Mentoring in the Engineering Profession

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Mentoring in the Engineering Profession, Introduction

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Mentoring - What Is It?

Mentoring is a common buzz word in the current field of training and professional development. Most people believe it is a desirable activity that should be encouraged and done more often. Those who provide training programs for companies and organizations often boast in their promotional literature that they will facilitate mentoring activities. In spite of all the current focus on this issue, there is a surprising lack of information about precisely what constitutes mentoring. Even more discouraging, my experience suggests that what people write about on this subject, and what training organizations suggest they can deliver, simply does not work. At a minimum, it is inconsistent with my experience in mentoring. Rather than debate the issue, three of my colleagues and I will each offer a personal perspective on how mentoring can be performed in the engineering profession, the benefits that can be achieved, and how this activity can be encouraged.

HOW DID IT BEGIN?

The word "mentor" comes to us from Greek mythology. Mentor was the name of the friend to whom Odysseus entrusted the education of his son, Telemachus. According to the *American Heritage Dictionary* (Second College Edition), the word's meaning today is "a wise and trusted counselor or teacher."

Defining Our Terms

Mentoring is a relationship between two people.

The core of the mentoring process is the relationship between the mentor and the protégé. There must be a unique chemistry and desire on the part of both individuals for the process to work. I doubt that this type of relationship can ever be forced to occur. Corporate management cannot create these relationships. The mentoring relationship is based upon respect, trust, and a mutually shared objective or goal.

Either person may initiate the process.

The relationship generally is initiated by one of the two individuals involved. Out of admiration and respect for the mentor, the protégé may attempt to initiate the relationship. The more common approach, however, is for the mentor to seek out a protégé who will be capable of carrying on the mentor's work.

A common goal is shared.

The mentor and the protégé share a common goal: A desire for the transference of knowledge and experience. The mentor is willing to give — and the protégé must be equally willing to receive. The mentoring relationship will be successful when this has been accomplished. The mentor will ultimately view the success of the protégé as an extension of his own. Whatever success the protégé experiences, that person will always consider it a direct reflection upon his or her mentor.

The wisdom transferred is prized.

Both the mentor and the protégé recognize that what is being conveyed through the mentoring process is more than just information. Both individuals, and the protégé in particular, must regard the wisdom and skill being offered by the mentor as a highly prized treasure that is being entrusted to the protégé.

Mentoring is a long-term process.

Mentoring relationships generally last several years. The process is gradual, probably due in part to the fact that it is so personal. The protégé must earn the mentor's trust, and the relationship will go through a trial phase before the mentoring process truly begins. Years of experience are being transferred in the mentoring process, and they will not be immediately assimilated by the protégé.

Most mentors will have just one protégé.

The mentor generally counsels and teaches just one individual who will carry on aspects of the mentor's life work. While there may be exceptions to this rule, a relationship representing such a unique commitment usually occurs just once in a lifetime.

The protégé eventually will become a mentor.

As soon as the protégé has assimilated the knowledge and experience of the mentor, and particularly as he/she begins to replace the mentor as the daily practitioner of the skills that have been transferred, the protégé will begin to think about being a mentor. After all, this individual has received the gift of knowledge from another, and this gift constitutes a heritage that must be passed along to another individual who will carry the expertise forward.

My understanding of the mentoring process is heavily influenced by my personal experiences, which are described in Part I of this series. In attempting to learn about the subject from other authors, I came across an article by Mr. Neil Blunt who suggests that mentoring may take many different forms. According to Blunt, writing in the May 31, 1995 issue of *People Management* magazine, "There may be a case for collecting a sample of 'mentoring tales' to gather for publication, in an attempt to encourage a wider audience to see mentoring in a desirable and realistic light." At the 1996 AISC National Steel Construction Conference, Dr. Leroy Z. Emkin of Georgia Tech argued for an increase in mentoring, so that the experiences of older generations can be transferred to the next. This series of articles is our attempt to support such efforts.

Mentoring in the Engineering Profession, Part I of IV

"On the Shoulders of Giants"

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Omer Blodgett in 1956, the year Duane Miller was born.

Meeting My Mentor

I studied welding engineering at LeTourneau University. The text for the welding design course was (naturally) Blodgett's *Design of Welded Structures*. During my senior year, Omer W. Blodgett and his wife Dorothy visited LeTourneau University where he was the scheduled speaker for a meeting of the AWS Student Chapter. As Chapter Chairman, I had the privilege of sharing dinner with Mr. and Mrs. Blodgett. To be able to share a meal and dinner conversation with this "larger-than-life" individual was a truly moving experience.

I was overwhelmed as he presented principles of weld design, followed by application after application that recounted his experiences in the field. "Provide a path for the load to be transferred to a member that lies parallel," "Don't over-weld," "Don't design with your heart," "Remember what you are designing for," and, "Listen to the welder" were principles that he expounded upon with experience and excellence. After stating the principles, he gave examples of how manufacturers had violated the principles, and the solutions that he had offered to overcome the design deficiencies. I was impressed! At the time, I had no way of knowing that this would be just the first of many such wonderful opportunities.

Laying the Groundwork

During this visit to campus, Mr. Blodgett met with several members of the Welding Engineering faculty and expressed to them his desire to have his employer, The Lincoln Electric Company, hire a young engineer who would eventually take over for him, since at the age of 60, he didn't know how much longer he would work. The mentor had started the search for a protégé, and the mentoring process had begun.

> **"Provide a path for the load to be transferred to a member that lies parallel."**

A few weeks later, I received an application for employment at Lincoln Electric. It seemed rather routine at the time. In reality, it was the initiation of a relationship that would become family-like in its significance.

After joining the company and completing its training program, I went into Technical Sales just as Mr. Blodgett had done. I can still hear him say, "That's where you'll really learn about welding and how it's applied. You'll meet some real geniuses out there, get to know some tremendous companies, and make a lot of friends. It will be a great education for you." And so it was. Without my knowledge, the mentor was already directing the activities of the protégé.

It would be several years before I returned to the home office and daily interaction with Mr. Blodgett. When that time did occur, however, the mentoring kicked into high gear. We began to attend conferences, committee meetings, and meet with customers together. He seemed to know everyone, and graciously introduced me as the one who would "take over for him some day." A typical response

was “Good luck ... you’ve got some big shoes to fill!” I felt inadequate then, as I do now, but Mr. Blodgett was opening doors for me — creating opportunities that would have taken me years to accomplish without him.

“Crazy Ideas”

Every experience seemed to bring a new opportunity to learn. Visits from customers who had problems that needed to be analyzed and solved were particularly revealing. The answers could not be found in textbooks — solutions had to be gleaned from the combination of engineering principles and personal experience. I observed how Mr. Blodgett approached our customers. It typically went something like this: “Hello, my name is Omer. I understand that you have a few problems, and we’ll try to help you out. We can’t guarantee anything, and you are the experts on your product, so don’t laugh at us if we have some crazy ideas.” His unassuming manner immediately put others at ease. I am sure their greatest concern was that just the opposite would occur, that is, that they would be embarrassed to discuss their problems with him. We would roll up our sleeves and tackle the problem as everybody worked toward a solution.

“We’re going to do some brainstorming here. One of the rules of brainstorming is, there are no dumb ideas,” he would say. People would relax a bit more, and share their experiences, revealing their “product failures” which sometimes were the result of their own inadequacy in engineering judgment. After pondering the application for a while, Mr. Blodgett typically would leave, returning with either a photograph, a sample of a weldment, or a written case study that directly related to the problem being considered. He would then follow the format he employed for teaching: state the principle, give examples of poor practice, and follow these with examples of good practice. Of the hundreds of customers that have visited us in search of answers, I cannot recall one situation where the individual left without a clear solution to the problem. My mentor well knew that each of these experiences was educational for me.

Attending technical committee activities was like graduate school. Indeed, through various committees, I met other authors of textbooks that I had studied in undergraduate and graduate school. There was nothing theoretical about the problems being debated at these meetings. They were real-life issues that required technical resolution, sometimes with inadequate research at the time to substantiate the requirements being imposed. However, the intuitive understanding that was expressed by these experts, and the ability to extrapolate from previous experiences, was impressive. Mr. Blodgett was the committee member, but I was invited along to observe. The mentoring process was progressing.

Career Building Opportunities

An activity Mr. Blodgett encouraged early in my career was the writing of technical papers. He urged me to submit papers to technical conferences. Public speaking wasn’t particularly challenging to me, but the idea of developing a paper seemed overwhelming. What would I say? What gave me any credibility to even present my thoughts? As I questioned him on these issues, his reply was simple: “That’s how I learned, too. Find a topic you’re interested in that would be of value to others. Research it, and put the paper together. You’ll be amazed at what you learn - I always am ...” and so I did. He was right.

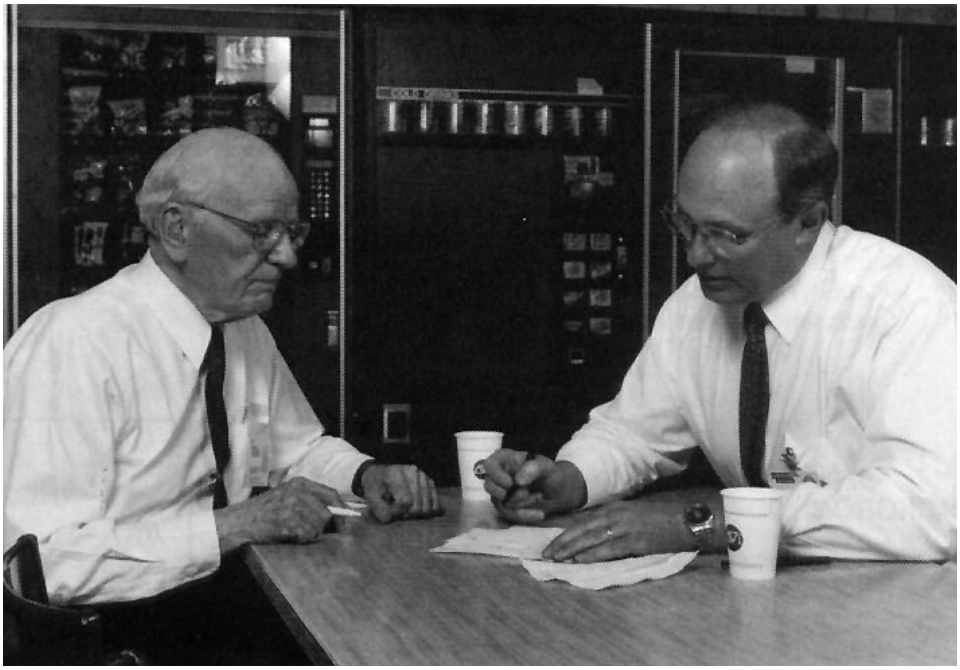
Every experience seemed to bring a new opportunity to learn.

A special time that I will always cherish is our “coffee time.” At ten o’clock each morning, Mr. Blodgett generally comes by my desk and asks if I am going to have coffee today. The answer is inevitably yes, and he and I go to the company cafeteria for coffee. The primary activity, however, is mentoring. As the coffee is consumed, napkins become the media on which sketches are made, and experiences are transferred. It may be a question posed by the protégé, or another principle that the master wishes to convey. In recent years, it is generally a problem of mutual interest that we both attempt to resolve. These are special times that I will always hold as particularly meaningful.

Timeless Principles

It would be impossible to summarize all of the principles and philosophies that Mr. Blodgett has conveyed to me, but two seem to be particularly noteworthy. As mentioned earlier, one of the recurring themes that Mr. Blodgett has always emphasized is the need to “provide a path for a force to enter into the part of a member that lies parallel to the force.” Because of the tremendous flexibility afforded by the welding process, it is possible to configure materials in a less than optimum orientation. The restrictions of a casting or forging operation, for example, limit the flexibility of the engineer with respect to the relative positioning of sections of materials. Along with this advantage of welding, however, comes a significant shortcoming: material can be oriented improperly. This causes the weld to be unevenly loaded and can lead to unexpected failures. Many fatigue problems have at their root the violation of this principle. Rather than supplying this path for load transfer, the designer may increase the surrounding section sizes, overcoming the problem, but in a less than optimum manner.

One of the current challenges in the engineering profession is to resolve the various issues that arose from the



Omer Blodgett and Duane Miller continue to enjoy and benefit from their long-standing mentoring relationship.

Northridge earthquake. One issue that admittedly has not been finally resolved is the importance of connection detailing, and the role of column stiffeners (or continuity plates) in particular. When these are supplied, the stress distribution across the length of a beam to column weld is uniform. When such devices are not supplied, the center of the length of the weld is loaded more severely than the ends of the weld. When this nonuniform stress distribution has a peak that is below the yield point, there would be no significant implications for static loads. However, due to the loads applied during an earthquake, this non-uniform distribution can result in fracture initiation in the center of the joint, propagating afterward toward the outside edges. While there are many variables that must be addressed, and still others that must be researched, Mr. Blodgett's reiteration of this basic principle, first taught to me at LeTourneau University, remains a prime lesson that I have learned from him.

Technology Transfer

Another item has to do with the conditions necessary in order to achieve ductile behavior from steel. One of the first committee activities I participated in with Mr. Blodgett was an AISC Task Group formed to help resolve the issues that arose from fractures that had occurred in welded connections

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involving jumbo sections. In those meetings, I met many leaders in the steel industry, and I was justifiably impressed with their credentials and their capabilities. One issue that was addressed dealt with the minimum size requirements for weld access holes. Ultimately, new requirements would be included as part of the AISC supplements #1 and #2, issued in 1989. The gentleman who proposed the larger minimum hole sizes, Mr. Bill Milek, formerly vice president of Research with AISC, had supplied some good, intuitive justification for these activities. That wasn't enough for Mr. Blodgett, however. Although the reasoning that had been presented seemed sound, he required a mathematical justification.

Mr. Blodgett went to work and analyzed the problem mathematically, looking into the distribution of residual stresses imposed upon the connection by the welding process. Then, having gained an understanding of the residual stress fields, he tackled the complex, triaxial stress problem with a simple Mohr's circle of stress. This dramatically illustrated the effect of access hole termination in various regions of residual stress. By showing that when access holes (which could contain workmanship defects) were terminated in regions of residual compression, the potential ductility in that region was enhanced. In order to obtain ductile behavior, the shear stress component of the load (or residual stress) must exceed the critical shear stress (that is, one-half of the uniaxial yield stress), and exceed it by a considerable margin. There must be a sufficient length of unrestrained material to permit "necking" to occur. And finally, the resultant movement that occurs must be in a direction that would relieve the applied residual stress. These are the variables that allow for ductile behavior in steel. Otherwise, it will fail due to excessive tensile loading, exhibiting little or no ductility, or deformation prior to fracture.

The information ultimately was incorporated into "Increasing Ductility of Connections," published in *The Welding Innovation Quarterly, Vol. X, No. 1, 1993*. I wish I could say I fully understood the concept at that time,

but it would be several years before I would really grasp its significance.

For the past two years, Mr., Blodgett and I have been quite involved with the investigations that have arisen out of Northridge. When unexpected failures occurred in the early testing sponsored by AISC, there was significant concern regarding why this type of behavior was being observed. Once again, Mr. Blodgett went back and examined the conditions that led to ductile behavior, the type of behavior that was sorely missing from the testing program. And, once again, when the triaxial loading conditions that were experienced in the welded connection were considered, it became apparent that ductile behavior in this particular region would be impossible. This explanation was also sufficient to provide an understanding into why some connection details were working while others were not. When I once again observed the power of this type of analysis, simplified into a Mohr's circle plot, I recognized that this is something I had to understand as fully as Mr. Blodgett did. It took several "coffee times" for me to grasp the concept, but this time (I believe) it sank in.

This analysis was recently presented in Mr. Blodgett's article "Details to Increase Ductility in SMRF Connections" in *Welding Innovation, Vol. XII, No. 2., 1995*, and has been circulated around the world with great interest. The next time there is a need to apply these principles, I hope I will be able to do so as well as Mr Blodgett has done in the past.

A Continuing Relationship

It is my great good fortune that, even at the age of 79, Mr. Blodgett continues to work part-time at The Lincoln Electric Company, and our interaction continues on a regular basis. It should be apparent that I believe in the mentoring process, and I am deeply indebted to the man who initiated this relationship, an individual who is certainly committed to the concept of mentoring. When I express my appreciation to him, his typical response is: "I stand on the shoulders of the giants who have gone before me. I'm doing no more for you than what was done for me." Perhaps that is the essence of mentoring.

Mentoring in the Engineering Profession, Part II of IV

Ensuring the Future by Preserving the Past

By Charlie Carter
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Looking for Direction

It seems that you have to know where you are going in order to get there. Benjamin Braddock, Dustin Hoffman's character in *The Graduate*, had more input than he could deal with, including that now-famous one-word directive: "Plastics." A few years back, when I was looking forward to graduation and that all-important first job, I lacked such definitive career advice. It seemed I would be destined to spend some time working in a structural engineering consulting office—a fairly typical first position—until I figured out what I really wanted to do. How quickly things changed!

Charlie Carter, protégé.

I first met Jerry Haaijer when I was a graduate student at Penn State in 1991. Then vice president of technology and research at the American Institute of Steel Construction in Chicago, he had come to State College, Pennsylvania, to speak about new technologies in steel design and construction. Lou Geschwindner, professor of architectural engineering and my advisor, had made the arrangements for the presentation. However, due to a class conflict, he asked me to attend the talk in case Mr. Haaijer needed any assistance. Although I didn't have to do anything but listen, my attendance was rewarded with an invitation to lunch—something no starving graduate student in his right mind would turn down.

As might be expected, steel was the main topic of conversation, along with occasional exchanges about some of the friends and acquaintances my lunch partners had in common. Through it all, I hardly said a word, but I did manage to mention possible

Jerry gave me more than just a job. He gave me a purpose.

directions for my master's thesis, which was leaning more and more toward something in the general area of steel connection design.

About five months later—to my surprise—Jerry called me while visiting his daughter, who, coincidentally, also lived in State College. He wanted to know what progress I had made in defining and developing my thesis—thank God I had actually made some!

Jerry Haaijer, mentor.

Our discussion led to another lunch, lunch led to a job interview, and eventually, I was offered an engineering position at AISC.

Trust and Respect

Early on, I learned that Jerry was genuine, open, and completely honest by nature. Good jobs were scarce in the early nineties, and few good leads had materialized. So after my interview, I called Jerry to find out if, in fact, he would offer me a job. At the time, I was somewhat unnerved to hear that he was "trying to work it out."

Jerry explained that he planned to hire two engineers, the first of whom would have to have steel fabrication experience. Only then could he justify hiring me, a soon-to-be graduate with no experience.

Initially, it sounded like a brush-off. But characteristically, Jerry did exactly what he said he would. From then on, I took him at his word. The fact that he never once let me down led to my eternally high respect for him.

A Man with a Vision

Jerry gave me more than just a job. He gave me a purpose.

He explained that AISC had come to be staffed in large part by engineers who were approaching retirement. Somebody had to acquire all the knowledge these senior engineers had accumulated. The "young blood" would be an investment in AISC's future. Jerry's challenge to me was as clear as if he had said just one word: "Steel."

I assumed from the interest Jerry took in me that he trusted and respected me as I did him. As a result, I was motivated to work hard for him, to try to be innovative, to use my outsider's viewpoint as an advantage, and to seek success.

To a certain extent, those goals have been attained. Along the way, I've also made some classic mistakes. But I've learned a great deal in the process, as I'm sure Jerry knew I would.

The Right Chemistry

In retrospect, our mentor-protégé relationship developed quite rapidly. We never called it that; we just seemed to interact in our working relationship as friends would. Of course he was my boss, but that seemed to me to be mostly a formality. I strongly suspect that he felt the same way.

We made it a habit to eat lunch together. He was interested in how I was adjusting to the Midwest, in how my fiancée's job search was going, and how our wedding plans were taking shape. I enjoyed hearing stories about his children, his years with U.S. Steel, and how things worked (and didn't) at AISC.

We shared a similar sense of humor, although at first I didn't know it. Jerry would almost never laugh out loud, which I've been told is somewhat characteristic of Dutchmen. If he cracked a smile, he was amused; any audible laughter was the equivalent of my belly laugh.

Naturally, we also talked about more work-related issues. Jerry's more than forty years of engineering experience was fascinating to me because he could recount fine details as though they had happened yesterday. It seemed to me that Jerry was closely involved in, if not directly responsible for, most of the important steel industry developments of the past quarter century. His knowledge was impressive, but it was his ability to express complex ideas in plain language that struck a chord with me.

Once we discussed the design of the liquid-filled exterior columns that formed the fire protection system of the U.S. Steel building in Pittsburgh. He described this complex system as one big boiler calculation with some circulating pipe flow, an expansion tank, and antifreeze thrown in. I soon came to realize why this man had become the chief engineer of the fabricated structural steel industry.

A Teacher at Heart

Initially, my long-range career goals had included teaching at the university level, but only after I had gained some professional experience. Naturally, then, I was most interested to discover that Jerry had contemplated a teaching career. After earning his doctorate at Lehigh University, he considered becoming a college professor, but took a job at U.S. Steel "because it paid better." Soon, four children had arrived. Jerry's wife Willy once confided, "He still wanted to become a professor, but could never have afforded to!"

it was his ability to express complex ideas in plain language that struck a chord with me.

By the time he retired after twenty-seven years, Jerry had built the U.S. Steel Research Laboratory from the ground up, hiring many of the young engineers who have become the industry leaders of today. Along the way, he found time to teach courses part time in mathematics, elasticity, plasticity, matrix analysis and advanced metal design at Carnegie-Mellon University in Pittsburgh. He joked that his math course came to be known as "Haaijer" mathematics (the name is pronounced "higher.")

Jerry's knowledge of steel as a construction material was amazingly broad-based. Fortunately, he found the time to share some of it with me.

I found that Jerry seldom gave a direct answer to any engineering question. Whether it was the result of conscious effort or simply a character trait, he always included a discussion of the history behind the issue at hand. Often, our discussions would digress to related issues, some of which it didn't immediately occur to me were related. I gained insight into things that had happened decades before I was even born.

His method was effective: tell as little as possible while providing the knowledge from which an independent conclusion could be drawn, then talk about the conclusion, right or wrong. The teacher taught far more than the subject; he taught the very process of learning.

Confidence Building

My office and phone number at AISC were coincidentally those that had been vacated by Bob Disque, an AISC legend who had retired only a few months before I started on the job. I didn't know Bob personally at the time, but I did know that he had spent forty-some years at AISC. As a result, he knew without hesitation how to answer most questions asked of the organization.

After fielding a few of his phone calls, I worried that because I didn't know

how to respond right off the top of my head, I shouldn't be taking those calls. After all, who was I to answer such questions?

Jerry pointed out that if the callers knew the answers, they wouldn't be calling. Suddenly it was clear that "I don't know, but I'll find out and call you back," was an acceptable response. What's more, by digging into the problem, I would learn about the everyday problems that engineers and steel fabricators face, and about their potential solutions. In retrospect, these simple phone calls have been my most reliable source of professional development.

Choosing a Niche

I suspect that the best advice Jerry ever gave me was to make a niche for myself and focus my efforts on that area. Steel connections became my niche, perhaps because of initial interest from my master's thesis or possibly because most of the phone calls I fielded were steel connection related. Whatever the reason, I was ready to focus my efforts.

In an ideal world, every motivated young engineer would be able to participate in the activities of the groups that shape the future of the engineering profession, even if only for the transfer of knowledge. In the real world, becoming involved and being accepted as a contributor is not so straightforward. But with a little push...

Jerry took the "sink or swim" approach when he assigned me to work with the AISC Committee on Manuals, Textbooks, and Codes, a volunteer group of fabricators and structural engineers responsible, among other things, for the ongoing development of the AISC Manual of Steel

The teacher taught far more than the subject; he taught the very process of learning.

Construction. He introduced me to a room full of distinguished engineers as the resource person responsible for supporting their activities.

Happily, I swam. And what a positive experience it has been for me. Where else could I sit down with top-flight fabricator engineers and design engineers a few times a year and learn from their collective front-line experience?

Since that time, I have become actively involved with other groups: the Research Council on Structural Connections (RCSC); the SAC joint venture, which seeks to identify economical moment connection details for seismic steel design; and a handful of ASCE committees. Each activity offers the chance to get involved, improve upon the current knowledge base, and learn along the way. Paradoxically, it was specialization that afforded me such broad opportunities.

Building a Future

More and more, Jerry talked about retiring, and even bought some land on which to build a house and do so. But he didn't seem to be in any rush, so I looked forward to the comfort of his friendship and guidance for at least a few more years.

But again, how quickly things change. Jerry's unexpected death in 1994 cut my time with him to a bit less than three years—a comparatively short period as mentoring relationships go. Certainly not enough time for me learn everything he had to teach. Nonetheless, I know that his influence on me will be lifelong.

From Jerry's many stories, I came to understand the magnitude of the contributions others had made in their careers at AISC. Staggering progress when one thinks about it. I soon knew that this was something to which I wanted to make a long-term commitment.

I hope everything I am able to accomplish will be considered a credit to Jerry Haaijer. And someday, I hope to have the effect on someone else that he had on me, both as an engineer, and as a person. 

"Big Shoes to Fill"

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Remembering Johnny Griffiths

In October 1995, the engineering community lost a unique individual when John D. Griffiths, P.E., passed away. His contributions to the profession cannot be measured by the papers he wrote, nor by the number of times he

Mark Holland, protégé.

spoke, nor even by his role in helping to develop the modern format of the latest A.I.S.C. Specifications and Manuals. John's greatest contribution was his passion for his life's work during a career that spanned more than five decades.

He came from an age when an engineer would sign in at a hotel and proudly write "P.E." after his name. It always saddened him to see engineers use disclaimers and approver notes in an attempt to dilute their responsibility. John was often annoyed by engineers who tried to over-complicate the behavior of steel. One of his favorite gambits was to ask them to explain, through examples, how adding stiffness to a frame could cause it to collapse. His insight into the behavior of steel would have been invaluable to the engineering community in today's post-Northridge environment.

Our Initial Meeting

When I first met Johnny Griffiths, I was a graduate student at the University of Oklahoma working on a research project sponsored by the American Institute of Steel Construction. Certainly, I had no idea that this was the man who, more than any other, would influence the course of my professional life. At the time, John was chairman of the A.I.S.C. research project, which focused on bolted moment end plates, a particular interest of his. He was also vice president of engineering at the Paxton & Vierling Steel Company of Omaha, Nebraska.

The next time I saw John was when my thesis advisor, Tom Murray, and I were traveling through Omaha on a research-related business trip. We stopped in to see John at Paxton & Vierling Steel, and Tom mentioned that I was looking for a job. John casually suggested that I submit a resume, which I subsequently did. It did not really occur to me then that Johnny Griffiths and Paxton & Vierling Steel had very specific plans for me.

John D. Griffiths, mentor.

Big Shoes

I was hired by Bob Owen (who was John's boss and is still my boss) and charged with working to the point where I would someday fill John Griffiths' shoes. At first, I did not really understand the scope of that expectation. However, as John took me around Omaha and Sioux City, introducing me to his colleagues in the engineering profession as "the young man I am training to fill my shoes," it began to dawn on me. Time and time again, I was told "You've got big shoes to fill!"

John's position at the time was in the engineering-marketing area of Paxton & Vierling. He was expected to be something of a tutor, or engineering guru, for everybody in the area—the guy that everyone could go to with the tough questions. Yet he also had to talk to the general public and educate people about engineering and connection design.

When I read the first article in this series, authored by Duane Miller, I was struck by the parallels between our relationships with our respective mentors, John in my case, and Omer Blodgett in Duane's. Something that Duane and I have always shared is that we stand in the shadows of these great men. When Omer and John searched for their protégés, both of them were looking for the kind of person who could be very theoretical, and at the same time be capable of taking a complicated problem and explaining

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it to people from any walk of life in a clear way. John was a master at this, and Omer is, as well.

Another thing that John and Omer had in common was the fact that both of them worked long past the usual retirement age. In John's case, it was because he could not find the right person to fill his role. At the time of my arrival at Paxton & Vierling in 1983, John was 74, and he had already retired twice, but the people hired to replace him had not worked out, so each time, he had returned to his position.

Priceless Lessons

Once I started working at Paxton & Vierling, Bob Owen made it clear that my time with John was to be my first priority. I am still grateful to Bob for that, because the insights and knowledge I gained were priceless.

Perhaps few us of know what we're getting into when we accept a new job. I had no idea! As the weeks and months went by, I began to get frightened. People expected me to know the kinds of things Johnny Griffiths knew, and of course he had more than forty years of experience in the industry. Furthermore, John's thirst for knowledge never ended. So I realized I would have to develop that same thirst just to keep up with his constant acquisition of new knowledge.

John's and my routine echoed the meetings over morning coffee that Duane described in his article about Omer Blodgett. As in their situation, what looked like a coffee break was really more of a classroom...an advanced course in not only the technical fine points of connection design (though plenty of those were dispensed), but also in how procedures and specifications had been developed: the process, the politics and the philosophy behind their development... the actual business of how work gets done. John was personal friends with people I had only read about in textbooks.

He was a very, very proper man. If I spoke in an unprofessional way, he would correct me, and correct me, and

As the best teachers do, John taught by example.

correct me again. I wasn't just getting technical tutoring, I was being trained in how to sit across a table from some-

The John D. Griffiths Memorial Scholarship Fund

The family, friends and colleagues of John Griffiths have established the John D. Griffiths Memorial Scholarship Fund at the University of Nebraska. The scholarship fund is intended to preserve and honor the memory of a great engineer by helping to support the education of qualified students with an interest in structural engineering.

Born July 8, 1909, in Takoma Park, Maryland, Mr. Griffiths graduated from the University of Cincinnati with a degree in civil engineering in 1934. After college, he worked in a variety of engineering capacities before serving in the Navy during World War II from 1942 to 1946, ending his naval service as commander of the Civil Engineering Corps.

In a career that spanned five decades, Mr. Griffiths progressed from being one of the original American Institute of Steel Construction regional engineers to eventually become vice president of engineering at Paxton & Vierling Steel Company. He published many papers and two books: *Single Span Rigid Frames in Steel* (A.I.S.C.) and *Multiple Span Gable Frames* (A.S.C.E. Transactions). Throughout his working life, he endeavored to raise the standard of professionalism within his industry, while constantly encouraging young engineers to maximize their potential.

Graduate student Lamont Epp of Lincoln, Nebraska, was named the first recipient of the John D. Griffiths Memorial Scholarship for the academic year 1996-97, and Mr. Epp's scholarship award has been renewed for 1997-98.

Those wishing to contribute to the John D. Griffiths Memorial Scholarship Fund at the University of Nebraska are asked to contact John Erickson, University of Nebraska Foundation, 8712 West Dodge, Suite 402, Omaha, Nebraska 68114-3434.

one and communicate clearly and professionally. It turned out John's mother had been an English professor, and his wife was an English major. I remember the first time I worked for him on putting together a presentation. He gave me a list of materials to gather, including everything from extra light bulbs for the slide projector, to tape to cover the electrical cords. John left nothing to chance when it came to professionalism.

John always made sure that I could arrive at the answer by doing the problem correctly, and then he would show me the easy way.

As the best teachers do, John taught by example. I noticed that he never dominated at the beginning of a conversation. Like a chess player, he would quietly listen to the conversation, letting others talk and define their positions. Then, at the appropriate time, he would use the information he had gained during the conversation to explain his position and persuade the others to his way of thinking.

"Always define the problem before you try to solve it," John would challenge me before I tackled any issue. He stressed that as engineers, we should answer only the questions we know the answers to, and research the rest. He emphasized that engineers have an obligation to be honest about what we know, and to find out about what we don't know. Even in the twilight of his career, John was always eager to learn, and he inspired in me that same hunger for learning.

Even with all of his knowledge, John had great respect for those working in other aspects of steel construction. He told me that I could learn more in one week working with a detailer than in a whole semester of an engineering course. When I first started with Paxton & Vierling Steel, he put me into the shop and made sure that I worked with the saltiest old fellow there, who also happened to be the most experienced fitter. This exposed me to a great knowledge base of just how things go together.

John was really good at giving me problems to solve. I would spend days working on one of these problems, come up with an answer that I thought was correct, and finally present it to him. He would look at it, perform some really quick, dirty calculations, and arrive at almost the same answer. And then he would say "Here are the rules of thumb that will get you to the quick answer." As a fabricator's engineer, one has to be able to get to the answers quickly. But John always made sure that I could arrive at the answer by doing the problem correctly, and then he would show me the easy way.

I remember once having to compute the shear center of an odd shape. After several hours and many pages of triple integrals, I proudly showed John my work. True to form, with only a few lines of simple calculations, he approximated my answer more closely than any shop tolerance would require. What the steel industry will miss, with the passing of John and of engineers like him, is this practical, accurate and simple understanding of the behavior of steel.

Mentoring in the Engineering Profession
Part IV of IV

Passing It On...

By Jeffrey W. Post, P.E.
J.W. Post & Associates, Inc.
Humble, Texas

Ray Stitt and I first met at an American Welding Society D1.1 Code meeting in Atlanta in 1977. It was my first code meeting attendance. At that point, he was 70 years old, but still very active and regularly attending AWS meetings. I remember that he struck me as one of the old-timers, amongst many old-timers. In those days, the committee was much smaller than it is now.

Ray Stitt, mentor, and Jeff Post.

Show and Tell

Every time I saw him at a code meeting, Mr. Stitt would reach into his pocket and take out a packet or two of snapshots of his latest flame straightening job. He was always eager to show them to people, and to explain the techniques and challenges of a particular project. Over the years, I began to look forward to these "show and tell" sessions, and perhaps I expressed a little more interest than some of the others. My only hands-on exposure to flame straightening up to that point had been the experience of cambering a couple of bridge beams, and at the time, I hadn't really understood the principles behind the work.

Ray Stitt had retired from R.C. Mahon in Detroit, but was very active as an independent consultant by the time I met him. Part of our initial camaraderie may have stemmed from the fact that I was a 1966 graduate of Ohio State's welding engineering program, which he actually had started in 1938, with some help from The James F. Lincoln Arc Welding Foundation.

Our relationship grew very gradually. Perhaps he was consciously looking for someone to whom he could pass on his vast store of knowledge, but if that was the case, I certainly was not aware of it at the time. I do know he recognized that I was interested in doing hands-on work; such an interest would be essential for any protégé of his. So during the years from 1977 until 1985, I looked forward to the semi-annual code meetings, and Ray Stitt's latest illustrated lesson in distortion control.

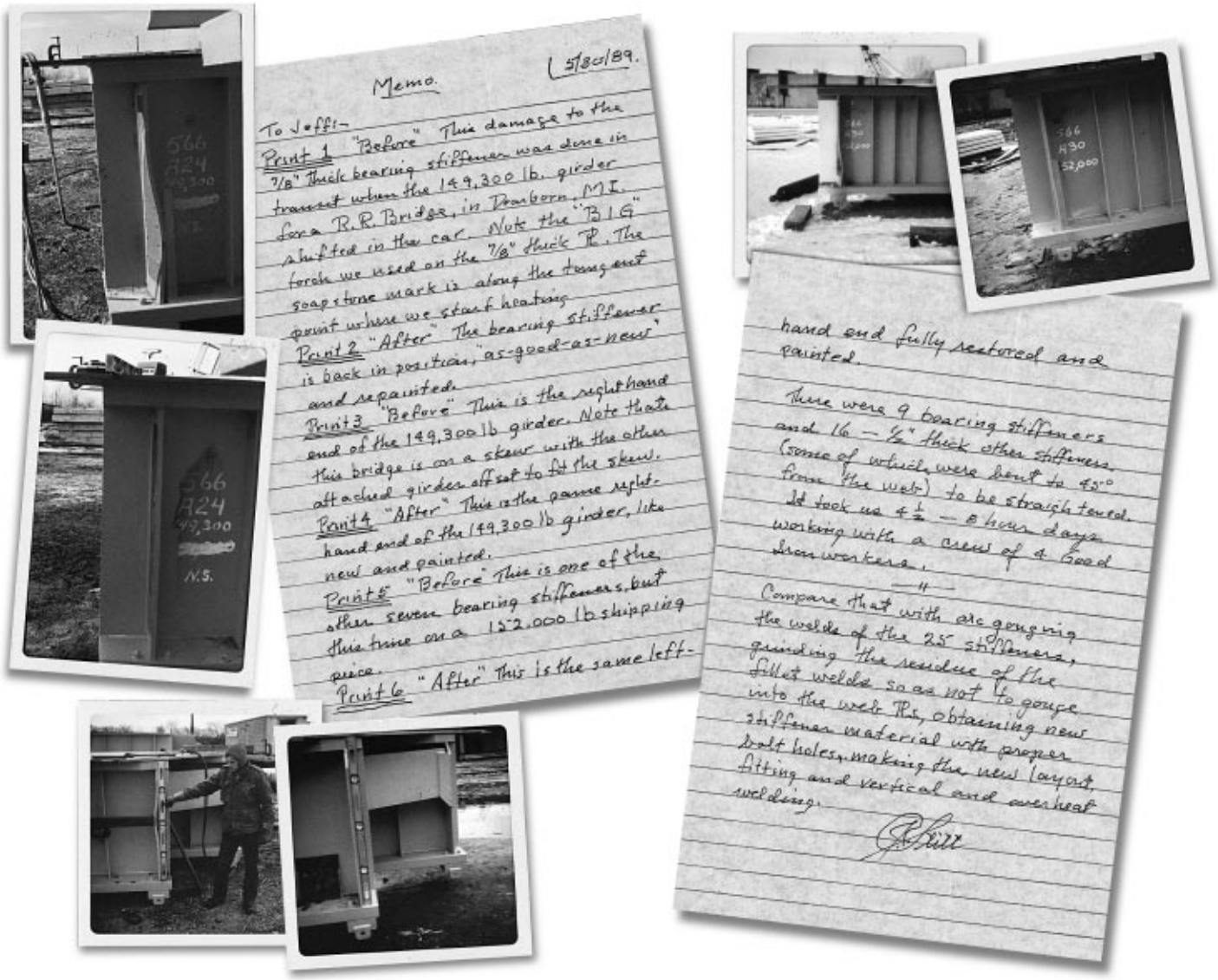
Mentoring by Phone

In 1985, a colleague in Houston asked me to try to straighten a bridge girder in his shop. My long distance call asking for Mr. Stitt's help and advice turned out to be the first of many I would make over the ensuing nine years. After that first job in ,85, with my mentor's recommendation, I bought my first torch and the necessary accessories. I went to a local shop, gathered some scrap material, and started to practice. Then I would telephone Mr. Stitt, and we would talk about what I had seen, and what I had measured.

Perhaps he was consciously looking for someone to whom he could pass on his vast store of knowledge

"Jeff's Post"

Eventually, I decided to create a demonstration project. Our church needed to replace a wooden basketball goal that was falling apart. I thought, "Why not bend a piece of pipe and make a permanent fixture?" Of course, it was the most expensive possible way to hold up a basketball hoop, but I learned a lot doing it, and I still



J. Ray Stitt

Born in Youngstown, Ohio, in 1907, Ray Stitt held a B.S. in civil engineering from Penn State. His first position after graduation, as a construction field engineer for the Austin Company, led to a lifetime interest in welding and, ultimately, in his specialty area of distortion control.

In 1938, Mr. Stitt was invited to join the faculty of the Engineering College of Ohio State University to organize and teach the first complete curriculum in Welding Engineering, leading to the establishment of a Bachelor of Science degree in the field. During World War II, he worked on welding and metallurgical problems for the Office of Scientific Research and Development. In 1950, he became the first individual to register as a professional welding engineer in the State of Ohio.

From 1945 to 1971, Mr. Stitt was in charge of research and technical service at the R.C. Mahon Company in Detroit. He was very active in the Detroit Section of the American Welding Society, serving as chairman and for nine years as secretary-treasurer of the Section. He was a member of the AWS National Board of Directors and in 1963 was appointed to the Structural Welding Committee of AWS. He was posthumously elected a Fellow of the American Welding Society in 1994.

During the course of a long and productive career, Ray Stitt perfected methods and techniques for the torch heat straightening of weldments or members that had been distorted by shrinkage stresses, overloads, or fire. He published many articles and frequently lectured on the importance of controlling distortion by proper preplanning and the correct execution of welding procedures. Following his retirement from R.C. Mahon in 1971, he became an international “trouble-shooter” in this area, and was known all over the world by the motto printed on his business card, “Have Torch, Will Travel.”

As he approached his eighties, Mr. Stitt began to share his expertise in distortion control with a younger colleague, Jeffrey Post. He increasingly referred clients to Jeff, to whom he eventually, symbolically, “passed the torch.” Ray Stitt passed away in 1994 at the age of 87, after a brief illness.

use photos of the project to demonstrate the principles of flame straightening. Mr. Stitt, who advised me every step of the way on the project, liked to make puns on my name, so he dubbed it "Jeff's Post." With his penchant for photos, he made a collage of the project snapshots I sent him; I still show potential clients that collage today. He also enjoyed reminding me that he was giving me a "Post-graduate" course in flame straightening and distortion control.

"I'm Sending a Young Fella"

As time went on, Ray Stitt continued to field calls from all over the country requesting his expertise. After all, his business card read "Have Torch, Will Travel." But the "will travel" part became more and more difficult. By 1985, he was 78, and problems with his legs had begun to restrict his ability to climb. When clients called, he started to respond, "Yes, we can do this. I'm going to send you a young fella I'm teaching."

...the thought is always there, that I need to find the right person, who can accept the heritage of Mr. Stitt's knowledge and transfer it to yet another generation.

In the beginning, we had extensive phone conferences before each job. We shared photos or drawings of the damage, and he would suggest the best line of attack. As time went by, he refrained from suggesting solutions, saying instead, "Well, what do you think you're going to do?" And eventually, he began turning it over entirely, saying "You figure it out and let me know."

Rules of Distortion Control

I was uniquely blessed to learn the lessons of distortion control from a master. Some of the rules Ray Stitt repeated until they became a part of me included:

- Plan to prevent distortion through a detailed fabrication and welding sequence. Don't let the member get out of shape in the first place.
- Study the distorted member thoroughly in order to determine how to shrink it back to its original configuration. (However it got into that shape, reverse that action.)
- Always heat on the bend lines (yield lines), i.e., convex sides.
- Patience and perseverance are essential. Never let the contractor or anybody else rush you on the job.

Sink-or-Swim

On a typical job, we would confer by mail and telephone beforehand, agreeing on an approach to the problem at hand. Then I would fly out to the job site and start the actual flame straightening. I'd call Mr. Stitt at lunchtime and say, "Man, this isn't responding like I thought it would," and he'd say, "Why don't you change the pattern a little bit? Try this..." Then when I got back to the motel room at night, I'd call him again and say "Well, it's still not working exactly right," and he would offer some more suggestions. During the next day's lunch hour, I'd call him to report, "Now it's working the way you told me it should!"

It would have been better to have had him there, but the fact that he wasn't there put me in a sink-or-swim situation. I had to do it on my own each morning, and every afternoon, but it was great knowing I could talk to him and get immediate feedback twice a day. On every job, I'd take a set of photos—before, during, and after. I'd always order double prints, and number each set of photos. After I sent him one set of the snapshots, he'd call me and say "O.K. Jeff, look at number 6. What were you doing right there?" It was sort of a debriefing, after every job, and it was incredibly helpful.

I doubt that anyone ever had a better "Post-graduate" course than the one Ray Stitt gave me. It is not only an obligation now, but it will be a privilege to pass it on. Although at the age of 54, I feel I am far from retirement, none of us knows how much time we have. So the thought is always there, that I need to find the right person, who can accept the heritage of Mr. Stitt's knowledge and transfer it to yet another generation.

A Sudden Loss

Ray Stitt died somewhat unexpectedly. As often happens with elderly people, he had a couple of bad falls, developed pneumonia, and was suddenly gone. A few months later, I went to his home to help his family sort out his files. I would open a file, and there would be a note to me: "Jeff, on this case, we did...." He hadn't known whether or not we'd have the time get to certain subjects, so he'd left me notes, just in case.

At the end of our phone calls, it was his habit to sign off by saying, "More power to you." I was always glad to hear that from him. He was a great guy, and I really miss him. He died three years ago, and there are still times, on the toughest jobs, when I talk to him, and dearly wish I could hear his answers.