Why Should You Become a Mentee?

Robert Zimmerman, October 2023

I am an accomplished mass properties engineer. I retired from a major aerospace company as a member of the Senior Engineering Staff. I have certification as an Expert Mass Properties Engineer (EMPE), and having served the SAWE in multiple capacities, I have been awarded the Richard Boynton Lifetime Achievement Award. However, I wasn't always the engineer I am today.

Once upon a time, I was a fresh-faced college graduate who started my first real engineering job at one of the aircraft companies in Wichita. I did not run across a fairy godmother who waved her magic wand and proclaimed, "You are now a mass properties guru." Until I had my interview at the company, I had not even heard of mass properties engineering. Most of what I now know regarding mass properties came from learning from others – on the job and off the job training, reading, observing, and asking questions. Every one of these methods involves transfer of knowledge from one or more people to another.

Some of this knowledge transfer is eye opening, setting the stage for later use. As an example, while in college I went to one of my professors, Dr. Langer, with a question. I don't even remember what the question was and what the answer he gave was, because what struck me was something I observed, and used extensively in my career. He was sitting cross-legged on his desk, a pad of paper on one knee and a textbook on the other. He was busy writing on the pad. After our "official" business was over, I asked him what he was doing, and he told me he was going through a textbook. He was considering using it and was verifying that he could reproduce the mathematical equations in the book step-by-step. In other words, he was both making sure the equations were correct, while also using his knowledge to work out the answer. He said something I can recall nearly 50 years later, "You might be able to find something in a book, but it is much better for understanding to work it out for yourself." That was true mentoring, freely given with the cost of tuition.

At the aircraft company, I had a lot to learn. Yes, I could determine a volume and multiply by a density to get an object's mass and calculate its center of gravity. But – I also knew there was lot I didn't know. One day I was asked to determine a balance mass for a control surface. My brain went into neutral, and I just couldn't see how to do it. Had I only remembered Dr. Langer's advice, I could have come up with the answer. Instead, I headed back to the senior engineer who had given me the task and confessed I couldn't see how to calculate the desired balance mass. Instead of admonishing me, he drew me a diagram and went over the mechanics without working out the answer. In other words, he mentored me on determining balancing objects. I was his mentee – and I learned several lessons in this simple session. First, I learned about balancing. Secondly, by examining how it was done, I could see how I could have derived the correct formulation of the equation. Thirdly, I found I could seek out guidance and not be thought a moron. And fourthly, I recalled Dr. Langer's lesson and realized that even a non-obvious answer can be "discovered" by going back to basics and working from there.

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From the aircraft company, I changed companies and found myself working for a major aerospace corporation. I was initially assigned as an associate engineer to a much older mass properties engineer. By this time, I had a solid understanding of basic mass properties. What I learned working for this man was how to thrive in a highly competitive environment, using office politics to your advantage, avoiding pitfalls, and how to ensure that you aren't the "invisible engineer". That isn't to say that there were not technical challenges to work out, but this era of being a mentee enabled me to be a survivor when the coming downturns meant that 2/3 of the workforce disappeared either through self-induced attrition or layoffs. But before the downturn, I was given a series of increasingly responsible positions culminating in assignment to a major proposal. When we won the proposal, I was somewhat deflated to learn that a senior engineer was assigned in the lead mass properties position. Rather than complain, I decided that here was someone I could really learn from. He was an SAWE Honorary Fellow, and from him I benefited from his lifetime's knowledge of technical and non-technical life in aerospace. I would not have become the engineer I am without having him as a mentor.

I had one more mentee experience having to do with getting a spinning spacecraft to naturally spin about a specific axis. I called my department head, and he came over and tried to explain what that entailed. Finally, he said something that made me write out the equations and rearrange them until it was obvious what had to be done to get the desired answer. From that, I wrote a program so that as the design evolved, I could make adjustments to keep the axis aligned.

I took all this knowledge that had been passed to me and utilized it in the years ahead. As a mentee, I had evolved from a boneheaded neophyte who couldn't balance a control surface, to the company expert in mass properties. I became a mentor to others. I wrote papers, technical articles, led teams to implement mass properties tasks, designed measurement apparatus that could encompass a wide CG range while determining Moments of Inertia. Along the way I was elected and appointed to leadership positions in the SAWE. And each step of the way was due to, in the words of Isaac Newton, "Standing on the shoulders of giants," in other words "I leveraged other's knowledge to my advantage by being their mentee."

And this is why, at almost any stage of your career, you should become someone's mentee.