

# The Canadian Professional Engineer -in- Training

Paul T E Cusack

BSCE, DULE 23 Park Ave. Saint john, NB E2J 1R2 Canada

## Introduction

I am a first generation professional in our family. I attended the University of New Brunswick after a brief stint at the University of Waterloo. After bouncing around from Mechanical to Electrical to Civil Engineering, I finally graduated from UNB with a 2.9/4.3 GPA. Upon graduation, I was hired during a recession to work in the ICI Building Construction Industry. I left the engineering field after 31/2 years of working in it and never returned. I had earned my professional licence (P. Eng.) in Ontario. I also held five different positions as a student during my summer breaks from UNB. In this paper, we seek to cover some ground on the learning experiences of the student engineer and, while working, as an EIT.

I went to St Malachy's memorial High School in Saint John from grade 10 -12. It had an excellent reputation. I did not consider anywhere else. I had attended St Peter's Elementary and junior high for 9 years. Despite not being awarded the valedictorian ship, UI did have the highest-grade point average in grade 9 -the exit year. Interesting that St. Peter's School produced the leaders at St Malachy's- a school of 450 students. We have the Valedictorian, the King, and the top goal scorer in the hockey league.

When I began at St Malachy's High School, I had enrolled in all enriched courses. I found, after two months – that there was simply too much homework in all enriched classes. I regret that I left all enriched. I could have used the advanced training to do better in standardize dd test for programs such as the MBA GMAT. I lost out on an opportunity to take Chemistry from a PhD until my second year; French from a Francophone; and History from a Master's in Canadian history. It was a mistake to drop from level

1 courses to level 2 courses. I did maintain enriched Math and English. The teachers were superb.

Upon graduation in which I finished 13<sup>th</sup> out of 132 graduates, and not receiving a scholarship I decided to attend the University of Waterloo in Ontario - Canada's number 1 ranked engineering school. I did not receive a scholarship to the local university which had an impressive Engineering school reputation. It was an unmitigated disaster going to Waterloo. I did not flunk out; I could have gone back after four months; but my friend and I decided to go back to UNB which I was geared from New Brunswick Students. Ontario had Grade 13 at the time; we only had grade 12 in New Brunswick. Upon returning to New Brunswick, I had straight "A's" in Mechanical Engineering. I tool Mechanical Engineering because I wanted to work in Aerospace.

So, I decided that since I excelled at Math and Physics, I would take the more mathematical Electrical Engineering. I failed the main course in second year. I got a zero. I did not realize but I was poisoned by a Muslim, Kash, just before the final exam. I did some soul searching and returned to my love of buildings. I had applied to McGill Architecture to which I was not accepted. The next best thing was Structural /Civil Engineering. I didn't realize until I was done engineering school that structural engineering is arguably the hardest type of engineering practice. A mistake results in colossal failure if something falls down.

Part of my engineering education was done at the Saint John Campus with less than 2200 students. The final years were spent at the Fredericton Campus of UNB. UNBF was a more difficult university, and more poorly taught. It is more international. I got a better education at UNBSJ. While I had "A's" at UNBSJ, I had mostly "C's" at UNBF. I failed the

min civil course only to take it again and got an “A-“. Dr. John Dawe was an excellent professor who taught me the bulk of Structural Engineering courses (Stell; Concrete; Wood and Masonry Design courses). However, there was no consistency in grading to help build confidence in a budding engineer. My courses in structures ranged from a “D” in Structural analysis to an “A” in Masonry Design. Four courses from Dr Dawe ranged from a “c” to an “A”. It all depended upon how the grading was done. In Stell Design, we had open book so we could use formulas and codes. I got an “A”. In Concrete Design, we

We’re not allowed to have open book and I got a “c”. I put more effort in Concrete than Steel, but the grades were not consistent. I did not develop the confidence to be a Structural Engineer -my primary goal.

I had attempted to get a summer job at a local Structural Engineering Consultant. I went to many interviews during summer vacations. There was not much call for civil engineers because governments were bankrupt in the words of the Prime Minister at the time. One Prime minister said there would be no jobs until the baby boomers retired. The government did not do much to help civil engineers. Interesting that years later, a engineering friend invited me to work at that Structural Engineering company. It was too late for that. I had forgotten most of what I had studied in Engineering. I also had an opportunity to work in Aerospace- my original goal- but turned it down. We had to pass a course and only the top 50% would be hired in Fredericton working for Bombardier. My interests had changed over the years. I was not interested in spending countless hours designing hours designing a single part for an airplane.

I had 5 different summer jobs all related to engineering as a student. Governments provide organization and supplements for firms to hire students for the summer months. I worked as a civil designer in a Works Department and Building inspection department; as a Instrument Shop technician; as a Road Inspector; as a Timekeeper on a highway construction project; and as a Site Superintendent on a Soup Kitchen construction. I

enjoyed the first job the most. It used my artistic skills the best, and the boss, a technician was the best boss I had had. It was exceedingly difficult to get a job in Engineering Municipal Design. And salaries were low. On my first job, I was paid \$3.05 per hour or \$135.50 per week and I had to travel 20 miles to get it. The best I made was with the City where I earned \$11.00 per hour.

Upon graduation from Civil engineering, the only half the class got a job offer. I had an offer because I had secured a position the year before I graduated when the economy was good. I could have worked for that company during my last summer before graduation for \$9.00 per hour. It was not enough to live in Ontario. Had I gone to Ontario for the summer against my mother’s advice, I would have seen that perhaps it was not a good idea to move to Ontario permanently upon graduation. After I graduated and returned home from Ontario, I was interviewed by three of the five companies for a permanent job. They did not hire me. I must have done a poor job. I found that getting a good boss -a mentor-was critical success for a young engineer. Most engineers make poor mentors. They do not have the personality for it. It seems to me that technicians make better “Engineers” and better mentors. In fact, Technicians make better employees than university graduated engineers

As armed with the family car as a gift from my mother and father, and \$19,000 in debt, I went off to work in Ottawa for \$30,000 per year. I ran the gamut of job titles: Project Coordinator; Contract Administrator, Project Manager; and Estimator; and Claims Writer. I did not know, but I was grossly underpaid by about 40%. I should have been making about \$50,000 per year. I had asked a fellow UNB graduate from Ontario what was a fair salary. He would not say. Welcome to Ontario.

So, after taking 60 courses in Engineering, I only need a few of them to perform my job in Ontario: Project Management; Cost Estimating; Construction Equipment and Methods; Construction Engineering; Construction Engineering II, Technical Writing; and Accounting, Finance, and Engineering Economics, Law and Ethics for Engineers, and Oral and Visual Communication. A course in Soils; Structures, the

National Building Code, Hydraulics, and the Environment were useful. This is 14 courses that could be done easily in two years with prerequisites.

I had a boss who was my main mentor -an Engineer from Queen's university- that said to me: "There is no difference between someone with a degree and someone without." That company went out of business two years after I left them. He went on to found a Construction and Engineering Company, apparently hiring engineers.

When I was hired for the medium sized construction company that built large commercial jobs, I was sent to Chalk River Ontario. It is about a three and a half drive from Ottawa. I had been told in the interview that the company would pay for your living expenses while living away from your home base. I did not have a home base. I was staying with a relative in Ottawa on the weekends. Despite being told to the contrary in the job interview, I was told by the President of the Company that they would not pay my gas back to Ottawa on the weekends but expected me to pay it myself. I had signed up for an apartment in Ottawa, only to be told that I was being sent to Kingston, Ontario, where no one from Ottawa wanted to work. My mentor at that time was an engineer- graduate from Concordia and Waterloo Masters, that "the rules are, there are no rules. Everything I was taught in the ethics and Professional conduct Course at UNB went out the window. Of course, he really was not a mentor at all. He had an obnoxious personality and dare I say, he was stupid.

So, after the first summer in Eastern Ontario, I moved to Kingston to come under the auspicious of another young engineer. He was a carpenter as well as an engineer. He was only 30 years old. He had a reputation in Kingston, since his brother and father worked in Construction as well. He father was a superintendent, and his brother was a labourer. His brother made 3 times what I was making as an EIT.

I recall that his father stopped by to see if I could tell him what size beam, he needed to build a house for his Labourer son. I told him what size he needed. I found out later that he did not use the wide flange that I indicated, and he used a used beam with

residual stresses in it. He thought that it was the depth of the beam that determined its strength. It is the wide flanges that do the load carrying. He uses an S-Section that has no flanges. I told his son, the engineer that he should listen to my advice. He did not.

The non-engineering type hate engineers. They do not have the training to understand why engineers do what they do. One co-worker- a brute – or 30 years old, was an engineer. Neither was he a technician. He could not understand why a concrete slab in a Water Treatment Plant had to be 6" instead of 4" since "every slab [he] ever poured had been 4". There is no requirement that engineers occupy positions in the management of constructed works, despite that phrase is part of the definition of Engineering work - the management of constructed works. This has the effect of lower quality construction projects and an intolerable work environment.

While in Kingston, I managed the construction of a \$6 million Naval Training facility. I went from Project coordinator to Project Manager during the project. There was one problem that began on day 1 when I first arrived to be under the auspicious of an Architectural Technician. He had me do something that I realized later was not in my job description, i.e., taking measurements for shop drawings by a sub. The sub did not want to travel to Kingston from Niagara. It was dangerous being on the high steel with a measuring tape. At least I put the caveat that it was up to the sub to make on site measurements and that the steel was not yet set. It reminded me of a summer job in Highway Construction where I was given an old broken-down truck that lost its steering when I was making a turn. The mechanic said it could have been an awful accident if it had happened on the highway.

As an EIT, I was the scape goat for a design flaw on the project. I was not the designer, but a subcontractor said I was the "Project Coordinator" and should have picked up that the building was un-constructible between the masonry and precast connections. The design called for bolts to be tightened on the outside of a masonry wall. Holes had to cut in the new masonry walls to access the bolts. It was a costly design mistake. A Project

coordinator is not responsible for design drawings. Non-engineers do not know that. In the interest of fairness, as per the code of ethics, treating all parties fairly, I told the client, Defence Construction Canada that there was design problem. Telling the client was the reason I was fired. Whistle blowing is not looked upon fairly by companies as bad as the one I was with.

I was never given an office in Kingston nor Ottawa. I never got an office all the time I was with that company. They did not believe in computers. The books and drafting tools that I brought into work were stolen by a co-worker. Even my hard hat was stolen from the estimating room. I helped to lay out the floor plan for the office. I enjoyed it. I took photographs of various projects completed by the company and had them framed and displayed. I helped with Estimating in Ottawa. I used to travel to Ottawa-an hour and a half drive in my own car with gas paid for by the company. I was a lucky charm. We had to regularly have to bid 13 jobs to get one. Times were hard. I was the only one who would volunteer to do odd jobs in addition to my regular work. I liked to get the experience. Other employees would not do because it lowered than in others' eyes. Recall the secretary saying that "{She} could do my job." She could not.

I don't have a single performance in the 3 ½ years I was with the company. I wrote a claim worth \$150 k, and was given a raise of \$1500 to \$31,500. The salary survey for Professional Engineers indicated that, even after I was earning \$38,000 per year that I was below the decile, not for my year of graduation, but go back in the tale four years to the guys who just got out of school. At least 90% or recent graduates were making more than I was. Even though I never had a review to tell me how I was doing, I was fired by the president. He took me outdoors to tell me I was done. I showed up for work the next day anyway. They arranged to pay me anyway. They had an accountant who was always looking to fire someone. Many other junior engineers had left the company before I did. I thought I was doing a satisfactory job. Apparently not. The reason given for being fired was that I was talking about the boss negatively. He was a bad president.

While at the company party, a non-engineer, the same one about the slab, and who stole my drafting equipment and damaged my car, poisoned me, my boss, and the company president at the company party in August of 1993. The President started off by telling me that "I hope you don't sure the company, but you were positioned at the company party that make you sterile." It was an awful company. No wonder they went out of business as construction companies regularly do. I should have sued the company as they were vicariously liable for the actions of their employees.

I recall that the Senior Estimator in Ottawa said that the company had trained half the people in the industry. What kind of business model was that? For personnel, the company was a revolving door. Why they recruited Engineers at UNB I do not know, except that we work for lower salaries.

I was eventually licenced as a professional engineer (P. Eng.), I wrote to the Professional Engineers of Ontario telling them that Engineers needed a union. (The Associations only mandate was to protect the public from bad engineers. It was a tax really). Not long after I left Ontario, they did set up a union. Too late for me. I was back home in New Brunswick. I did learn how the Construction works. Engineering school was not all that helpful. I learned far more on the job than I did in University. That job is more Business, Law and Management than Engineering.

When I returned to New Brunswick, with my resume, I got a job right away in the same job. It was more of the same stuff, so I quit after 7 weeks. They too went out of business eventually because they relied on technicians to manage their funds.

After leaving Kingston, I told them they just cannot leave me high and dry in Kingston. They shifted me to Toronto when I had a boss who was about the best boss I had although he was crooked. For example, He demanded that I sign a document without allowing me to read the document. I thought we were all on the same team. Apparently not. When I complained about low salary, he pointed to the stack of resumes on his desk. The agreement we had was that my salary would be reviewed after one year. It was not. I managed \$16 million worth of work -3 projects -a t

one point, along with estimating duties. Work was getting done. I recall after surprise site visit that the superintendent on one of my projects was on LSD at work. There was another fellow back in Kingston who was on a one-month cocaine binge while his project suffered losses.

My boss in Toronto, a non-Engineer, wanted me to enroll in Project Management courses. He thought I would do a better job. But I was educated at UNB in PM by a graduate of Stanford University. My regret was that I did not take Law at Queen's University when I was fired in Kingston.

I worker with Engineering graduates from universities such Concordia, Queen's, Toronto, Waterloo, and Carleton. UNB produced engineers that were at least as good as those places. However, simply because UNB is in the economically depressed region of the country, UNB engineers are taken advantage of salary-wise. I never thought the boss on a project would make less money than the workers. Ther sad fact is they do.

Should engineers be supervised by non-engineers? I think not, although some engineers I encountered were worse that non-engineers who had no code of ethics. Really professionals cannot be employees under a boss who is not an engineer. There should be regulations that prevent this from occurring.

### **Conclusion**

The realities of working as a professional engineer are a world of difference from that taught in university. There are far too many courses in the engineering curriculum. The Construction Industry needs an Association of Construction Engineers to lobby for things like mandatory engineers in positions of power. There needs to be stiff fines and discipline for engineers who do not follow the code of ethics. They should be temporarily stripped f of their professional status. There should be more emphasis on reading and writing for the toolbox of skills for engineers. It is the skill I used most often. Also, courses in ADR and negotiation are recommended. University should build confidence in the young engineer. They do not that when I went at

least. The EIT's summer jobs are more important than the university courses. It is true that universities operate in an ivory tower environment. University does not prepare the EIT for the "real world". There should be a course in the engineering curriculum that teaches the EIT on how to set up a professional practice as they do for doctors and dentists and lawyers. I left the engineering profession in 1995. I never took up to work at it again and remain jobless. The parent company was a multibillion-dollar company that was touted as one of the 100 best to work for in Canada. They had a policy whereby the employee could only refuse to move for a job once in their career without commensurate remuneration. As an old man said, "Today, the companies own you."