



The Steering Wheel Guy

Ed Dellis, Inventor

R&D efforts to improve steering technology always have to take two different factors into consideration: On the one hand side technological issues, on the other hand human factors. we.CONECT spoke with Ed Delli, Inventor, about the human side of steering performance.

Prior to the Automotive Steering Technology 2013, we spoke with Ed Dellis, Inventor, about custom-moldable handgrip technology.

we.CONECT: Please describe briefly the industry and market in which your company is operating?

Ed Dellis:

PersonaGrip custom-moldable handgrip technology was first introduced to auto racing and the automotive industrial ergonomics sector in the mid-90s by its inventor, Ed Dellis. His work has appeared in IndyCar, NASCAR, F1 (cars and boats), ALMS, the Unlimited Hydroplanes, and nearly all forms of amateur racing. 761 serial-numbered steering wheel grips have been designed by Dellis as of March, 2013. The US Olympic cycling team has used it as well, and the World Champion in Racquetball, Mike Ray, claimed the championship title using PersonaGrip.

Automotive assembly lines at Toyota, Chrysler, Dodge, Harley Davidson, and many other factories have joined the movement. In 1987, NIOSH researchers proved that a reduced grip effort can reduce the risk for Carpal Tunnel Syndrome TEN-FOLD for workers in high-repetition/high-grip force environments. This reduction in risk is only possible if they can relax their grips enough to fall below the threshold that puts them at risk in the high-grip-force category. A correctly molded PersonaGrip was EMG tested at NIOSH in Nov. 1994, and results showed a 54% reduction in grip effort in sliding mode, and a 43.5% reduction when twisting.

we.CONECT: In your opinion- what are the main current challenges and trends your company has to face?

Ed Dellis:

The biggest challenge has been introducing a TOTALLY NEW paradigm for controlling handheld objects that runs opposite to what has been ingrained in us since birth. The new paradigm moves us away from

friction over to leverage at the human-machine interface. At first glance, a custom-molded handgrip appears to only provide additional comfort. However, in auto racing it opens up entirely new channels for feedback, and can easily eliminate the need for power steering completely. Another challenge is getting teams/drivers to realize how nuanced ergonomics truly is. Until you actually try developing a grip that satisfies the mechanical and physical requirements - including the driver's finicky sensations - it looks simple enough that talented teams felt they can easily do it. The last 10 years has shown that's not the case.

we.CONECT: How is your company reacting to this? Which implication does this have for your work?

Ed Dellis:

PersonaGrip is currently introducing a special Motorsports Master Certification program. This program will convey to selected technicians the numerous lessons learned from designing 761 grips over the last 20+ years in the top forms of racing. The test on the final day will pose technicians in real-world steering wheel conversion situations at a track in Southern California with me driving my '58 Beck Lister Corvette acting as a customer. Once certified, they will be listed in a database online at www.SteeringWheelGuy.com. The industrial ergonomics certification program will list graduates at www.IndustrialErgonomics.com. This will allow Certified Professional Ergonomists to locate them to perform tool modifications under their guidance for factory workers in assembly line environments.

we.CONECT: Please describe in brief the project you will be presenting on the Automotive Steering Technology 2013.

Ed Dellis:

I will cover History of Steering Wheels right up to the introduction of PersonaGrip into IndyCars. Car control basics will explain how the custom-moldable handgrip improves the steering feedback's signal-to-noise ratio. The human side of perception will be discussed, and colorful anecdotal stories about the teams and drivers will be shared that cover the lessons learned along the way. Design basics will also be touched upon, and the legal implications for OEMs will be addressed, as well.

we.CONECT:

What are the special challenges of the project?

Ed Dellis:

During the early stages, compounding the material to attain the correct physical characteristics was the primary challenge. Since it needs to be stable in harsh work environments - while still being moldable with the human hand - ideal stick-slip characteristics eluded discovery for the first few years. Once the six-compound formula was developed using a prototype piston-type injection-mold machine, post-production molding techniques then needed to be discovered. Lastly, opening the minds of users both at the track and in the factories (industrial ergonomics) was frustrating since PersonaGrip represented a totally new paradigm that went against all the established rules of perception. As a professional driving instructor for many of the top U.S. racing schools, I was able to describe the principles behind the new paradigm to his drivers. However, my interpretation of the driving concepts was 180-degrees opposite to what had been established in the '60s by tire engineers. My new theory flips the Friction Circle inside-out since it focuses on what the driver feels, and not what the car

feels. As such, drivers begin to think of the steering wheel as an extension of their thoughts in what I describe as “mental transparency”.

we.CONECT: Which challenges are related to that topic for your industry as a whole?

Ed Dellis:

After two decades of successful implementation, PersonaGrip now has a proven track record when it's done correctly. However, the biggest challenge remains convincing talented individuals that their former perception of how humans relate to their tactile environment is not the best path to perfection. Oftentimes, their untutored attempts fail to create grips that meet their goals, and the grip gets blamed. However, it's not the grip that failed...it's their efforts that fail; hence, the new master certification programs.

we.CONECT: What are your plans within the field of steering wheel technology for the future? What are the next steps?

Ed Dellis:

After technicians become certified, they can be contacted online to finish designs performed by end users who require assistance during the fine-tuning process. This will open up the opportunities for OEMs to offer moldable handgrips on special steering wheels for “Off-Road Use Only”. Live, video tech support via webcam will make the techs available to their customers virtually 24/7/365. This level of support allows the technology to be implemented throughout the globe regardless of time zone.

Ed Dellis

Ed Dellis is known as The Steering Wheel Guy in the top forms of racing today. He is the patent-holding mechanical engineer responsible for inventing the custom-molded steering wheels. Dellis began racing in the early-70s, and has taught high-performance driving and car control at the top racing schools throughout the U.S. all his life. While writing for SAE's Automotive Engineering magazine in the late-80s/early-90s, he went on to custom-mold Emerson Fittipaldi's IndyCar steering wheel at the '93 Indy 500. Fittipaldi won that race, and Serial #001 wheel was stolen that night during the slideshow at the victory banquet. But, it wasn't until his technology was EMG tested at NIOSH in '94 using standard university test procedures, that its value on automotive assembly lines was discovered. According to their research*, a ten-fold decrease in risk for carpal tunnel syndrome can be achieved for workers involved in high-force/high-repetition tasks when Dellis' technology is used properly... same benefits apply to professional drivers. Today, Dellis uses his 650-hp/886-kg Beck Lister Corvette #007 as the test bed for his steering wheel designs. With his new feeling for the front end made possible by using leverage to line up forces at the human-machine interface, Dellis now says the traction problem has moved to the rear.

* Silverstein BA, Fine LJ, Armstrong TJ. Occupational factors and carpal tunnel syndrome. Am J Ind Med 1987; 11: 343-358

Automotive Steering Technology 2013 is a global automotive conference that discusses latest developments in the steering industry: EPS applications, market adaptations and current challenges, steering system development and new technologies such as steer-by-wire. <http://automotive-steering.we-conect.com/en>

Contact:

Dr. Klaudia Malowitz | Senior Product Manager | we.CONECT Global Leaders GmbH

Email: klaudia.malowitz@we-conect.com

Phone: +49 (0)30 52 10 70 3 - 48 | Fax: +49 (0)30 52 10 70 3 - 30

Design Contests will be held online to reward techs with the best designs and presentation. This ensures that their discoveries are shared via YouTube videos.

we.CONECT: What do you like most at your job?

Ed Dellis:

The eye-opening, jaw-dropping reactions I get from drivers after they first use a properly molded steering wheel is quite rewarding... especially for the drivers who had some doubt about the product claims.

we.CONECT: What expectations do you have for the Automotive Steering Technology 2013? Which outcome and benefit do you expect from the exchange with participating companies?

Ed Dellis:

The greatest satisfaction I can get from the conference will come when engineers understand that success with custom-moldable handgrip technology is a PROCESS that goes beyond the moldable plastic itself. When they embrace the human side of it, and become comfortable with the 'gray matter' aspects, then I'm sure they'll realize all the benefits the new leveraging paradigm offers.

we.CONECT: What happened to Serial #001 Steering wheel?

Ed Dellis:

Emerson Fittipaldi used it to win the '93 Indy 500, and it got stolen at the Victory Banquet that night during the slide show.

we.CONECT: What is the Tale of Two Dales?

Ed Dellis:

It is about how I made a wheel for Dale Earnhardt, but after the driver demanded sponsorship, I retained the wheel. Less than 2 weeks later, Dale Jarrett called me and told him that he qualified dead-last and needed a molded wheel to relieve the pain in his left hand from two broken fingers suffered earlier that day. After interviewing Jarrett over the phone about his remaining dexterity, I redesigned Dale Earnhardt's wheel, and shipped it overnight to the track. Jarrett only hoped to start the race for his sponsors, but ended up winning it the next day, broken fingers and all.

we.CONECT: Why do people think it looks so simple to do?

Ed Dellis:

When the previous friction paradigm limits creativity to enhancing surface friction ONLY, it is not hard to understand why people see protruding surfaces as being more for comfort only. It's only after you begin to understand how the human hand interfaces with an object - and study its force interactions - that one can begin to appreciate and learn how to take advantage of the new leveraging paradigm.

Mr. Ed Dellis, thanks a lot for this interview!

Interview Partners: Dr. Klaudia Malowitz and Ed Dellis

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