

ENGINEERING

ON TRACK FOR A QUICK SOLUTION

Computer-aided engineering is a crucial tool for upper end testing and simulation. **Report: Michael Bleby**

● The rules are getting tougher in the V8 Supercars competition. In comparison with the much higher-spending Formula 1 code, rules governing vehicles' weight and such things as aerodynamics are tightly defined in a well-enforced bid to level the playing field and keep the focus on racing, rather than money. From next year, the rules will become even tighter.

All this makes the use of computer-aided engineering for testing and simulating race conditions crucial, according to Ford Performance Racing's director of business operations, Mark Roworth.

"They're removing a number of the freedoms that allow the teams to go out and spend," he says. "We are more and more reliant on simulation today than we've ever been."

Computer-aided engineering, or CAE as it is known, is widely used in drawings and design but at the upper end is a crucial tool for testing and simulation.

It allows structures to be put through stress tests in ways once only possible by physical tests of prototypes. Virtual testing offers great savings in time and money.

Away from the glamorous world of racing cars, it has widespread application in areas such as building bridges and testing the lifespan of rail cars.

CAE is crucial to the future of manufacturing but is something many in industry fail to grasp, says RMIT University's head of aerospace, mechanical and manufacturing engineering Aleksandar Subic.

"They have this middle-aged view of manufacturing where manufacture has to happen in the same place as where the design is happening. It's ludicrous," he says.

"The whole point of digital technology is that you can do design and analysis anywhere."

Most people agree there is not enough



Fast times: Ford Performance Racing relies on computer-aided engineering

uptake of CAE in this country. While larger companies do, smaller ones lag.

"The big companies get it. It's the smaller companies where the uptake does slow a bit. They're probably the ones that need it more to be competitive," the managing director of Compumod, a Sydney-based supplier of CAE software, Warwick Marx, says.

Sydney-based consulting engineer and former academic Richard Wiltshire, who works a lot with CAE, says the cost – the software packages start at \$30,000 and stretch into the hundreds of thousands of dollars – is a hurdle for smaller companies. But there is another point.

"One of the impediments to buying it is having the people to use it," he says. "I don't think the universities are doing a particularly brilliant job in solving that one either. The courses that skill people for that stuff are not what they used to be."

Subic, who sends 200 students a year to Europe on paid internships, disagrees

SIMULATION AND SPLIT SECONDS

Fast-paced games require fast solutions. In December last year, the Ford Performance Racing team arrived in Sydney for the Telstra 500, the last race of the championship calendar, and did a walk of the track. They noticed a different profile on the kerbs and raised concerns that this may have a negative effect on their cars' suspension. They were right, they discovered on the Saturday, the first of two race days that weekend.

"We were having component failure," director of business operations Mark Roworth recalls. That race was a disaster – three of the team's four cars didn't finish – but even during the race, with the use of its CAE software, the engineering team redesigned, evaluated and simulated new components that could solve the problem.

Tests complete, they manufactured two new steering arms, one for each side of the car, at the team's Melbourne base and got them on a 10pm flight that night to Sydney. To give the pit crew a choice, they worked overnight on second versions, which were put on a 6am flight the next day. The pit crew chose version A for Sunday's race, which FPR driver Mark Winterbottom then won.

"We went from the losing position on Saturday to winning the race on Sunday," Roworth smiles.

Michael Bleby

vehemently. The problem, he says, is that there are too few graduates coming out of the system. "Half of the jobs in Australia are met by migrants," he says.

While there is not enough appreciation of CAE and the high-end niche of design, testing and simulation it permits, Australian manufacturing will continue to flail around in the lower-end, widget-producing industries that unsuccessfully attempt to compete on price, Subic says.

"When you own the IT and value-added technology being sold worldwide, you don't care whether they're producing that component," he says.

Back at the racing track, Roworth endorses Subic's view. Not only does Ford Performance Racing have a "large number" of highly skilled Australian engineers but other codes do, too, Roworth says.

"There is a large volume of Australians in Formula 1 because they get such great training and education here," Roworth says. **BRW**