



Redesigning the tailgate: Lightweight Design and Innovative Features

Overview:

In today's automotive industry, steering wheels have evolved far beyond their basic function of controlling the direction of your vehicle. Engineering is done for the lightweight design of the steering wheel with glass-filled thermoplastic, provision for switch bezel and canister assembly, string ribbing for enhanced strength and durability, and the ability of PU over-molding and back cover. These advancements not only elevate the driving experience but also contribute to significant weight reduction, up to 40-48%.

Challenge:

Changing the existing conventional material of aluminum to lightweight material with enhanced performance and significant weight reduction. Virtual evaluation of composite wheel should be analyzed with automotive standards.

Engineering Solution:

Durability and Strength analysis is important in proving the capability of the tailgate assembly to handle different loads and environmental conditions without compromising its structure for passenger safety. The results obtained from these analyses are crucial in the overall safety and performance evaluation of a car.

Crash analysis is to ensure the safety of the tailgate assembly and occupants of the vehicle at the time of impact due to rear-end collision. It guarantees compliance to safety specifications, reduces crashworthiness, and mitigates risks of injuries and death in case of collision.

NVH Analysis tells us whether the component is operating well above the natural frequencies or not, to sustain various vibrational loads in the tailgate.

This assists in determining possible problems, improvement of the design, guaranteeing compliance with safety requirements, and generally improving the reliability and safety of the tailgate during its service lifespan.

Conclusion:

Every simulation step demands design optimization and correct material selection from which we achieved around 40-48% of weight reduction.