
OVERVIEW

A rigid structure is of paramount importance in a performance car. High rigidity provides a stable platform for proper suspension geometry and alignment, and it makes possible a tight, rattle-free interior. Additionally, central to the goal of performance is a favorable power-to-weight ratio; a very light car can achieve high performance levels with less horsepower. After an intensive research effort, it was determined that the most efficient way to meet the rigidity and weight targets for the NSX was to build the car exclusively of aluminum.

Using a Cray supercomputer, the engineers performed millions of Finite Element Modeling (FEM) and stress analysis calculations. The result of this research and development effort is a chassis that weighs 210 Kg (462 lbs) with doors, hood and deck lids installed—about 40% less than a steel chassis, but with the same rigidity and impact protection. The NSX structure is significantly stiffer than every other competitor currently on the market. Both models, the NSX and the removable-top NSX-T, meet 1997 federal side-impact standards.

BODY REINFORCEMENTS

To restore rigidity to the body with the roof panel of the NSX-T removed, the structural engineers employed extensive reinforcement measures throughout the body. The areas that required reinforcement were a redesigned side sill aluminum extrusion with significantly thicker wall sections, the base of the B-pillar where it joins the rocker panel, a larger rear bulkhead crossbar, a thicker trunk leading edge panel, a reinforcement web in the rear floor cross member, an additional rib in the center rear bulkhead section, a redesigned and thicker walled rear roof rail section, a redesigned front roof rail section with increased wall thickness, a completely redesigned and thicker upper A-pillar, a redesigned and thicker upper dashboard cross-member, and a redesigned front lower floor section with increased wall thickness.

REMOVABLE TOP

The removable top is made of aluminum for light weight and durability. The roof panel is body-colored and is easily removed by means of two latches located on the left and right side. Its light 8.5 Kg makes it easy to remove and stow away. A dash indicator light alerts the driver if the latches are not properly closed. Once removed, the panel is stored under the rear glass hatch and the hatch can be locked with a key for security. Since the top has its own storage compartment, it doesn't use any of the available trunk or interior space. In addition, the vehicle security system functions with the top removed as well as in place.

EXTRUDED ALUMINUM SIDE SILLS

To attain a structure of high rigidity, complex aluminum extrusions were used for the crucial side sills of the unit body. These extrusions, with their carefully braced internal structure, contribute to the extremely high torsional stiffness of the NSX.

For the NSX-T, these side sills received extensive reinforcement. The wall thickness of the vertical center web of the five-sided extrusion was increased from 2 mm to 6 mm. Other wall thicknesses were increased from 2 mm to 5 mm, 3 mm to 6 mm, and 5.5 mm to 6 mm.

RADIUSED FRONT FRAME RAILS

To maximize occupant protection, the front frame rails of the unit body are designed with large-radius curves where they meet the passenger cabin. This design helps to dissipate energy in the event of a collision, spreading out impact loads and diverting them under the passenger cell.