



# Future Demands Next Generation of Standards and Practices in Gear Industry

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Gear manufacturers are moving into an era that will see changes in both engineering practices and industry standards as new end-products evolve. Within the traditional automotive industry, carbon emission reduction legislation will drive the need for higher levels of efficiency and growth in electric and hybrid vehicles. Meanwhile, the fast growing market of wind turbines is already opening up a whole new area of potential for gearbox manufacturers, but this industry is one that will demand reliability, high levels of engineering excellence and precision manufacturing. Over the coming years, these changes will require new techniques and approaches that will quickly become accepted industry standards.

Efficiency has become one of the most important factors in the design process for hybrid and electric vehicles. However, optimizing gear designs to be more efficient without compromising other design targets, such as NVH and durability, can be challenging.

Having recognized this problem of conflicting design requirements, Romax has carried out significant research and development into simultaneous optimization, so engineers are able to consider efficiency, durability and NVH in the same environment and optimize the system performance to meet all the targets.

Another major challenge facing hybrid and electric vehicle designers is that gear noise becomes much more prominent and can be at a high frequency—which is much more noticeable to end users. This makes gear

noise in electric vehicles harder both to predict and to solve. Potentially, the gear noise in hybrid and electric vehicles needs to be lower over a much wider range of operating conditions than the traditional vehicle. This can be achieved with computer aided optimization of design.

As quieter and more efficient automotive gearboxes are required by the end user, this also means that manufacturing standards need to be raised to meet these higher demands. By using advanced computer-assisted design optimization combined with virtual prototyping, you can give the HEV and ZEV drives of the future the quietest and most efficient experience possible, but this must be combined with tighter and more precise manufacturing techniques and a good standard of quality control.

The wind turbine industry is growing and providing a route for many companies to diversify and find new revenue streams. However, whilst component suppliers are welcomed, many are discovering that the wind energy industry demands both quality as well as quantity.

The mechanical parts of the wind turbine have to be robust enough to deal with extraordinary forces and stresses, and for this reason, the industry demands exceptional technical ability, as well as high quality from its component manufacturers.

Within the area of gearbox transmissions, in particular, reliability problems are widespread, and these issues have to be addressed if the industry is to develop to its full potential.

Manufacturers looking to enter the wind turbine industry can turn to design platforms to support their needs. Design platforms enable manufacturers to decrease design time by allowing a variety of concepts to be reviewed quickly and easily, considering all permutations. It also allows different components to be tested in the design stage and the impact on performance, weight and manufacturing to be measured, for example investigating the effects of switching a helical gear for a spur gear. Having the ability to understand the forces and material capabilities enables design decisions to be made before expensive prototyping is performed, ensuring quiet, durable and long-lasting components.

For suppliers entering the wind energy market, design platforms can provide a valuable reduction in time and costs to meet the demands for turbine component manufacture, particularly drivetrain elements such as gearboxes and bearings. For those companies already supplying the wind energy industry, design platforms can offer an opportunity to develop capabilities and improve results.

As we move into the future, a new generation of opportunities awaits the gear industry.

Going forward, the gear industry will need to utilize and embrace new and developing technologies to ensure that it remains as competitive as possible. The gear industry has a bright future, one that will carve out new practices and standards as we seek to meet the challenges this future brings with it. 