Runkle Consulting, Inc.

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George W Runkle III, PE, CEO and Founder of Runkle Consulting with GW Runkle IV, Business Development Manager circa 1985.

Groundhog Day

February can seem endless. So, in honor of the 1993 Bill Murray film "Groundhog Day" where the character experiences the same February 2nd several thousand times, we are taking a break from our normal topics to go back in time.

In this issue, George W Runkle III, PE, discusses what working for an engineering firm entailed in 1987 when he became a licensed Professional Engineer. He concludes that it would be impossible for Runkle Consulting to function in in 1987 with only 4 employees, much less accomplish even a small percent of the work we do in 2024.

1987 and Now - How Things Have Changed

In a discussion in my office, it came up that I obtained my professional engineering license in 1987 (in New Jersey), and a discussion ensued on how things have changed since then. It was suggested that this would make a great newsletter article, so here we go. I'm going to divide the article in two parts, Administrative and Engineering. The administrative part will cover how things have changed in offices in general, and engineering how we've changed how we do engineering.

In 1987 I worked in three locations. The first one was the Air National Guard Support Center (ANGSC) at Andrews AFB, MD. I had taken an Air Force active-duty tour there to manage three construction projects. After I completed that tour, I took a job in the DC area with a very large engineering firm that no longer exists. I left for a very small engineering firm that is now a very large engineering firm. So, I got a good exposure on how technology was changing and was applied and misapplied.

Administrative

In 1987 personal computers were starting to reach critical mass. Compared to today, the PC's back then were a lot harder to use, you were stuck with one program running at a time (which Windows 1.0 and some other programs that existed at the time tried to remedy), although it was pretty obvious that they could revolutionize office productivity.

We were still using typewriters back then, but less and less. Larger companies still used dedicated word processors, which were difficult to use and expensive. In the Government, we were going to PC's very quickly. This was helpful, since we were always short of administrative help in the Government, and with a PC, you could do a lot of stuff without a secretary.

In 1987 we kept paper files, which made finding documents a bit difficult. It was easy to lose stuff if someone didn't file the document, or if it was taken out of the file and not replaced. We still had floppy disks, and we kept some stuff on them. The disks could easily be destroyed or go bad. Backing them up was not an easy task. Hard drives were out, but they were expensive. Since networking wasn't a thing back then, it was easier to keep all your stuff on floppy disks, that way you could hand them off to others easily.

In the Air Guard, we had a mainframe that had central files, e-mail, word processing, a database, and spreadsheets. The e-mail was used mainly to announce retirement luncheons, and it only communicated inside the building, there was no Internet connection. The other software was hard to use. The central file storage was difficult to understand. However, this was the beginning of what we would see with networks,

and the Internet, we had just started the journey.

In short, offices were running in a way that wasn't much different to what they had for the past 50 years. Technology had appeared, but it hadn't reached any kind of maturity in its development, or how it would be implemented.

Engineering

Without a doubt, the biggest change that has come to engineering and architecture is the use of Computer Aided Drafting (CAD). For the most part in 1987, CAD just wasn't used. We didn't have it in the Air National Guard yet, all our drafting was done by hand. I didn't see any drawings done with CAD by any of our consultants, everything was done with either pencil or ink.

The mega engineering firm I worked for did have an Intergraph machine. Intergraph was a minicomputer-based CAD system that was insanely expensive. Highway departments, the Army Corps of Engineers, and other large agencies and companies were using this system. We had to run the system 24 hours a day to make it pay off. Internal pricing for drafting was $70 and hour compared to hand drafting at $30 and hour for hand drafting. Drawing with it was no faster than by hand. Since your drafting might be done on the midnight shift, there was often no way to communicate with the CAD operator while they were doing your job. In short, it was totally uneconomical to use the system.

PC based CAD had been out for a few years, and it was much cheaper than getting the Intergraph type system. AutoCAD was the leading vendor, and still is. You could set up a workstation with the software, computer, and plotter for about $10,000, which adjusted for inflation is expensive compared to costs now, but it still was affordable. The small company I went to had an AutoCAD system, and it worked quite well. The technology was there for converting to an affordable CAD system, but it took years to happen.

I didn't see a big changeover to CAD until the mid-nineties, and it then it seemed to happen overnight. I was back in the Air National Guard at that time up in Pittsburgh. For us it took that long to convince the decision-making powers that it was a good idea to put out $10,000 (the cost stayed the same, so with inflation adjustments it dropped) for CAD.

Today, we've gone to using 3d design software, which is also called "Building Information Management" (BIM) – Revit. Revit is another product by Autodesk, which publishes AutoCAD. Revit is relatively expensive, but it has revolutionized our design process since we can produce exceedingly realistic 3d design drawings in very little time.

Another step forward from 1987 are pdf files. We don't generate physical drawings anymore; everything gets output to pdf files, and we send them to our clients electronically. This really has revolutionized how we operate. Reproducing drawings took time, and always seemed to have to be done at 5:00 PM to make a deadline. Government agencies such as building permit offices often wanted original signatures on drawings, so you then got to hand sign pages and pages of documents. Then you had to get a courier, or if you were lucky enough to have a few more hours, you could use FEDEX to get your drawings to the client.

Along with CAD, we've changed a lot with how we do our calculations. In 1987 there

were engineering programs out there, we used a coordinate geometry program at the large engineering firm I worked for to check layouts of lots and buildings, and at the small engineering firm we had a few geotechnical engineering programs. The software was rather difficult to use, but it allowed us to do calculations that would be impossible by hand. Still, most of the calculations I saw were done by hand, and it was a tedious process prone to errors. If you had to make design changes, you got to go through all the calculations all over again. It wasn't fun, and it could really eat up project time.

Today almost all of our design calculations are done on the computer. Even my "hand" calculations are done by the computer using programs such as Mathcad or Excel spreadsheets. The advantage of the computer is it does not make mistakes. The disadvantage of the computer is it multiplies the mistakes humans make using it. If you have a computer program with an error in how it was coded, or the data put into it, the problem can present itself over many projects making the problem all that more severe.

Culture

In 1987 you wore a tie to the office. In the Air National Guard I would wear "fatigues" to work, which didn't go over too well. Most people wore their "blues", I went with the fatigues because I was on construction sites almost all day. At the small engineering firm I went to work for, I would wear jeans to work along with a dress shirt and tie on days I was out in the field. Otherwise, it was ties, dress pants, and sports jackets to work. Today I go to work in jeans and a t-shirt, and shorts in the summer. If I am meeting clients or going to professional society meetings, I'll wear a sports shirt and khakis. I'm not sure when I wore a tie last.

We didn't work at home. I did know people that worked from their homes, mostly salespeople. Today, in our office we work a couple of days a week from home, and that seems to be the norm with people I've met. With technology, there really is no reason to be in the office every day. COVID really hastened that along.

Back in 1987 we seemed to have endless in-person meetings that were boring, wasted time, and could be extremely stressful. Today we do the same thing remotely, instead of sitting in a conference room, you can get bored, frustrated, and stressed out from the comfort of your own home.

So, since 1987 a lot of stuff has changed. I would say for me, there are two results of the changes:

First, I can run a small firm with very few people I don't need people to draft, and I don't need administrative help. That allows me to function very lean. The second is technology that has developed makes my geographic location less important. We're working on projects across the country which would be unheard of with a firm our size in 1987.

I do complain that due to technology, I can't get away.**No matter where I go, someone can reach me**. I remember being in a train museum in Roanoke, VA and having to stop and answer questions from a client on an urgent matter. On the other hand, my father (who had a firm a bit larger than mine), couldn't get away. He would not have been able to go to that train museum because he had to be available in the office to deal with urgent matters that would inevitably come up. So, ultimately, I think the changes in technology since 1987 have made things better.
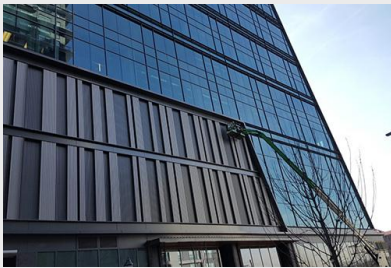
Structural Engineers

Runkle Consulting was founded in 2000 by George W. Runkle III, PE, SE. We provide structural design for structures fabricated from shipping containers, the structural design for building cladding, and forensic engineering services.

Contact Us

What We Do

Building Cladding

We have 15 years of experience in the structural engineering of exterior building panels, store fronts, and curtain walls for commercial and government buildings.

Shipping Container Buildings

We provide design services for the design of buildings fabricated from repurposed shipping containers. Our services include the complete design package, architectural, structural, and MEP. Depending on the area, we may be able to help you find a fabricator to provide the containers.

Cold Formed Steel Design

We have extensive experience in cold formed steel design. We can provide structural design services and shop drawings for your project.

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