Raymer's Rules for New Grads
by Dr. Daniel P. Raymer

...or, How to Succeed in Aerospace by Really Trying

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If you are a youngster just considering a career in aircraft design, check out Raymer's Rules for Would-Be Aircraft Designers

http://www.aircraftdesign.com/ray-rule.html

There are many different roads through this sometimes baffling profession that we call aerospace. Some engineers, many of them very capable, just want a steady job. While they would like a big promotion to a highly responsible position, they do not "thirst" for it. Other engineers, however, really want to get ahead from the moment they start their first job out of college.

This article is written for those "driven" young engineers, who want to get responsibility (and promotion!) as fast as they are ready to assume it. An outgrowth of a talk given at a number of universities, it presents some lessons learned the hard way by a no-longer-so-young engineer who really wanted to get ahead. This eager engineer later had the opportunity to hire, nurture, and promote young engineers, and eventually gained some understanding of what is really important from the boss's perspective.

Considering the factors for getting ahead, ten rules seem most important for success. These are described below. I wish I could say that I intuitively knew and followed these from the moment I joined my first company, but my co-workers from that time would die laughing! I think I followed about six of these in my early years, and painfully learned three more, and am still working on the last. (No, I will not say which is which!)

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1. Never Screw Up on the Due-Date!

We all screw up! We have too many assignments, we thought we understood it when we did not, sometimes our grandmother really is sick, and sometimes we just forget. It is okay to screw up occasionally, but never, ever wait until the due-date before admitting it. When it is due, other people are depending on it. If you are not going to make the due-date, notify the boss as early as possible. Better yet, pull a couple of all-nighters to finish the job, and be more realistic in the future when you agree that you can make a due-date. You will not get the next responsible assignment if you screw up on the due-date, and after a while you will be placed in the category of "good engineer, but can't be trusted with anything important."

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2. Be Technically Excellent!

Yes, some people get ahead armed only with a nice suit, a good briefing style, and a lot of politics. Luckily, they are few in number and their careers are (usually) limited. To break out of the pack in a technical organization, it is critical that you be known as one of the best engineers. Always do superior work. Get that graduate degree soon. Sign up for short courses in your technical area and in other areas for broadening. Respectfully pick the brains of the experienced engineers. Not only will you learn, but they will think that you are a sharp young engineer for recognizing their expertise.

As you start to become really good technically, you should let others know. Write technical papers and submit them for presentation at meetings. It is amazing how many times a technical session at an AIAA meeting gets just one or two abstracts in response to the announcement in the Aerospace America bulletin. While in school, present a paper at an AIAA Regional Student Conference. Try to write something for the company paper. Give talks to the local or company AIAA branch and to local schools.

Also, do not be afraid to express a technical opinion in conversations and meetings at work when you are certain that you know what you are talking about. Do not always try to dominate every meeting, but do not be a wallflower either.

3. Excel During Proposals!

Willy Sutton was once asked, "Why do you rob banks?" He replied, "Because that's where the money is!" Proposals are "where the money is" for any technical company, and you should become known as a young engineer who can help to win the proposal and get that money! Proposal time is the very best time to impress the bosses, and you should plan to work your hardest and longest when you are permitted to join a proposal team.

The ability to write clear and concise text on a technical subject is probably the single most valuable and rare commodity in aerospace. Take writing classes. Write as often as possible, and seek critical review from someone who writes well. I personally never submit anything, including this article, without finding someone who will constructively hack it apart for me.

When a proposal is approaching the due-date, and it is three o'clock in the morning, I frequently notice something strange. The "oldtimers" (over thirty, like me) are all there, and the young engineers have left. Their usual excuse is that "nobody told me what to do next" so they went home. If you want to impress the bosses, be the last person to leave while a proposal is under way and always ask for more work and responsibility. "I'm done, what can I do next?" is wonderful music to an overworked proposal manager, and a great addition to your growing reputation.

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4. Network!
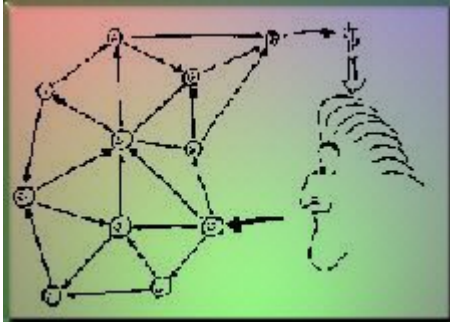
The Yuppies are right. You will get ahead faster if important people outside the company know who you are. Sad to say, but it is very common for a good engineer to languish in a job until an outside company offers a much higher position, at which point the current company suddenly offers the same promotion. It happened to me (I left anyway!). These outside offers come only if important people know you.

The American Institute of Aeronautics and Astronautics (AIAA) is probably the best networking avenue for aerospace engineers (SAE is good too, but AIAA is fully-focused on aerospace). Attend conferences. Better yet, volunteer to help organize the conference. Work with your local AIAA section, and volunteer to work on one of their standing committees. Once you have proven yourself, run for a local section office.

Another networking avenue offered by AIAA is membership on a National Technical Committee. While is it difficult for a young engineer to be invited to join one of these committees, it is not impossible! You will meet and work with the key people in your technical area, and have many opportunities to prove your talents.

5. Socialize with Your Peers!
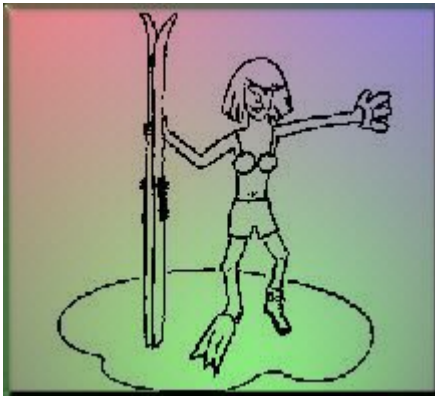
Some young engineers seem to have the idea that, to be truly professional, one should always remain businesslike with co-workers. Others have a full social circle outside of work, or some other personal situation which prevents socialization with people from the office.

However, an engineering organization is a social grouping as well as a structure for accomplishing technical tasks. Engineers are people, and will be far happier working with people they feel they know than with some unsmiling automaton whom they only see at work (and therefore in stressful situations!). Also, as you get ahead you will encounter much less resentment if people know you from the softball team, or the ski club, or some other outside socializing.

Along the same lines, try to be nice! I know this sounds silly, but your career is over if you are labeled as a "great engineer, but one nobody wants to work with". Smile, say hello, and take a few seconds for social pleasantries before leaping into a discussion of the current panic!

6. Temper Your Ambition!

You are the hottest graduate from the hottest school, and you are ready to take over something really important, right now! Kelly Johnson did it, why not you?

Because things have changed a bit since the 1930s. Aerospace is a mature business, and aerospace organizations are bureaucracies. The bosses' careers depend almost as much on not doing anything wrong as they do on doing things right. If they trust you with something really big, and you screw up, they will look worse than if they had appointed a seasoned veteran who had made the same screw up!

Also, your effectiveness as a rising aerospace leader depends as much on your ability to get quality work out of other people as it does on your own output. If you are perceived as a person who only cares about the immediate promotion and who wants to be the boss all the time, others will resent you and will work poorly for you. So be aggressive, but not excessively or overtly (easy to say, but for many of us, hard to do!).

7. Cultivate the Secretaries!

Some young engineers develop an unfortunate and even dangerous attitude about secretaries, treating them as typing/copying servants. After all, engineers have one or more college degrees and are the lifeblood of the company, whereas a secretary....

A secretary is the boss's closest co-worker, and is usually a personal friend. A good secretary adds about 20 to 50 percent to the boss' productivity (or more!), and is far more important to the boss than any new-hire engineer. A really good secretary would have no trouble destroying a new engineer's career! Even a "department" secretary (i.e., one who does not work directly for the boss) is used as a source of information about which of the new engineers have the most promise.

Furthermore, a secretary can make you look good by improving your writing, by offering hints as to what the boss really wants, and by moving your typing or other jobs up on the priority list. Treat the secretaries as equals who perform a job different from yours, but important just the same. Be friendly (but not too friendly, if you want to stay out of really big trouble!).

(2007 update: Times change. Secretaries no longer do the typing for engineers - now we have to do it ourselves. Everything else still applies, so I still say ....Cultivate the Secretaries!)

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8. Become a Great Briefer!

If proposals are "where the money is", then briefings are "where the reputation is". Skill at giving a clear and enjoyable briefing is an absolute requirement for advancement in a technical organization. The only way to get this skill is practice. Give talks at every opportunity. Perhaps take a class in speaking or acting. Toastmasters is a fine organization for perfecting speaking skills.

Also, ask the good briefers in the company for help when you have a briefing to give. You will learn that a great briefing results from great preparation and organization as much as it does from the "gift of gab".

<---- Raymer's first AIAA presentation - love the Sonny Bono hair and John Travolta white suit!

9. Look the Part!

Again, the Yuppies are right. You will be entrusted with more responsibility, and given promotions sooner, if you look like a trustworthy, competent person in the eyes of your company's customers. In our culture that usually means a suit and a "normal" haircut/style. The "correct" dress varies from company to company, and even from department to department (people in the computer department can wear anything!). Don't "put on airs", obviously overdressing to curry favor, but look like you would fit in just fine at the next level up. A good rule of thumb is to dress approximately half-way between what your boss wears and what your average co-worker wears.

10. Always Be Totally Professional!
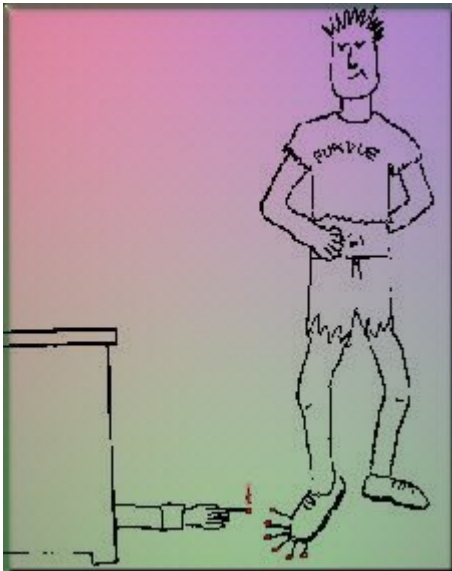
You are being paid to work. Period. Always look like you are working, even if there is really nothing to do. Do not read Spiderman while waiting for the computer to respond. Also, no horse-play, foul language, practical jokes, or other foolishness on company time. If you are not sure what is acceptable, imagine that your boss and your company's most important customer are watching.

DO NOT ever, ever do anything that could be construed as sexual harassment. No off-color jokes, come-ons, or even excessive compliments concerning looks or dress.

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Also, avoid office romances. The concern by management is that productivity will suffer, especially when office romances end. Most importantly, avoid office romances with the boss or the boss's secretary!

(What about cultural differences? See Below)
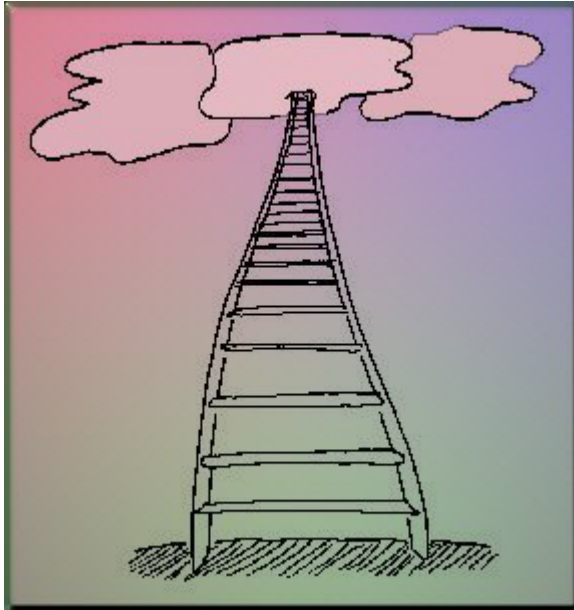
Well, those are "Raymer's Rules." Hopefully they will help you get ahead. If they help so much that I wind up working for you someday, I want a raise. A big one!

(If you are not yet a graduate but are aiming for a career in aircraft design, read Raymer's Rules for Would-Be Aircraft Designers.)

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Raymer's Rules - Cultural Differences

Needless to say, there are many differences from culture to culture, and not all of Raymer's Rules will "translate". For example, the importance of time-based deadlines varies a lot around the world. In some countries it just doesn't matter that much if something is done a little late, as long as it is done eventually. But for young engineers working their way up the ladder, I recommend doing better than those around you - so follow Raymer's Rule #1 no matter where you live - *Never Screw Up on the Due date!*

Of course, if you are the boss, you can be as late as you want in any country. But it isn't nice.

The importance of proposals is an area where other countries, or other forms of organization in this country, may see a difference. If you work for an organization that does not depend upon winning proposals to bring in money, this Rule is not directly relevant. But, wherever you do work there is a local equivalent - the primary way that the organization brings in the resources to pay its people and to operate itself. This may be in pleasing politicians, or in creating great publicity, or possibly even in doing good technical work. Wherever that resource-capturing activity may be, you be there and be excellent!

In matters related to the workplace treatment of women, there are substantial cultural differences from country to country. This is a complicated, politically-charged issue, and it is difficult for somebody who grew up in one culture to really appreciate how another culture operates. But, no matter what the local culture, I still stand by Raymer's Rule on professional behavior: *Do not ever, ever do anything that could be construed as sexual harassment. No off-color jokes, come-ons, or even excessive compliments concerning looks or dress. Also, avoid office romances.*

I offer two reasons why young male engineers should follow this, regardless of where they live or what the local culture says is acceptable. First, I think that this attitude has a substantial impact on a country's economic status. Imagine a country where there is a random lottery at birth, and half the men are tattooed with a mark that, for the rest of their lives, would prevent them from getting a good education, finding a good job, starting a company, or getting selected to run an existing company. That would just about kill the economic development of that unfortunate country. What if the next Bill Gates "lost" such a birth lottery? Or the next Wilbur Wright, or Kelly Johnson, or Burt Rutan?

My second reason is personal - along with two sons, I have a wonderful daughter, and I want her to be able to decide her future for herself and to pursue her dreams. If she wants to be a housewife and raise wonderful grandchildren for me, I'll be very happy (but don't start any time soon, please!). If she wants to pursue a career taking advantage of her intelligence and abilities, I don't want the men around her holding back her career and treating her like her only important abilities are those obvious ones related to her gender.

As to what an individual should do if they are in a country where women in the workplace are treated unequally - that is a personal decision. An individual, especially a young one, cannot force those around him to change. But, each individual can decline to actively participate in a bad thing. Surely it is possible to get an education and to get a job or start a business without participating in the subtle but persistent degradation of fellow human beings whose only fault is sharing the gender of our mothers, sisters, and daughters.

So, skip the off-color jokes and get your own coffee!

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Sorry for the lecturing tone of the above - it's a difficult topic to discuss unemotionally, which is one reason why it is such a difficult thing to change. While we in the USA have come a long way towards workplace equality, we shouldn't be too smug - it took many decades of struggle by courageous people to get this far, and we still aren't 100% where we should be.