

## Permits, As-Builts, Drawing Numbering and Delusions of Grandeur, or, Even a NYC Skyscraper does not a Process Plant Exceed in Complexity

My apologies for what follows, but between how long I've been an engineer and how I became one, I feel the need to provide bonafides for why I am fed up to here with the DOB Plans Examination process and the increasing incompetence displayed by some self-important filing representatives and Plans Examiners.

When I was but a young lad, my first ambition was to be a Marine Corps fighter pilot. After passing the required mental and physical tests, I majored in chemistry in college, and worked at [Bechtel's](#) NYC office while going to night school after getting thrown out as a matriculated student in my lower freshman semester for flunking 9 out of the 16-1/2 credits I was carrying.

This forced me to disenroll from the Marines' PLC-A ([Platoon Leaders Class](#) – Aviation) program and I spent two or three agonizing semesters in night school before realizing this whole academic thing was not for me. It was 1966, and I figured I'd just enlist as a grunt, and through sheer determination and brilliance would find myself in some sort of a (flight) officer training program after a while, but fate, providence, or God, had other plans for me, and the day I was to leave for [Parris Island](#), a Navy Corpsman had me pee in a bottle because he didn't like my color.

He discovered I had a microscopic [haematuria](#) (extant to this day), traceable to no detectable pathology. I had multiple [cystoscopies](#) and [IVP's](#) in the hospital where my mother was a nurse's aide in a effort to show there was nothing wrong with me, but after 120 days of doctor's letters and test results stating such, the Marine Corps said they had to discharge me from class III reserve (I got a cool Honorable Discharge parchment), with me never having got on a bus to P.I. for my recruit head-shaving and gentle indoctrination lecture by a [D.I.](#) upon my subsequent arrival thereto.

So I found myself back at Bechtel in my job as an engineering aide, a step up from what I'd been hired as a year or two before, a file clerk for the steno department.

Because of a year of Mechanical Drawing I'd had in High School and 3 semesters of Calculus in college, upon leaving Bechtel, I became first an estimator and later assistant sales manager for [Lightalarms Electronics](#), then in Brooklyn, who at that time manufactured Stage Dimming Switchboards and Fire Alarm Systems as well as the Emergency Lighting equipment they still manufacture. As an estimator there, I saw design packages presented by dozens if not hundreds of design professionals, and thus have no sympathy at all for NYCDOB plans examiners who seem to have difficulty finding information in plain sight on a set of drawings.

A few years with Lightalarms, and I moved to a commercial consulting engineer, Jansen & Rogan at 500 Fifth Avenue as an Electrical Draftsman/Designer, and it was here I began

to confirm the suspicion I first had when at Bechtel, that this engineering stuff was not all that difficult and that not all engineers were flaming geniuses.

I mean, there was an engineer at Bechtel whom I remember proudly announcing to all within earshot that he'd just failed the PE exam for the fifth or sixth time

As I transitioned from a draftsman to a designer at Jansen Rogan, I learned the [Zonal Cavity method](#) for calculating lighting footcandle levels, discovered all this watts and amps stuff was what I'd learned in High School Physics (with the addition of the complex numbers attendant to 3-phase Systems, which I learned in 11<sup>th</sup> year mathematics, but we called imaginaries, *i* instead of [phasors](#), *j*), and found the Electrical Code to be pretty much a design manual, notwithstanding its stated denial of being such.

My suspicion about engineering was reinforced by the fact that in between employment at Bechtel and Lightalarms, I spent a few months (I quit because I couldn't deal with being forced to join a union) as a Plant Craftsman at [AT&T Long Lines](#) where three quarters of my tenure was attending their school of basic electronics during which I learned to read [ladder-type schematic wiring diagrams](#), and combining this with a course on and-or-not [binary logic diagrams](#) I learned at Bechtel, I amazed an engineer at Jansen and Rogan while directing me to draft changes to a refrigeration machine wye-delta starter wiring diagram by replying in a very nonchalant affirmative to his question as to whether I'd understood his explanation of the difference in circuit's operation attributable to the changes. I had to, of course, repeat it in my own words to convince him.

It was with some amusement I learned that with regard to mathematics, while calculus is necessary for bleeding-edge engineering, simple algebra and arithmetic is enough for workaday engineering.

With that experience, and the scuttlebutt then circulating that the New York PE exam would no longer be permitted to be sat for on the basis of 12 years acceptable (as defined by the NYS Board of Engineering and Land Surveying) experience, I decided to apply, figuring that if a Bechtel engineer could fail five or six times, so could I. I had by then been three-quarters through International Correspondence Schools' Electrical Engineering (Power) program, which, while not [ABET](#) accredited, provided the academic knowledge necessary to deal with a professional licensing examination.

By then I was working as a job-shopper electrical designer assigned to firms like DuPont and Lummus, and later as an independent contractor to Crawford and Russell, working on Refineries, Process Plants, and Nuclear Power plants with my last assignment being at Indian Point #3 shortly after the Three Mile Island fiasco.

Anyway, the State Board at first rejected my application, stating in a form letter that they'd let me sit in another two years, and one of the three PE's who recommended me

wrote them a letter asking if I could immediately sit for just the undergraduate portion of the exam. You see, even a graduate engineer can't sit for the second part of the exam until completion of five years of internship under the tutelage of licensed PE's. Well, the Board reconsidered, and very kindly mailed me an admission card to the full two-day examination, which I received on a Monday for the exam to be given that Thursday and Friday.

I passed (by one point).

By the time I took the exam, I'd come back into commercial from heavy industry engineering design, and was struck by how poorly presented were the documents in the former field. When working for a Bechtel, Kellogg, Lummus, or Crawford & Russell, the construction package consisted of what were for all intents and purposes, shop drawings accompanied by material requisitions, rather than design drawings accompanied by specifications, and I spoke half-jokingly that the construction drawings accompanying the specifications in the latter field might just as well be blank with the words "BY FIELD" in the center of each sheet or page in large letters.

So, to come back to the title of this piece, while permits are required to verify the design intent's compliance with construction codes and other regulations, the NYCDOB's schizophrenic requirement for as-built drawings where the [Plumbing and Boiler](#) Divisions require as-builts for **all** changes and the DOB's [Design Professional Plumbing Closeout Checklist](#) only requires such for "... changes that are not considered as minor ..." is difficult to understand as having anything at all to do with safety or protection of the public, absent a belief final project signoffs may be fraudulent or that a design professional's affirmation that all changes were Code-compliant is inadequate, particularly in light of the point alluded to in the previous paragraph regarding the lack of meaningful detail presented by a commercial engineering design package.

That is, I still see packages with sheet upon sheet of details, not one of which is referenced to on the plan drawings. This used to be called CYA get the money in the job in an attempt to make up for poorly thought out designs forced upon a project by impossible project schedules, which should be (but apparently is not) a thing of the past, since the inflation which drove such schedules hasn't existed for nearly 40 years.

Finally, the *Delusions of Grandeur* in the title of this piece refers to DOB's imposition of the US National CAD Standard drawing numbering scheme via their [B-SCAN](#) requirements, where the current issue of the [former](#) has attempted to allow for almost everything, except more than 99 sheets per discipline and sheet type. I hope DOB has done better than these [Darwin Award](#) nominees who seem not to have heard of [relational](#) rather than [flat-file](#) databases

If ever there was an example of the definition of an elephant being a mouse built to government specifications, this is it, but in this case it was input from AIA, CSI, NIBS and the military that saddled us with a drawing numbering system inadequate for megaprojects while being overkill for an apartment renovation.

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