

excessive underride occurs in 30-40 percent of all fatal accidents in which passenger cars crash into truck rear ends."

Early federal attempts to deal with the override problem date back to the 1953 rules "49 CFR 393.86, Rear End Protection," issued by the Bureau of Motor Carriers of the Interstate Commerce Commission (ICC) [now the Bureau of Motor Carrier Safety (BMCS) of the Federal Highway Administration]. The rule applied to trucks and trailers (t&t) manufactured after 12/31/52. The rule requires that the ground clearance of the bumper shall not exceed 30" when the vehicle is empty. The device is to be located no more than 24" forward of the rear end of the vehicle, and it has to be wide enough that its end are not more than 18" inboard from either side. The rule further requires that the device be "substantially constructed and firmly attached."

In 1967, NHTSA initiated its rulemaking on rear end underride protection to improve on the BMCS rule, and in 1969 it proposed a new rule which required a device with a ground clearance of 18" for unloaded vehicle of greater than 10,000 GVWR's, to be located no less than 15" from the rearmost part of the vehicle. Important addition to the BMCS rule was a requirement for a static test of strength. Initially it was proposed that the device should withstand a 75,000 pound load applied with a 4"x4" test block at the center of the device. Subsequently, it was lowered to 50,000 pounds, to be applied with 4"x12" test block at any point between the outmost sides of the guard. However, in 1971 after evaluating cost and accident data, and responses to the proposed rule, NHTSA terminated these rulemaking efforts. At that time NHTSA estimates that the proposed rule would save 50-100 lives per year at an annual cost to the consumer of \$500 million. Most of the increase in cost was attributed to increase in the guard rail weight in order to withstand the 50,000 pound impact.

In 1977 NHTSA resumed work on the improvement of underride protection. This was a direct results of tests conducted by the Insurance Institute for Highway Safety (IIHS) in 1976, and eventually a US Senate Oversight Hearing. IIHS conducted five tests in which cars were crashed into the rear of a typical semi-trailer van. Two of the tests evaluated a prototype "Rigid Guards," developed by IIHS. A "Rigid Guard" is one that can withstand a load of 100,000 pounds without permanently deforming. The IIHS "rigid guards" were lightweight with struts which transmitted the collision forces from the guard to the uderframe of the van. These test shows that substantial reduction in underride damage can be achieved with this type of light guard.

As a result of the Senate hearing and a subsequent petition for rulemaking filed by the IIHS, BMCS and NHTSA jointly initiated a new research program and a new set of proposed rules on underride protection. On August 29, 1977 (42 *Federal Register*) they made an Advanced Notice of Proposed Rulemaking (ANPRM) was published to solicit comments. As NHTSA indicated (*Federal Register*,