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The Creative Engineer

What can you do to spark new ideas?

By **Carl W. Selinger**

We engineers are often accused of being uncreative. In fact, many nonengineers would say that the phrase Creative Engineer (</images/aug04/images/care01.gif>) is an oxymoron. Why is that, since much of engineering is inherently creative? If we weren't inventive, how could we ever develop new technologies and adapt emerging scientific principles to solve problems? That said, not all the work we do is done creatively. We can be more creative; the question is *how* to unlock your creativity to improve the quality of your ideas.

First, let's start by defining *creativity*: it's the quality of making, inventing, or producing--rather than imitating--and it's characterized by originality and imagination. One reason engineers aren't considered creative is that they often don't start with the proverbial blank sheet of paper each time they do something. Rather, they build on existing technology and try to improve incrementally on its performance.

Engineers use codes and standards that have evolved within each technology; they also consider the safe state of practice and lessons learned from past failures. But every engineer's core mission is to try to improve the utility of things, to design products or processes that will solve problems better, faster, and cheaper.

So when you're faced with having to devise an incremental improvement, how do you instill more creativity into the process? One trick is to try phrasing ideas in statements that begin with "What if" or "I wish." For example, asking "What if we could combine a PDA with a mobile phone so we'd need one less gadget?" led to hybrid PDA phones. Write down as many "What if" and "I wish" statements as you can, and don't be afraid to let your imagination and intuition run free, to follow your impulses, to be messy. You may come up with a vision of something new and better.

Most engineers are familiar with the classic creativity-enhancing technique of brainstorming. In these unstructured discussions, people are encouraged to spout ideas and suggestions. Too often, though, brainstorming fails to produce anything satisfying or practical. Participants may feel uncomfortable with the spontaneity or turned off by how some people dominate the proceedings. Or maybe nobody takes the time to tabulate or follow up on the many ideas that are generated.

There is at least one better way. Called "synectics," and developed in the 1960s, this process combines brainstorming with a more disciplined harvesting of ideas. The discussion includes not just those involved on the project but also a representative from the client, who asks the group to address a specific problem. Each person writes down a dozen or more "I wish" statements, and then each reads aloud the ideas, which others can build on; most important, no one is allowed to criticize ideas as they come out.

The ideas are then organized into categories and reduced to a manageable number of options. The client takes notes and has the authority to act on any of the ideas that seem feasible. I've found that synectics helps transform a wild and chaotic session into a more focused discussion with specific results.

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Another way of being more creative is to look at things from different perspectives. Often we're constrained by ingrained habits that can limit our thinking. We tend to stick with the current paradigm--the way it's done today. The culture of our society or organization may also constrain our thought processes. And our core engineering principles can compel us to follow the same step-by-step approaches we learned in engineering school.

To view the world--and your problem--differently, try stirring up ideas by regularly talking to people from different industries, cultures, and professions, and, yes, to your customers, too. Keep your eyes open when you're traveling--spotting interesting developments can be a rich source of ideas. For example, I was excited when I first encountered the helpful digital displays in Hong Kong's subway; these are now finding their way into Western transit systems. Even if a development isn't directly applicable to your problem, you may glean some novel and feasible concepts. And when you encounter a new technology, ask yourself: "How will this change my ability to solve this problem, do this better, or seize an opportunity?"

In addition to boosting your own creativity, you can also encourage others to welcome new ideas--or at least not stifle them. We all know the engineer who, when pitched a new idea, instinctively rattles off all the reasons it won't work--"We tried that before and it failed." Maybe you do a little of that yourself; I know I sometimes do. The reasons may reflect legitimate issues, a desire to stick with the status quo, or the prideful "not invented here" mentality. Unfortunately, these reasons serve as an excuse for not seriously considering the suggestion.

So the next time you're presented with an idea that at first blush sounds outlandish or impractical, try one of these responses: "What made you think of that?" or "What are you trying to accomplish by doing that?" You'll get the person to explain how he or she arrived at the idea, and determine if the thinking process was sound. The person, in turn, will feel encouraged, and the discussion that ensues may even lead to other ideas.

With some simple steps like these, we engineers can become more creative and work to develop fresh ideas for improving the products we design and build.

This is the 10th installment in Carl Selinger's professional development series for younger engineers, "Stuff You Don't Learn in Engineering School." The series is available online at </careers/careers>.

Michael J. Gelb's *How to Think Like Leonardo da Vinci: Seven Steps to Genius Every Day* (Delacorte Press, New York, 1998) draws on Leonardo's notebooks, inventions, and works of art to offer seven principles for thinking more creatively.

Robert J. Kriegel and Louis Patler's *If It Ain't Broke...Break It!: And Other Unconventional Wisdom for a Changing Business World* (Warner Books, New York, 1991) shows how business people today have to turn the old rules inside out and upside down to survive.