

# Ford say "FirstEarth tools save time and money"

"Safety and Reliability are very important to Ford," explains Andreas Kraus, Manager, Electrical Technologies & CAE (Europe) of the Ford Motor Company. "Automobile electrical systems are getting more and more complex, and we need to carry out thorough FMEA (Failure Modes and Effects Analysis) and SCA (Sneak Circuit Analysis) for each product, while reducing our product development times."

FirstEarth helped the Ford Motor Company to make the improvements they needed. The AutoSteve™ design analysis tools generate comprehensive FMEAs in minutes, freeing up weeks of skilled engineer time and reducing the number of breadboards and physical prototypes required.

AutoSteve is designed to allow close integration with a number of different Electrical Computer Aided Design (ECAD) tools. Through the integration of AutoSteve with Ford's standard ECAD tool, Ford benefits from an advanced design analysis solution for the electrical design department, without having to change the way they work.

FMEA is the process of analyzing how individual component failures affect the overall functionality of a system. For example, if a relay's coil burns out, what happens in an airbag circuit when the electronic control unit detects a crash?

The output of an FMEA is a report that details the effects caused by each possible failure in the design. Each effect is assigned a Risk Priority Number; a larger number indicates a higher risk. Ford engineers analyze the report and decide what action may be required to address the issues raised, for example a partial re-design.

SCA involves identifying unexpected interactions in an electrical circuit. A common cause of Sneak Circuits is a combination of switch positions that wasn't originally considered by the designer and that may have unexpected or dangerous side effects.

A traditional, manual FMEA involves working meticulously through the implications of a particular component failing. The work is time-consuming and often tedious, but it needs the skill and experience of scarce design analysis engineers. Until now.

**AutoSteve increases quality, reduces risk, and saves money, while giving us a faster time-to-market.**

FirstEarth has developed AutoSteve, a program that simulates all possible activity of a circuit and automatically writes an FMEA report detailing what would happen if any component failures occur. Using the same simulation technology, FirstEarth developed a solution to automate SCA.

Ford has adopted AutoSteve as part of its global engineering strategy. It is in use at centers in Detroit (USA), Dunton (UK) and Cologne (Germany).

"When we performed an FMEA by hand, we would form a team that would typically spend months on a detailed analysis. The analyses were not exhaustive and could contain inconsistencies. We wanted a way to reduce the time spent on our design analysis, in particular FMEA and SCA, and improve the coverage and quality," says Mr. Kraus. "AutoSteve has given us everything we were looking for. We are able to experiment with more designs and to analyze the safety and reliability consequences of design alternatives, whilst reducing our overall design time and costs. AutoSteve paid for itself the very first time we used it on a production project."

Ford has made additional savings, because more thorough analysis means lower warranty costs and fewer recalls.

"AutoSteve increases quality, reduces risk, and saves money, while giving us a faster time-to-market," says Mr. Kraus. "AutoSteve is making a major contribution in these areas for Ford."



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Automating Design Analysis