Today's MOTOR VEHICLES

Roadblocks to automotive innovation

Features - Cutting tools

Jim English, president of cutting lubricants supplier Tool-X, describes manufacturer practices that can stifle innovation in motor vehicle production.

September 22, 2015

Jim English, a longtime automotive marketing consultant, former General Motors suspension engineer, and marketing chief at Rain-X from its early days through its sale to Quaker Oil, says the automotive industry's classic way of doing things can stifle innovation and keep cost-saving products away from manufacturers and customers. Now president of Tool-X LLC, a manufacturer of nanotechnology-based cutting lubricants and coolants, English describes factors that hold back creative product releases.

TMV: Why is it difficult as a small tech company with new technology to do business with the big automotive companies?

English: I think for most tech start-ups, doing business with Detroit would be almost impossible, at least the way things are being done today. Even as an automotive insider, someone with decades of automotive experience, someone who has served on Society of Automotive Engineers (SAE) and Specialty Equipment Market Assocaiton (SEMA committees), and with an extensive Rolodex, I find the cards are stacked against us at Tool-X.

With new technology, you have to:

- Convince the right people that the technology works
- Find a way to get it tested and validated
- Get the standards changed

- Get approved as a vendor
- Convince purchasing that it will result in lower costs or better quality
- Get selected as the supplier

Each of these steps can be monumentally difficult for a small company.

Find the right person to consider new tech – If you have a new technology, then purchasing is a dead end. It's not their job to evaluate new technologies, they are only going to be choosing based on established standards and lowest cost.

You have to identify the right people in engineering for this process. Many of the old engineering departments and staffs are gone, retired, or reorganized. And a lot of the time the right contact isn't at GM or Ford, it's now the engineering staff at the supplier level, the Tier 1, who's responsible for some subsystem they are buying.

Even if you can identify the right person to talk to, they are probably not the decision maker. Many times, there are multiple sign-offs required – from manufacturing, from health and safety, from purchasing, and from various engineering departments.

So you probably have to convince several different managers to support your efforts. And these people are inevitably very busy, with many urgent projects, and very few incentives to even look at your project, as the savings or improvements that might be realized probably won't be credited to them. They might own a failure, and they will see little upside from taking on your project.

Unless your technology is the fix or the solution to a very large problem, one that is systemically important to the organization, you are unlikely to get further.

The "not invented here" attitude – Every technology currently in use at a car company is of course the best, world-class, and demonstrably superior to anything that might have been invented elsewhere.

The testing dilemma – Test results you brought into the meeting with you will not do. You will need to do testing on their products, with their metallurgy, parts, or components. This testing will either be fantastically expensive, fully irrelevant to real-world applications, or involve special equipment that only they possess. The engineering department has no budget for testing new products. And inevitably some field or endurance testing is required. Since it doesn't make sense to run multiple cars around test tracks for a single part, tests of multiple systems, parts, and projects must be combined, requiring coordination, scheduling, and endless delays before a test can be completed.

Aluminum wheels machined with Tool-X's 703 coolant [left] had higher output rates than those machined with traditional fluids [right], and the manufacturer was able to eliminate a polishing step.

Slow decision making – Start-ups and new technology companies typically are under tremendous pressure to grow quickly, to show financial results, or at least to get to break-even. Dealing with large car companies that move glacially, take forever to make a decision, are conservative in their risk taking, and do not have programs to support and promote innovation just doesn't make much sense.

TMV: What about the process for introducing new materials technologies?

English: The process is messed up, too. Many of the materials standards are set by SAE committees, which often act as gatekeepers or worse, set standards designed to keep competition out. They outsource the validation process to a committee run by your competitors, who require full disclosure of your technology. And you wonder why small companies get taken advantage of.

TMV: What's difficult about becoming a vendor to automotive OEMs?

English: Even if you can get the standards changed, or a new standard written, there are still hurdles to overcome such as becoming a vendor. Since GM, Ford, and FCA US want to slim down their supply chains, they may choose not to do business with you directly, but rather set you up with one of the companies they use to manage their supply chain. Now you lose your visibility, your contacts with engineering and manufacturing, and there is another margin to support, upping your costs compared to other suppliers. But that still may be preferable to meeting some of the supplier criteria for just-in-time deliveries, labeling, and electronic data interchange.

In a tooling test, a manufacturer drilled holes in 4140 stainless steel with a Mazak CNC until the tool failed. Using standard fluid, machinists were able to cut 20 rows of holes. Using Tool-X coolant, machinists ran out of space on the plate after 42 rows of holes without a failure.

You may very well be judged too small to handle the financial risk. Some contracts provide for punitive damages for supply or warranty issues, even if the cause is an act of God.

But even if you can persuade purchasing to specify your product, choose your company as a vendor, and issue a purchase order, your next problem is that you will face pressure to cut prices regardless of technological change, market price levels, or the amortization of the big investment you just made to become a supplier.

TMV: How can pressures for continual cost downs stifle innovation?

English: Incentives for innovation can be perverse, too. The pressure for cost downs could easily be costing Detroit by deterring innovation.

If you bring new technology to a Tier 1 supplier, not only do you have to persuade the supplier to make the investment in research, testing, new equipment, and training for them to adopt the new technology, but you also have to deal with the fact that they discount away any savings they achieve from the new process, especially after a few years.

They assume that GM, Ford, and FCA US will take back any savings that they have achieved through price reductions once they find out about the change in process. So you end up with a situation where you have to persuade an engineer to risk time, dollars, and effort to evaluate a change in process, still more to make the change, and

yet they face uncertain returns on investment because they just don't know how much of the savings they will be able or allowed to retain.

The same dilemma also impacts other supplier decisions. If you know your costs are going to be audited, you have no incentive to push through cost downs prior to the audit. You may very well choose not to invest in new tooling or technologies to reduce costs if you know that you will not see the full benefit from them.

TMV: What challenges do you face introducing new nanotechnology products?

English: Descriptive issues – If people can't see your product, then you have to find some other way to explain what it does, how it works, and why it is important. These products are smaller than the visible wavelength of light, and show up as little squiggles or dots in most graphics. You end up having to do animations if you want to show how things work.

Health and safety – Industry and the U.S. Environmental Protection Agency (EPA) have become aware that some otherwise benign materials at the micron or larger scale can be dangerous if they are present in quantity at the nano scale. Particles can have greater surface area and greater reactivity; they can act like catalysts; they can behave unexpectedly because they are so small. The EPA is trying to introduce new rules under the Toxic Substances Control Act (TSCA) to cover them. The toxicology departments of the auto companies are being very cautious.

Prototype aluminum wheels, machined on CNC turning centers, experienced better surface finishes and higher speeds and feeds when the manufacturer switched cutting coolant.

The carbon nano-onions we've developed at Tool-X are benign, inert, non-reactive, and are being adapted for medical use. So we have successfully passed muster with at least one toxicology department.

Anonymity – Again, if people can't see your product, they won't know it's there. Even if you aren't offering a commodity product, the source of the differentiation cannot be found in the packaging, appearance, or marketing of the product. So how do you let potential customers know that your product is an integral part of a subsystem that they can't see or recognize?

Confidentiality agreements – Normally, non-disclosure agreements (NDAs) pertain to test results, internal standards and tolerances, or costs and price lists. But what if your ingredient is the "secret sauce?" If the very presence of your product in a formulation is subject to an NDA, that makes it (intentionally) difficult for us to market it to alternative suppliers or other customers. It's quite a marketing challenge to not be able to cite customers, give references, or tell potential customers who else we are supplying. And all because our current customers are afraid that the big automotive companies will catch wind of the productivity improvements and demand a cost down.

TMV: What could the automotive companies do better to promote innovation?

English: The big automakers should do what the military and aerospace industries are already doing – set up and support technology portals, technology incubators, innovation centers, whatever you want to call it, with a mission to identify and promote new technology. These need to be portals – an entry to the company, so that new potential vendors know where to go to be heard.

CNC-machined wheel production rates increased 40% with the use of Tool-X coolant.

These centers need top management support for their mission, so that engineering and manufacturing will support their efforts. A typical set-up provides that the engineers in charge of the portal do a first screen of the technology, decide whether it has promise, and weed out the kooks and crazies. They then forward proposals to the proper contacts within the organization, and ask them for an initial assessment, which is due within 30 to 45 days.

This is actually a pretty good trade-off for engineering staff. They only have to deal with a limited number of pre-screened technologies and products, without having to take meetings for products outside their bailiwick.

The other key requirement is that the innovation centers have a budget for testing and research and development. It may not be possible to get testing done in-house, in this era of limited resources, tight budgets, and conflicting priorities. If third party tests, or custom, proprietary standards need to be met, having a budget to support testing can facilitate progress and signal a commitment to the technology to potential partners.

Innovation staff would be assessed based on their success in identifying and progressing new technologies, realizing cost savings, or promoting improved quality and products. Innovation wouldn't wait until the next big problem needed fixing but would truly represent a commitment to continuous improvement.

Tool-X LLC
www.tool-x.net

RELATED