



**Pardon My Soapbox. –** Semi-random, unsolicited advice for those just beginning their engineering careers.

- Find Mentors
- Learn from the Experience of Others
- Ask the Experts
- Participate in Company Functions
- Join a Technical Society
- Study other Engineering Disciplines
- Take Professional Development Courses
- Be careful in Failure Analysis
- Double-Check Simulations
- Understand the Materials You are Using
- Wear Sunscreen

*The next issue of Technical Tidbits will go back into general engineering topics, with a discussion on Hertz stress.*

## Random Advice for New Engineers

This is a special edition of Technical Tidbits, appropriate for the start of the New Year. It is designed specifically to provide the benefit of experience to those just starting out in their engineering careers. Feel free to read or ignore as you wish. Remember, you can learn from the experience of others or from your own mistakes – it’s entirely your choice. *(All opinions below are expressly that of the author.)*

A few years ago, I had the opportunity at an awards banquet to speak to a group of high school seniors who were receiving scholarships to help them in their quest to obtain technical degrees. For a while, I wondered what I would talk about. And suddenly, it occurred to me that the most appropriate talk would be about things I wish someone had told me before I started my university education. In summary:

- While it is important to have a good relationship with your professors and your academic advisor, it is even more important to have a good relationship with your department’s administrative assistants.
- Always be thorough in your work and documentation, because you never know who is paying attention. It may result in later opportunities.
- Sell back poly sci and history textbooks. Keep any math, science, or engineering textbooks.

Later, while on a plane ride from somewhere to somewhere else, I began to think about the benefits of doing a similar, unsolicited service for those who have just finished earning their engineering degrees. With that in mind, here is some advice to help new engineers navigate the path from graduating university student to fulfilling engineering career.

- **Find mentors**, but choose them wisely. Ask them questions. Good mentors will take time to explain why, not just how and what.
- Problems often appear repeatedly over time, and an undocumented solution may very well be in someone’s memory. You can **learn well from the experience of others**.
- When in doubt, **ask the experts**. In fact, ask, discuss and absorb all you can from the experts while they are still around. Mentors come in handy here.
- One day, your mentors and the other experts will be gone, and you will look around and find that you are the expert. Be sure to take the time to mentor the newer, younger engineers.
- **Participate in company functions** such as lunches, dinners and team-building exercises, even if they are not mandatory. It will help to build relationships with people outside the group you work with.
- **Join a technical society** (even if schedule conflicts prevent you from attending meetings regularly). The educational opportunities and networking opportunities alone are worth more than the cost of membership.
- Pick a new cross-discipline area to learn expertise in each year. The best NBA basketball players such as LeBron James and Michael Jordan made it a point to work on improving a particular skill each offseason, in order to improve their overall game. Engineers can do the same. Some good examples of learning opportunities are in areas such as reliability, failure analysis, signal integrity, etc.
- **Study other engineering disciplines**, not just the ones that you learned in school or what you were hired to do.
- **Take professional development** courses. This is a good way to improve your communication, time management, leadership, financial, etc. skills. No matter how good you think you are, you can always improve your presentation and writing skills.
- Remember, an engineering degree does not always equate to good engineering skills. (With tongue loosely planted in cheek, I say beware those that have cheated their way through college.) Conversely, don’t ignore good advice because it came from someone without an engineering degree.
- Be careful using industry-specific acronyms and lingo, particularly when presenting or writing technical papers. Be aware that any audience you have comes from a great variety of different backgrounds, which may use different terminology. For example, depending on your audience, the square root of -1 may be written as “i” or “j”.

### **Random Advice for New Engineers (continued)**

- Early in your career, the quickest path to success is to keep your mouth shut and your eyes and ears open. However, speak up if you notice a real problem or have a real solution.
- Never unfairly criticize anyone. Offer only constructive criticisms, and give people the benefit of the doubt. You never know who is paying attention (or who you will end up reporting to). If you need to lodge a complaint about a bad situation, have at least one potential solution ready.
- Done beats perfect. Don't continue to tweak your work until it is perfect – you will never accomplish anything.
- You may work on an unlimited number of projects simultaneously. However, you can only finish one at a time.
- **Be careful in failure analysis.** Read the following articles (“5 Common Failure Analysis Mistakes” by Dave Palmer and “Metrics, Models, Statistics, and Other Faerie Tales” by Alan Nicol). You will not be disappointed.
  - [http://www.designnews.com/author.asp?section\\_id=1365&doc\\_id=242711](http://www.designnews.com/author.asp?section_id=1365&doc_id=242711)
  - <http://www.manufacturing.net/articles/2011/11/metrics-models-statistics-and-other-faerie-tales>
- Do not rely on textbook values, databases, or CAD/FEA material libraries for accurate material property information. Always contact the manufacturer for such values.
- **Always double-check simulations** using back-of-the-envelope calculations. Exact equations may not exist, but use equations for models approximating your geometry and loading conditions to make sure that your simulation results are in the ballpark, or at least that they're of the proper order of magnitude.
- Be sure you appropriately **understand the materials you are using** or specifying. Understand where/when/why/how particular alloys or tempers should or should not be used.) Be sure that they can be fabricated the way you specify. You do not want to design a part that can't be manufactured, or one that will fail well before it's supposed to in its intended service environment. Your material suppliers would be happy to discuss these issues with you.
- Extoll the virtues of engineering and other STEM careers to others coming after you. If nothing else, people in these careers are least likely to be replaced by automation.
- Even in the wake of #ILookLikeAnEngineer, there will probably be misconceptions about who can or cannot be an engineer or what an engineer is supposed to look like. Do your best to dispel them. The world needs more engineers.
- **Wear sunscreen.** While technically not engineering related, this is definitely worth reading, or reading again as the case may be: <http://www.chicagotribune.com/news/columnists/chischmich-sunscreen-column-column.html>

Well, that about sums it up. I am sure there are other readers out there who would have their own advice to chip in. Maybe there will be a sequel to this edition next January.

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