

DEP | RAISING PRODUCT DEVELOPMENT BAR TO ADDRESS FUTURE NEEDS

The fast-paced world of vehicle development needs as much assistance as possible to further enhance the design and development phase, so as to be able to bring newer models to the market faster. Such R&D can be further strengthened with software tools that can assist in the entire life cycle management of products. Detroit Engineering Products (DEP) predominantly offers such solutions to the automotive industry among others. DEP offers three main levels of support - software solution that transforms product development, engineering consulting that provides tools, techniques & methods for development and engineering manpower at client locations for customised development of their products.

Auto Tech Review met up with **Karthik Shankaran, Chief Innovation Officer, DEP** to un-

ADDRESSING THE MEGATRENDS

Shankaran said the key enabler for electric vehicles (EV), which has remained the same for over two decades, is the energy source or the battery. As vehicle development is moving towards systems engineering concept of looking at various components as single systems, the same should occur for battery development as well, he added. There should be a capability to model the battery at various levels, add different types of physics, and understand other criteria as well. There is a need to understand how the battery discharges and what happens to its operations across different conditions. DEP is adding all those math pieces into its software solution and is coming up with clear battery modelling solutions that will be offered to customers in the future.



derstand its solutions for the complete product development cycle as well as testing and validation – all focussed on future automotive trends.

MESHWORKS

The flagship software solution of DEP is called MeshWorks, an integrated CAE-driven platform for pre and post-processing, involving rapid concept CAE and CAD model generation, parameterisation & optimisation, advanced meshing, process automation, concept modelling and CAD morphing. Shankaran said MeshWorks takes data of existing products and provides future virtual models. The latest release of the platform included features like a powerful FE/CFD pre and post-processor, as well as a customisable engineering process automation environment. This tool is more applicable in the development of physical or hardware systems, asserted Shankaran.

However, with regards to electronics, DEP picked the area of sensing technologies to provide solutions, since it felt it could add value given its vast experience in areas of engines and transmissions. DEP built its own engine sensing system and subsequently connected it with a controller unit that was also developed in-house. This solution will enable engine manufacturers and OEMs to transition from Euro 6 emission standards to regulations of Euro 6 with real drive emissions (RDE), noted Shankaran. This solution

On the focus towards electric motors, the company currently provides solutions focussed on the mechanicals of the motor. The solutions offered are in the form of optimising the magnetic flux and corresponding electromagnetic force, as well as improving NVH levels, Shankaran observed. This is an area of comfort for DEP, due to the similar solutions it already offers in the areas of engines and transmission systems.

Another area of development that is common across the megatrends is lightweighting. The common requirement is for lighter but stronger vehicles, which bring in the need to identify the optimum areas to cut weight, said Shankaran. DEP has published several methodologies towards the approach of cutting weight in vehicles, be it electric or autonomous.

POWERTRAIN OPTIMISATION

There is an increased focus on enhancing the future powertrains to become more efficient and clean. In the case of transmissions, there has been a demand for packaging all the components into a single unit or system for EVs. The transmission of the future is going to be a motor integrated with a smart set of gears and a parking system. Therefore, it will become an integrated drive unit in the future. DEP has carried out work on the engineering of such drive units, since the requirements have changed for such systems.

sing other integrated systems and ensuring adequate levels of cooling.

With regards to internal combustion (IC) engines, developments will be focussed more on the commercial vehicles segment, since that is where larger diesel engines and transmissions will continue to be mated together. The eight-speed transmission will continue to be the top choice for various types of engine sizes for a period of time before changes occur in the industry, Shankaran noted. Other factors to improve the efficiency of IC engines include component-level advancement for ignition and fuel injection. Gasoline compression ignition (GCI) is growing in popularity, for which there is a requirement to model every performance cycle. Therefore, engines need to become smarter, for which enhanced sensor capabilities are prescribed.

CONCLUSION

Virtual validation was earlier carried out to pass or fail a design, but now it has transitioned to being part of the product development cycle, noted Shankaran. It is now carried out in the early stages of development, thereby providing designers with optimum design iterations. Such software tools at the concept stage of a product are also addressing the fundamentals of manufacturing, thereby enhancing overall product delivery.

is a plug-and-play sensor that will replace five to six sensors that were used earlier.

Earlier, the problem was to address gear noise from the transmission, but now it is about optimi-

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