About 2,300 words

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ARE YOU THE GUY WHO...?

by

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Despite having been a prisoner for 45 years, I can not begin to tell how many times conversations begin with the question, "Are you the guy who designed (this or that)?" More often than not, the question to me is, "Are you the guy who designed the lock boxes used on handcuffs with wrist shackles?" As anecdotal evidence has it, some prisoner working in Correctional Industries or UNICOR designed the small fabricated boxes that keep handcuffs from turning. (You should know that if you are ever going to have handcuffs and wrist shackles put on you with a lock box, do not present your wrists to the officer with both of your hands pointing forward; present your wrists with both hands facing towards your stomach, adjusted so your wrists are stacked one above the other.

This positioning allows the handcuffs to easily be put on, and when the lock box is used, it does not then put excessive and painful bending forces on your wrists.)

And when my answer is, "No, I did not design that," and since I am often trying to shorten such conversations, I do not offer any explanation about what I <u>did</u> design. However, every now and then, I am asked, "Did you design the main gate of Western Penitentiary?" The answer is, "Yes."

I tend to give more detailed explanations -- depending upon circumstances -- to people who I judge to be trustworthy. Now, since I want to leave the legacy of this essay, here is the whole story.

Once upon a time, the first son of a Registered Professional Engineer, Rudolph Andrew Minarik, P.E., No. 4689-E, helped his father to survey land totalling in the thousands of acres in the Southwestern Pennsylvania area, mostly in Allegheny County, between June 1, 1957 and February 6, 1971. In the tradition of apprenticeship, since my father's practice included consulting work for general contractors and individuals, I was carefully and closely involved in the <u>process</u> of how my father was designing retaining walls, foundations, and sizing structural steel. I consider this practical experience as the most valuable portion of my engineering education, even beyond everything I learned while earning a Bachelor of Science degree in Mechanical Engineering from Carnegie Mellon University in 1970. In the less personal environment of an engineering organization or engineering college, there is seldom time or interest for an engineer to explain exactly

how a decision which "goes beyond the numbers" is being made. While engineering certainly involves the application of mathematics and science, sound engineering judgement is also an art which requires development of intuition, observation of the ethics of the profession, and some awareness of the legal and social aspects of an engineering decision. For example, at a young age, I saw my father insist that a contractor he was working for remove all the red clay underneath the foundation of a large retaining wall.

During summers between attending engineering college, between June 1 and September 1 of 1967, 1968 and 1969, and upon graduation, from January 1, 1970 to February 6, 1971, I worked for United States Steel (USS) Corporation's Central Engineering Construction Division, reporting for work each day at the Irvin Works Plant in Dravosburg, Pennsylvania, all while the Irvin Works Plant was undergoing a $250 million "Cold Rolled Sheet Expansion Program" with Central Engineering responsible for the plant expansion.

I made some personal engineering design contributions by: (1) investigating the performance characteristics of new large circuit breakers being installed in an old substation, requiring a field change that I transmitted in a technical report to the design group in the U.S. Steel Building in downtown Pittsburgh; (2) my redesign of the #7 Temper Mill limit switches at the top of the mill because the overhead crane would not clear the top of the new mill, having the contractor do the work to my field design and then marking the prints "as built" and sending them to the Central Engineering Design Group. [A general rule of thumb was that 10% of the design work had to be redone in the field because the equipment would not

function as originally designed.] When a brand new Morris vertical pump at the River Pump House failed, with a new twelve inch diameter shaft being broken in two, I was the only engineer at the site to correctly analyze the failure and diagnosis the problem. I recognized the failure as one caused by fatigue because it presented with an almost classical textbook failure site. A low-cycle fatigue failure on a brand new pump is suggestive of the pump operating somewhere near its critical frequency, causing resonance. After a Professor from Cleveland State University was called in by Morris to set up vibration monitoring equipment on the huge pump, he delivered a highly technical report concluding the pump was operating near its critical frequency, and the successful solution was to change the number of blades or vanes on the pump's impeller. To my knowledge, information and belief, those four huge vertical Morris pumps are still pumping raw river water to this day. After this, I was offered a position with USS Research and Development, and other USS engineers who I worked with valued my engineering insights and recommendations.

After serving ten years to the day, when I was released from prison on bond pending a new trial on February 6, 1981, I was employed between February 16 and March 13, 1981 as a Project Engineer with Economy Industrial Corporation in Ambridge, Pennsylvania. I redesigned an ingot casting machine, supervised assembly of a high-capacity gas-oil burner system for a ferro-nickel casting machine, and re-sized a hydraulic cylinder to accommodate tilting a larger coil. This was a particularly rewarding engagement because of the close connection between

design, fabrication and assembly operations.

After my being returned to prison by a Friday the 13th decision by the Pennsylvania Supreme Court, between February 6, 1986 and October 19, 1990, as a prisoner I was employed in the prison's Engineering Office. The State Correctional Institution at Pittsburgh is a maximum security facility covering about 24 acres with a daily census of 2,200 and with a total heated cubic footage of 10,290,254. The prison was established by an Act of Legislature prior to 1886 and originally designated as Western Penitentiary.

A former member of the State Registration Board for Professional Engineers, Guy Bey, PLS, characterized this period of employment as the beginning of my serving as the de facto engineer for Western. I sat for and passed the difficult 8-hour Engineer-in-Training examination on October 31, 1987, becoming the first prisoner to earn EIT certification. My major design projects included designing a new make-up tank for the power plant boilers, the reinforcement of the laundry floors, the repair of the 48" Wysong power shear, the rebuilding of the 80 foot high vertical coal elevator, and the design of the new main gate.

Because of the riots in the Camp Hill prison in 1989, both the Superintendent of Western and the Commissioner of Corrections became concerned about the security of the new main gate area. During the Camp Hill riots, prisoners had commandeered vehicles and heavy equipment and tried to crash through prison gates.

Because Western had been recently remodeled, the back of the prison became the front and the front became the back. Recent construction had cut a seven foot and six inches by a ten foot

opening in the former back wall, leaving only glass panels between the population of the prison and the new front control booth area.

One of the Building Maintenance Supervisors came from a meeting with the Superintendent and the Commissioner of Corrections and told me that I was going to design a strong new main gate which could be closed to seal the prison in the event of a riot. This was a design job that I would have preferred not to do as a prisoner myself. A new main gate did not contribute to the quality of life for everyone living and working in the prison, something that I used to justify my working so hard and at such a high level of performance. (I was working seven twelve-hour days each week.)

I asked my immediate supervisor to be excused from doing the job, but I was told that a decision had been made by his bosses. I was told that the Superintendent (Warden) of Western wanted it done, the Commissioner of Corrections wanted it done, and that "everyone knows you are capable of doing it." I was also given the clear threat that my failure to obey the direct order from the Superintendent would result in my being thrown into the hole.

After some soul searching, I came to the conclusion that a new main gate would contribute to the public good and public safety because no one would benefit from rioting, angry prisoners crashing through a glass curtain wall and spilling out of the prison.

Nevertheless, upon my decision to comply with the directive to design the new main gate for Western Penitentiary, I made it quite clear that there was only one condition to be imposed by me, that it was my intention to over-design the new main gate, so -- as I put it -- "I could never be criticized for designing too weak a

main gate." In a kind of personal revenge for having been forced to design the new main gate, I fully intended to make it as strong as the wall itself was at that location. The wall was three feet and six inches thick at the location where the huge opening had been cut into what was formerly the back wall. My one design condition was not only accepted, it was greeted with enthusiasm by saying, "It is exactly what we want anyway."

In one month of continuous work, seven days a week and twelve hours day, I produced a series of detailed design drawings. The Superintendent, the Deputy Superintendent of Operations, the Facility Maintenance Manager, and surely many other officials approved of my design drawings, beautifully done by hand and with instruments on vellum in ink.

A total of $14,000 worth of special steels and tools were purchased from my specifications. At one point in time, the prison could not find a vendor for the steel; I was put on the telephone and found two vendors myself. The design was made in two parts: (1) a heavy structural steel frame to be bolted (anchored) into the three feet and six inches thick wall of the prison, and (2) two bar-type doors and two bar-type end panels to fill the opening in the frame. The heavy frame was made from unequal leg angles, eight inches by four inches, and one inch thick, ASTM A588 steel. These frame angles were the heaviest section angles commercially available, still being rolled by Bethlehem Steel in 1989. The frame angles were oriented in such a way that the geometry prevented the frame from "falling into" the wall. Four twelve-inch wide by one-inch thick by two feet and six inches long "straps"

were welded to the angle iron frame, using four enormous anchor bolts to anchor the entire frame into the wall to prevent the frame from being pulled from the wall. The four anchor bolts for the four "straps" are Type Three, ASTM A490, 1½ inches in diameter by 17½ inches long, prepared for grouting into holes to be drilled into the wall. My calculations showed that the strength of the frame approximated the strength of the wall itself at that location. If rioting prisoners had commandeered earth-moving equipment and heavy chains to pull the frame out of the wall, one would literally have to pull down the wall itself.

Regarding the two doors designed to be slammed shut and the two end panels, they were <u>not</u> a simple carbon steel; they were things of alloy steel beauty! The horizontal flat bars were 2½ inches wide by 5/8 inch thick, and the vertical round bars are 3/4 of an inch in diameter, but they were alloy steel, heat treated (quenched, tempered and stress relieved) to develop a yield strength of at least 100,000 psi and a Bhn of 300. [These numbers are almost tool steel numbers! I mention in passing that even back in 1989, it was next to impossible to find an American manufacturer of specialty steels; waivers for foreign-made steels had to be obtained.] The lock protection panels were ASTM A514 (T-1, Type A) with a 100,000 psi yield strength. The welding electrodes were matched according to A.W.S. standards. Four Folger Adam ball bearing prison hinges were specified for each of the two doors, along with a Folger Adam "slam gate" lock. [Folger Adam makes the best of the best prison hardware.]

I recognized and articulated how this new main gate was

over-designed, but it was exactly what was wanted by the prison officials: they loved their new main gate design because it also conveyed a psychological impression of being very strong.

From November 7, 1990 to January 20, 1997, I was employed as New Product Designer for Correctional Industries. In 1991, when it came time to actually built the new main gate, in an ironic twist of fate, I became the person to personally fabricate the two end panels and two bar-type doors. Billy Mac did the skilled welding.

Having designed the end panels and doors from alloy steel, I had to use every method and trick that I knew to keep the darn things from twisting up like pretzels when they were being welded together. I had specified that at every single place where a round bar passes through a flat bar, it would be a welded joint. I could barely find a drill hard enough and tough enough to drill the hundreds of holes through the flat bars, but I got the job done. At every joint, I used a 45 degree reamer to reverse-fillet-cut to prepare each joint. When I had all the flat bars and all the round bars cut to length and all the joints prepared, I designed and fabricated two different sizes of rotisseries: one for the end panels and one for the doors. The alloy steel bars could be assembled and clamped into position on the rotisseries before welding began. The rotisseries allowed for rotation of the work during the welding, making it possible to work in alternating locations to minimize the heat build up (and heat distortion) during welding. The two panels and two doors finished perfectly flat and square.

When the heavy frame was being installed in the opening in the

wall, it was so heavy that a forklift had to be used to position it into place before it could be field welded together. One of the "brown shirt" maintenance supervisors coined the term "Big Bertha" for the frame as it was being installed. For those not familiar with it, the term "Big Bertha" was also applied to name the largest monster blast furnace USS ever installed (at Duquesne Works).

To add to layers of irony about my having been forced to design the new main gate to Western, on August 30, 1991, Laurence J. Reid, who was one of the key officials who had ordered me to design the main gate because "everyone knows you are capable of doing it" when he was then Executive Deputy Commissioner of the Pennsylvania Department of Corrections, he wrote to me refusing to allow me to personally appear before the State Registration Board for Professional Engineers to allow me to try to convince the Board to allow me to sit for the Professional Engineer (PE) examination.

Then, to add insult to injury, after there was a tunneling escape from Western, on January 20, 1997, I was told that "inmate has a working knowledge of the institution from working in the maintenance department," and I was transferred out of Western into SCI-Somerset.

(the end)

COMMONWEALTH OF PENNSYLVANIA

DEPARTMENT OF STATE

BUREAU OF PROFESSIONAL AND OCCUPATIONAL AFFAIRS

STATE REGISTRATION BOARD FOR PROFESSIONAL ENGINEERS

TO ALL TO WHOM THESE PRESENTS SHALL COME GREETINGS

JOHN MINARIK

Know ye that the above-named individual, having submitted satisfactory evidence as to character, technical training or practical experience and all other matters required by law and in accordance with the provisions of the Act of the General Assembly approved May 23, 1945, is granted this certificate of

ENGINEER-IN-TRAINING

in witness whereof, we, the undersigned, have hereunto set our hands and caused the signature of the Commissioner of Professional and Occupational Affairs to be affixed this date: OCTOBER 31, 1987

Raymond M. Best
Raymond M. Best
President of the Board

George L. Shevlin
George L. Shevlin
Commissioner