Midas NFX project application

Side Impact Protection Analysis - FMVSS214S

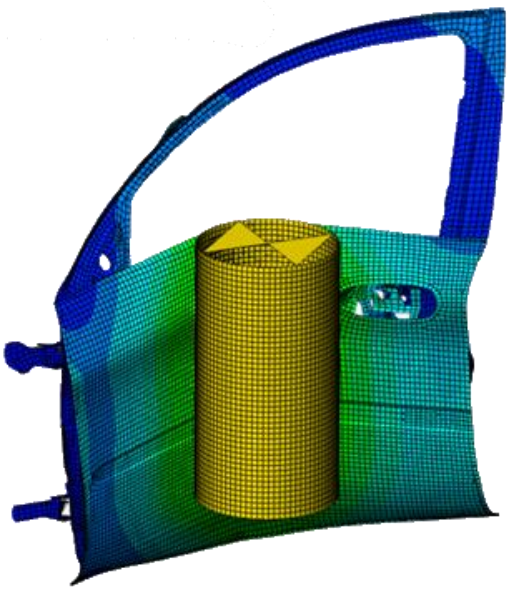


Figure 1.1 Side Door Impact FE model

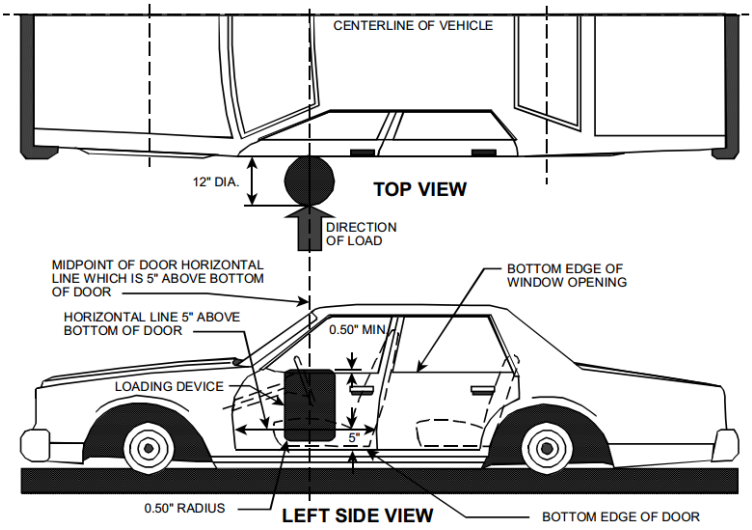


Figure 1.2 Federal Motor Vehicle Safety Standard

FMVSS 214, Side Impact Protection, specifies performance requirements for protection of occupants in side impact crashes.

The purpose of this standard is to reduce the risk of serious and fatal injury to occupants of passenger cars by specifying strength requirements for side doors. This standard applies to all PASSENGER CARS as well as 90% of light truck type vehicles with a GVWR < 10,000 lbs, manufactured on and after September 1, 1993, to August 31, 1994.
On and after September 1, 1994, all light truck type vehicles with a GVWR < 10,000 lbs will be required to meet the static requirements.

Laboratory test procedure for FMVSS 214S (STATIC) – U.S. Department of transportation

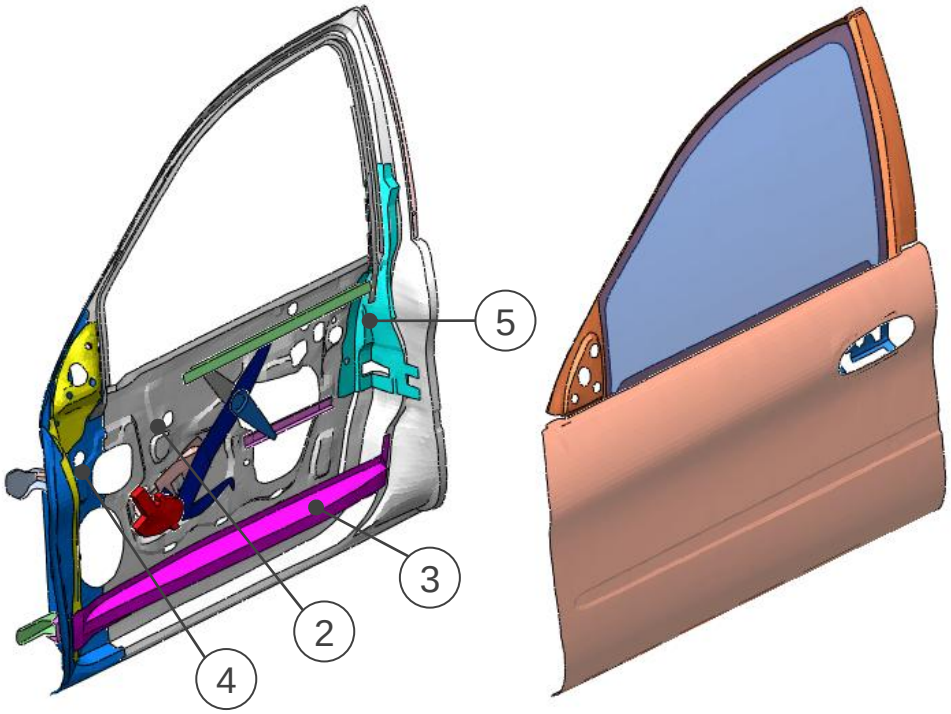
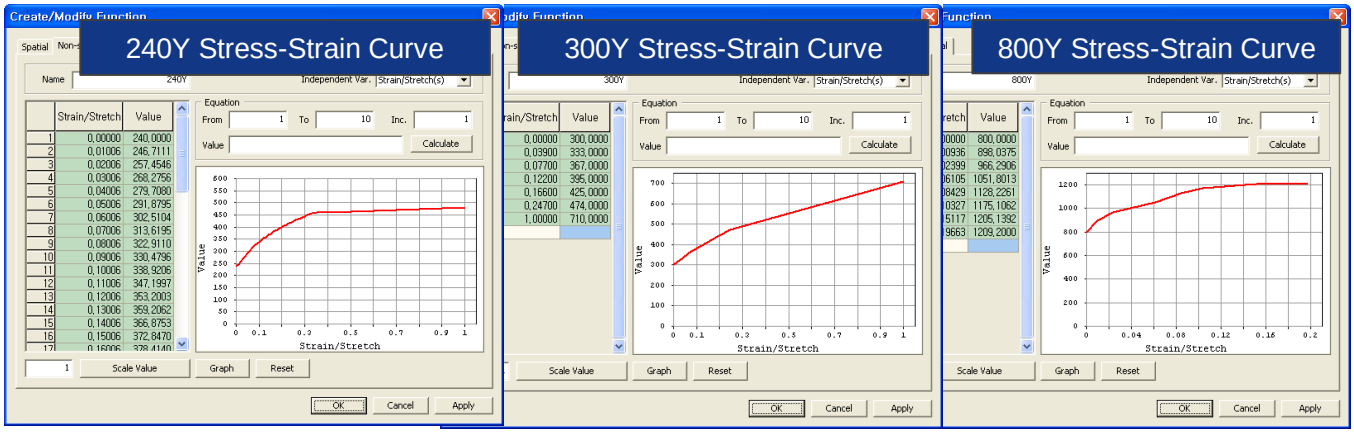


Figure 2.1 Nonlinear Material Models

	Part	Thickness (mm)	Modulus of elasticity (N/mm^2)	Poisson's ratio	Density (kg/mm^3)	Plasticity curve
1	DOOR_PNL_OTR	1.1	210e3	0.3	7.89e-6	240Y
2	DOOR_PNL_INR (TWB)	1.4/1.5	210e3	0.3	7.89e-6	240Y
3	DOOR_IMPACT_BEAM	1.6	210e3	0.3	7.89e-6	800Y
4	REINF_DOOR_HINGE	2.4	210e3	0.3	7.89e-6	300Y
5	REINF_DOOR_LATCH	1.0	210e3	0.3	7.89e-6	300Y



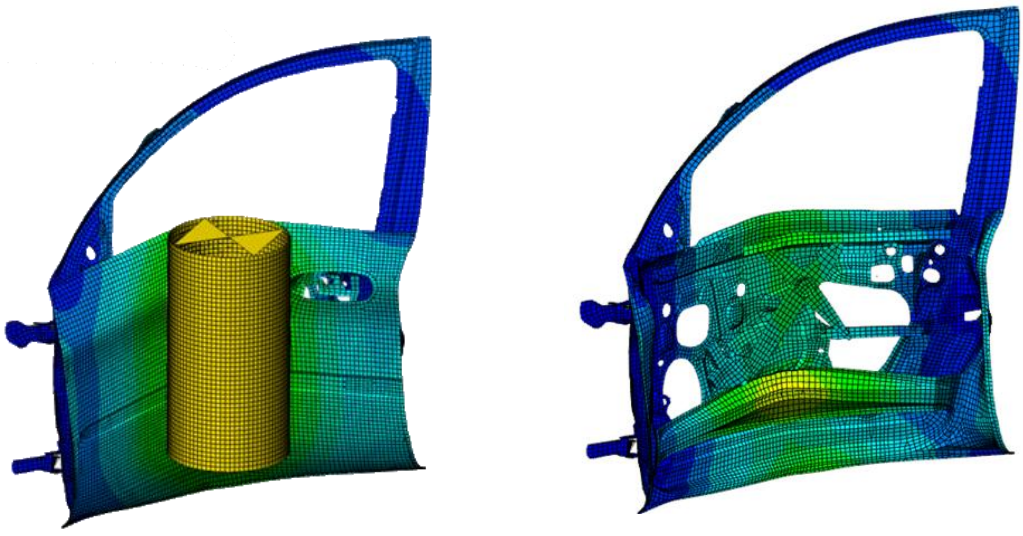


Figure 3.1Displacement Results of Side Impact Analysis

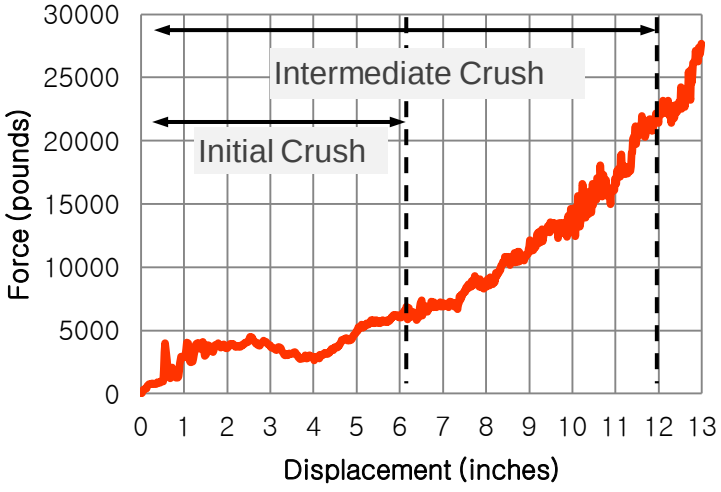


Figure 3.2 Load – displacement plot

Simulation with midas NFX helped the Engineers to obtain the load –displacement plot of the cylinder impact and obtained results shown to be complying with the regulation (cf. Fig 3.3)

FMVSS214		Results
Initial Crush Resistance	> 2,250 lb	3,564
Intermediate Crush Resistance	> 3,500 lb	7,837
Peak Crush Resistance	> 7,000 lb	Above 20,000

Figure 3.3 Results of the Side impact protection Analysis regarding to FMVSS214S