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### Where's That Bottleneck?

by Mike Rainone, co-founder of PCDworks

When I was asked to write a monthly column for Product Design & Development, I asked if there was anything special I should focus on, other than product design and development, of course. She suggested that this issue was going to deal with time-to-market, and it might be nice to at least start with something relevant to that issue before I wander off into the ether.

Since I have been doing this product development stuff for a long time, and thus have a bit of a different perspective than most new product development (NPD) folk, I know something about the issues of speeding time-to-market and have been attuned to customers griping about this for years.

It dawned on me that after all my years of working in NPD, dealing with design, manufacturing and sustainability engineers, and marketing VPs and managers, I can hardly remember a time when it was the design engineer who was really the choke point of the NPD process. Put another way, it is most often not the process of engineering design that screws things up.

Well, yes, there are times when the developed device doesn't work or BLOWS UP (literally—and in front of the board of directors, too!), but in my experience, design engineers are rarely the cause of a major holdup of a project. They are often blamed for the holdup (especially if it doesn't work or blows up), but design engineering is rarely the time-killer.

I suppose that the bulk of this audience would have no argument with this notion. So, if the design engineer is usually not the big stumbling block for time-to-market, then whose fault is it and what can the design engineer do about it?

I am going to put forth the totally preposterous notion that decision-making is the real killer of quick time-to-market. It's the endless meetings from product inception on market direction, consumer input, concept testing, looks, color, packaging and pricing during which the design engineer waits ... and waits ...

We wait for product specifications; cost limits; tooling budgets; manufacturing decisions about onshore or offshore; supplier qualifications; decisions to go, to hold, to get upper management's blessing, to get the project on the long-range plan (LRP) or off the LRP into the NPD queue, to get the business case done, etc. ... ad nauseam.

As a cognitive scientist, I translate the purpose of these meetings as the quest for the reduction of uncertainty or an increase in certainty. (Most of the uncertainty is fear-based: fear of failure, loss of control, someone else winning, etc. ... But we will not go there right now.)

Think about it: Every decision you make, every decision we make as a group, is a hypothesis. It's a theory about what will happen. These theories are based on whatever information we have at the moment—thus, the better the information, the less the uncertainty. Most NPD decisions are based on minimal information, which means the theories are based on a huge surfeit of uncertainty.

It stands to reason, then, that anything that can be done to reduce uncertainty will speed up time-to-market, and that means anticipating, knowing or discovering all aspects of the design that may add to uncertainty, which is a critical task of the design engineer. Knowing, for instance, what technologies are out there, which technologies can be feasibly applied, who's making them, where they are currently applied, what their limitations are, what they cost, and who has the knowledge to apply them, can be a huge uncertainty reducer. Every design engineering group should be actively involved in keeping up in this area. Unfortunately, just staying aware of new technologies is not enough in today's NPD environment.

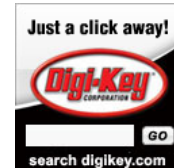
Ironically, aspects of the problem definition are logarithmically increasing. It is not enough to know about engineering to be a good NPD design engineer. The design engineer is interfacing with and supporting market researchers, suppliers, purchasing folks, and manufacturing and sustainability engineers at a minimum—all as product specifications are being developed.

I can remember a design engineer telling me that before he could release a project for our engineering innovation process (a critical path in the NPD timeline), he had to conduct his voice of the customer work! HE was going out to talk to the customer, so that he could shape the engineering challenge he was throwing to us. The job of everyone in NPD is to find information to reduce uncertainty.

Information is, by definition, a reduction in uncertainty. So if you really want to speed up time-to-market, here are some lessons:



"There are times when the developed device doesn't work or BLOWS UP (literally)."



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- Look at the NPD process as solving a series of uncertainties. How much will the customer pay; how much of the budget can we use for tooling; when is the Chinese New Year; what new technologies can we use to do this; etc. ... These are some of the thousands of questions that must be answered—from the profound to the profane—to bring a product to market. The more information you can provide, the less the uncertainty.
- Understand the product specifications. While they might look like certainties, product specifications are really derived from a flow of information. Question the specs that look too tight. Make sure that they are prioritized, and know where they come from. Sometimes salespeople are part of your problem, not part of the solution. As a general rule, the easier it is for them to sell a product, the harder it is for you to make it. Salespeople want a product that sells itself. Sorry, but it is true.
- Get physical fast. Without a physical model, you can't know all of the issues that need to be solved. Your mind cannot hold in its buffers all of the parts and their interconnections. Build a model: It's easier on your brain, and makes the uncertainties easier to spot.
- Research, research, research. Look widely for sources of information to fill in the blanks. Look across industries and go to conventions in addition to working the Internet. Keeping your brain filled with information about the newest, latest and greatest is what is expected of you. This is what you can contribute to the greater good.
- Finally, when fingers come out of their holsters for a blame game when the product is late getting to the shelves, tell them, "START EARLIER!"

In the months to come, I hope to use this forum to share more of the wisdom (or BS) that I've learned from years of hands-on experience in the NPD world. I admit to having a different perspective. In return, I hope you challenge my theories; reduce my uncertainty with your comments; share your stories, horror or otherwise; and generally keep me honest.

Besides being a cognitive psychologist, I have a graduate degree in architecture, but migrated to industrial design and product development years ago. I now run an NPD think tank in East Texas where I mainly stick with engineering, and kibitzing other engineers, scientists and a mathematician or two.

*Mike Rainone is co-founder of PCDworks, a technology development firm specializing in breakthrough product innovation. Rainone analyzes the applications and societal implications of emerging technology on his blog—[www.technologywork.com](http://www.technologywork.com). You can contact him via [mrain1@pcdworks.com](mailto:mrain1@pcdworks.com).*

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