after my first patent!)

The only other causes I can think of for the behaviors described are the ugly ones: corporate greed, absence of even rudimentary ethics, and career advancement at any cost, including plagiarism and publishing information that is known to be false and/or misleading and failing to give due credit.

Feedback From Tau Bates

I read recently that patent acquisition costs now run between $5,000-$7,000 and that a small percentage of patents ever makes money. If the gap that I describe is accurate and widespread, there exist major disincentives for small inventors to pursue patents on their ideas, which logically would create a serious impediment to technological development at a time when such development is crucial. As has been recently asserted by William A. Wulf, "Technology is one of the strongest forces shaping our nation" (THE BENT, Fall 1998, p.23).

Here is a list of the information we need to ascertain:

1. **Is the problem serious and widespread?**
2. **Are my numbers ballpark accurate?**
3. **If warranted, what mechanism(s) can be developed to provide the protection needed?**

With regard to the last question, I envision some sort of medium claims court, where,for a modest fee inventors could file claims against infringers. These courts could be staffed by engineers and patent attorneys on a pro bono basis for, say, three-year terms. Legislation would have to be enacted that would make their rulings have the force of law. I think the mere existence of such a mechanism would be a major deterrent to those who would infringe, the same people who now do so with impunity in the knowledge that they will not be sued if they keep their thefts below the $14 million threshold.

To assess the problem, I would be pleased to receive the commentary of my fellow Tau Bates, even if just a note or post card. If the response seems to warrant, we can take it from there. My address is 85 Newark Avenue, Bloomfield, NJ 07003-4941; phone: 973/743-6043/6210.

Finally, with respect to the ethics problem, I suggest that THE BENT republish its Canons of Ethics. This important set of principles last appeared on page 20 of the Winter 1999 issue.