

OU Students Learn Value of Efficiency At Chrysler's Manufacturing Academy

by Irena Granaas

"Okay, Tom, it's time to suit up!"

That was the word from Jeff Dobski of the Chrysler World Class Manufacturing Academy on a recent Tuesday night in April.

Tom Duchaine was one of about a dozen students from Bill Edwards' Human Factors Engineering & Ergonomics class, an elective for Industrial and Systems Engineering students in Oakland University's School of Engineering and Computer Science.

The students get an opportunity for hands-on learning at Chrysler's WCM Academy in Warren.

The "suit" in question was a black motion capture body suit equipped with tiny lights. Duchaine donned the special suit as he prepared to attempt the partial assembly of a toy bike. As he moved, Duchaine's every motion was monitored throughout the cycle time in a simulated workstation.

"The 3D equipment captured the movement of Duchaine's body and of every joint with a fine degree of precision," Edwards said. "Even the pulse of his heartbeat could be noticed in his index finger."

After Duchaine went through the process once, the initial workstation layout and assembly were quantified. The motion capture equipment highlighted the "spaghetti path" the operator took with high reaches and low bending, and the work each hand was performing.

Edwards explained that the challenge for students who were tasked with analyzing the data and improving the process was to get all of the worker's movements in the "golden zone," which he defines as the best place for a worker to do work, with parts and tools two inches

below the elbow ("make gravity your friend") and right in front of the operator.

"The suit generated Tom's path of motion . . . You don't want to reach, stoop and bend," Edwards explained. "You want to tighten the strands of spaghetti. The suit captured the length of motion, path of motion and his time to assemble."

Then it was the turn of competing teams of students to go to work. The students drew upon their knowledge learned from the HFE class and other lean process classes to optimize the assembly process, reduce the motions needed, have tools at the ready and the work piece properly positioned in the golden zone in front of the operator, and limit the operator's need to fight against gravity.

"That was awesome," shouted Ben Tew, an Engineering Management graduate student in Edwards' class.

It's all part of the science of ergonomics, about which Edwards says, "It's all about designing the job to fit the person, not the other way around."

"Ergonomics was given secondary thought in the past, but the industry has really taken note of it for a couple of reasons," he said. "You get a better product out of it, worker fatigue and carpal tunnel issues are drastically improved based upon the science of ergonomics being given a higher priority."

"Some of the benefits are, you get a better quality of work, faster work, increased throughput, reduced waste and overall leaner efficiencies and systems, which is what we do here in Detroit and which has done a lot for manufacturing."

"These resulting increased efficiencies, quality improvements and higher productivity are a key part to Chrysler's comeback in

recent years. Even some of the Chrysler employees have acknowledged going to the academy has made them more efficient, and it's why the automaker wants to eventually send nearly all their employees through the academy, from line workers to supervisors and even administrative assistants."

Edwards, who spent 12 years with Chrysler and served as an engineering manager at the time he left the company for Oakland University, sees class trips of this type to Chrysler's WCM Academy as a chance to "marry" the industrial elements with the academics.

Because of his automotive engineering background and Chrysler connections, he is glad to be able to share these kinds of "real world" experiences, which he said students truly appreciate.

In the class, which was held in the evening on Tuesdays and Thursdays, January through April, a mix of graduate and undergraduate students, most of whom are working in related fields, learn about factors inside and outside of manufacturing assembly.

Topics include recommended weight limits, frequency and variation in tasks, cumulative fatigue, and part-and-process flow. But the beauty of the Chrysler WCM Academy experience is that, as one instructor professes, much more knowledge is retained by doing something rather than reading about it in a textbook.

This point is stressed by Scott Tomlie, Chrysler's lead at the academy and an adjunct professor in Oakland's Occupations, Health and Safety Department. Tomlie and fellow Chrysler employees Dobski and Larry Robling have been part of the education team that soon will be able to say that 10,000 students have passed through its doors, a



Tom Duchaine wears a "motion capture" suit while assembling a bike.

group that includes Chrysler employees, suppliers and university students.

Duchaine, a Fourencia Quality Department employee working at the Chrysler Sterling Heights Assembly Plant as a quality inspector, was favorably impressed by the experience.

"I think it was a highly effective demonstration of technology and its use in the optimization of a production environment where there's an operator involved," he said. "Also from students' perspective, it reinforced what we learned in Dr. Edwards' class."

He agreed with Edwards that going through the hands-on experience will result in much bet-

ter recall and understanding beyond traditional classroom techniques "as a more value-added activity."

"It was a fun experience," Duchaine added. "Everyone had fun going through the design (process) and it was a friendly competition."

The study of ergonomics adds skills that Duchaine, as an engineer, feels engineers should have a working knowledge of, not only for what makes things better for the operator, but for the organization as a whole.

"Any engineer who has (the opportunity) available should take this course, in my opinion," he said.

Detroit Electric Gets Partner in China

Geely Automobile Group, a prominent China-based global car manufacturer, and Detroit Electric Inc., a Detroit-based electric vehicle manufacturer, announced at the Shanghai Motor Show that the companies entered into a strategic partnership to co-develop pure electric vehicles and related electric drive systems for the Chinese market.

Under the terms of the partnership, the first model of pure electric vehicles will go on sale under Geely's Emgrand brand starting in 2014.

After an initial three years of feasibility studies and a joint development program, the two companies have selected Geely's best-selling Emgrand EC7 model in the domestic Chinese market as the base vehicle on which to develop a class-leading pure electric vehicle.

The EC7-based EV, called the

EC7-EV, will be co-branded with a "Detroit Electric - Techno" badge and sales are expected to begin in the first quarter of 2014. The vehicle will initially be sold to business users and public-sector organizations, and the two companies are forecasting sales of around 3,000 units in the first 12 months, growing to 30,000 in three years' time.

A joint development and engineering team has been formed to work together in all areas of the EV powertrain solution, including electric motor, vehicle management system, advanced thermo-managed battery pack, battery management system and a twin-speed high-torque gearbox.

The partnership also extends to the formulation of a joint venture company to manufacture the critical EV powertrain components and associated parts, situated close to Geely's head-

quarters in Hangzhou, the capital of Zhejiang province. Geely also operates six car assembly and powertrain manufacturing plants across China.

The new EC7-EV model will offer both medium-range (with a driving range of 165km per charge) and long-range options (an approximate range of 258km per charge).

Building on Detroit Electric's performance DNA, the vehicle can deliver class-leading acceleration (0-100kph acceleration under eight seconds) and a top speed exceeding 200kph.

"This is a very significant step in the development of the Detroit Electric business and is testimony to our innovative technology and engineering capabilities," said Albert Lam, chairman and Group CEO of Detroit Electric, which has its corporate offices in the Fisher Building.

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