The Alternative Line

by Joe Holzer for CNY-PCA Redline Report http://www.holzerent.com

Teaching an Old Dog New Tricks

There is an old saying; "There are three kinds of people – those who can count and those who can't". Similar groupings can be made for engineers, hopefully with the irony eliminated. Engineers can generally be lumped into the intuitive and the analytical – those who can evaluate a situation and determine path based on an understanding of the factors which influence that situation, and those who use calculation to arrive at optimum results. Clearly, those who know Porsche will certainly lean toward the latter in their expectations. But even Porsche recognizes the need for the former on some level. All the calculations in the world determined, for example, that greater efficiencies could be achieved by an electro-hydraulic steering assist in the new 991 vs its predecessor continuous hydraulic system as in the 964 - 997. But Porsche has taken quite a gamble in using the new system, because it lacks much of the feel of the prior systems, which gave such stellar feedback to the driver. Those who follow the trades magazines have noted that the new system has been the source of the greatest negative commentary on the 991. We'll see.

What has brought this to mind is a course I am currently taking. MIT is trying an online course, their first foray into the process, and so they offered it free to those of us silly enough to accept the challenge. The response has been surprisingly high, and perhaps even more surprisingly – global. There are people of many languages taking the course. It is called 6.002x "Circuits and Electronics". I decided to try it, despite my last formal classroom in engineering being 1973, because it seems even vacuum cleaners must have digital displays these days. And I figure that I should be able to converse when the marketplace discovers that the ability to operate an iPhone is not the same as managing a project, and will start needing those of us with grey hair again. Live, horse, until that grass grows.

Anyway, I knew Toto and I were no longer in Kansas when the first day (March 5) was a refresher on Maxwell's Equations. Huh? I'm in trouble. Let me just say here that I am in the former group above, despite using (and even building them myself) math modeling to perform quality analyses which led to my solving the TRW RKE transmitter problems in the late '90s and running their associated recall program for Ford. And it has certainly been needed for a lot of the controls work I have done for machine logic and software systems. But I did when I first used them, and still do, have conceptual problems with "Diffy Q" or "differential equations", especially when it comes to solving them. For those of you who managed to avoid them in your career, as I have since Clarkson in '73, let me simply say they are a means to analyze systems during change. Like increased stresses over time, such as a wing loading increases to take off, or the stresses on a tail hook or the cables which grab it strung across an aircraft carrier. Or you and an airbag.

We should all be VERY glad there are people who ARE good at such equations. They are the reason airline travel is both safe and low cost. Few of us even think for a moment about the what-if as we board our flights across the North Atlantic. But at least one Air France jet found that we engineers are not perfect yet.

Those who have spent time with me know that I am very good at explaining complex subjects in simple terms. Hopefully that is why you bother to read my wordy diatribes here ;-) My engineering has leaned more to the "overkill" side – designing machine bases with the full knowledge that someone will eventually hit it with a fork truck, so I build the base of two inch thick boiler plate, because the difference in cost vs the minimal requirement for construction is so small vs the risk involved for durability in the real world. But if I had to make it fly, or try to meet the new CAFÉ standards, I'd be in serious trouble, because "diffy Q" would be essential.

The good news is that the course has had JUST enough that I have grasped sufficiently to not yet get too far behind. Things like Boolean logic, which many people have similar responses to as I have for Diffy Q, yet Boolean is like water to a duck for me. I did that homework before I read the course material. Each of us has some things we are good at, and others we are not.

But that is precisely the point for Porsche, and frankly for every car maker in the world. Since every car is ultimately a series of tradeoffs which collectively result in the broad range of vehicles which all exist in the same marketplace, those tradeoffs result in the characteristics which make that vehicle appropriate for its tasks. You would never think to buy a GT3 as a UPS delivery vehicle, unless you lived where there were no potholes and very wealthy people waiting for transplant packages, the same as you would be unlikely to buy even a Porsche Panamera Turbo if you hoped to win Le Mans. That is part of what made the Porsche 959 prototypes seem so ridiculous when Jacky Ickx approached Porsche with the idea of running the toughest race in the world, the Paris Dakar, in the mid '80's. If you do not know what I am talking about, I suggest you study before the next Porsche Parade Tech Quiz. The 959 simply astounded the competition, and changed people's perception of "possible" forever. Ask Helmuth Bott.

Developing a vehicle, like the 991 today, takes hundreds of millions of calculations. Compare the development of the 991 with, for example, the 356, and you see the differences computers have both enabled, and made essential, even as some of the craftsmanship has seemingly been lost. No car today could possibly meet emissions regulations, let alone creature conveniences, without the use of fast computing power. Even that last bastion of the good-ol-boys, NASCAR, has gone to EFI. And as Moore's Law (technology essentially doubles speed and halves cost about every 18 months) has demonstrated, microprocessors have become so cheap and ubiquitous that they are found in greeting cards.

Gone are the days when you would take your Slo-Syn to your Weber stacks to adjust your carbs, then use your timing light and dwell-tach to adjust your points for optimum power at the sweet spot. How many of you even realized that your carburetors were always a compromise between an idle setup and a sweet spot, with EVERY other spot suboptimal? Today, there are literally hundreds of thousands of discrete mapping points for the variety of inputs to your ECU so you have much closer to perfect performance at almost every place within the entire range of parameters your car will ever see. AND they are capable of learning and improving their own performance as they go along. That is why your cars since 1996 have had to pass OBD-II tests, not of the tailpipe emissions, but of the COMPUTER to determine if you pass NYS inspection. But it is also why YOU have almost NO ability to adjust ANYTHING on your car anymore. And why your car is more likely to be diagnosed by an oscilloscope than by a guy who puts a stethoscope on the valve cover and accurately tells you what is wrong with your car. So you might, or might NOT, think that is good.

Unfortunately, especially for a place like Porsche, that choice does not even exist – technology is selected because it is ultimately easier to achieve requirements across a global perspective, even if those "improvements" often seem to benefit YOU less and less, and often seem to make things cost even more. Now you know why the Tee shirts proclaim "Sure Porsche made cars after 1965 – Who the Hell Cares?" That is a cry of electro angst ;-)

NOW you know why I am studying 6.002x online from MIT, despite having an MBA and a BSME. Not because I ever hope to become an Electronics Engineer – I have no illusions whatsoever. I just want to be able to talk to the people who are, and not sound TOO archaic ;-)