vans; 722 in large vans; 1,686 in small pickups; 3,342 in large pickups and 898 in other LTVs. By comparison, in 1993, there were 8,487 fatalities that occurred in LTVs. The fatality distribution by LTV vehicle category was: 576 in small vans; 545 in large vans; 2,519 in small pickups; 3,357 in large pickups; and 1,389 in sport utility vehicles.

c. Side Impact Safety Problem

The number of fatalities in LTV side impacts increased faster than the overall fatality rate. In 1984, LTV side impacts resulted in 1,197 fatalities; in 1991, there were approximately 1,676 fatalities in side crashes. NHTSA estimates [1] that, by the mid-1990's, side impacts will result in 1,763 fatalities for LTV occupants sitting in the front or second seat, annually. Front seat occupants will account for 1,705 of the fatalities, with occupants of the second seat accounting for 58 fatalities (less than 2 percent). Side impacts are also expected to account for about 6,000 serious but non-fatal injuries to occupants sitting in the front or second seat, annually. These injuries are of a level of 3 to 5 on the Abbreviated Injury Scale (AIS). (An AIS level is a measurement that rates the severity of any injury. For example, a minor injury is rated at the AIS 1 level. At the other extreme, a fatal injury is rated at AIS 6.)

The side impact protection requirements in Standard 214 are two-fold. The quasi-static strength requirements address intrusion-related injuries, such as in narrow object side crashes into poles or trees (fixed objects), by limiting the amount of intrusion. The standard's dynamic requirements primarily address LTV occupant fatalities and serious injuries that are likely to occur due to occupant contact against the side interior of the struck vehicle in a two-vehicle collision. (See Final Regulatory Impact Analysis for the rule adopting dynamic test requirement for passenger cars, Docket number 88–06, notice 8, DOT HS 807–641, August 1990.)

The dynamic side impact requirements address primarily chest and pelvic injury, using dummies that are instrumented with four accelerometers to measure accelerations in the dummy ribs and spine, and pelvic region. The values measured in the ribs and spine are used in determining the ''Thoracic Trauma Index (TTI(d)).'' TTI(d) is an injury criterion that measures the risk of thoracic injury of an occupant in a side impact. The fourth accelerometer, mounted in the pelvic cavity, measures the potential risk for pelvic injury. To meet Standard 214's side impact protection requirements, the TTI(d) and pelvis measurements must be below specified maximum values.[2]

NHTSA estimates that, by the mid-1990's, about 14 percent of the 1,763 LTV fatalities (i.e., 245 fatalities per year) and roughly 14 percent of the 6,000 serious (AIS 3–5) thoracic injuries (i.e., 857 injuries per year) would be due to contacts between an occupant's chest, abdomen, back and pelvis and the struck vehicle's side interior. The agency believes that approximately 88 percent of these fatalities and injuries will occur in side impacts with LTVs, heavy vehicles, and fixed objects, rather than in side impacts with passenger cars. Looking solely at multi-vehicle side impacts between LTVs and other light vehicles, approximately 78 percent of the LTV fatal ''torso'' injuries are caused by other light and heavy trucks, and only 22 percent, by passenger cars (mostly large passenger cars).

II. The NPRM

Following the ISTEA-directed ANPRM initiating rulemaking on dynamic side impact protection for LTVs, NHTSA published the June 1994 NPRM which set forth the proposal upon which today—s rule is based. The NPRM proposed to extend Standard 214's dynamic side impact protection requirements to LTVs with a GVWR or 8,500 pounds or less and an unloaded vehicle weight of 5,500 pounds or less.

Under the proposal, all of the provisions in the standard that currently apply to passenger cars would have been extended to LTVs, but the test procedure would have been modified by raising the height and weight of the moving barrier used to strike the tested vehicle. The agency proposed this modification for several reasons. One was the agency's tentative conclusion that ''a simple extension of Standard No. 214's dynamic side impact protection requirements to LTVs would result in few, if any, benefits.'' The agency noted its related concern that a simple extension ''would result in significant compliance costs without concomitant benefits.'' Another reason was the design differences between passenger cars and LTVs, and in the size and weight of striking vehicles that caused the most extensive safety problems in side crashes. The modifications were intended to make the test ''more representative of the side impact crash conditions causing fatalities and serious injuries in LTVs.''

Occupants of LTVs are generally seated higher than those in passenger cars. Because of this, LTV occupants generally face a smaller risk of side impact thoracic injury, than passenger car occupants in a majority of side crashes (i.e., in crashes in which passenger cars are the striking vehicles). If a passenger car (which composes the majority of the current vehicle fleet and represents the most probable striking vehicle) strikes another passenger car in a side impact, the striking vehicle typically pushes the inside door panel of the struck vehicle at a relatively high velocity directly into the thorax of an occupant sitting next to the door. However, if a passenger car strikes an LTV in a side impact, the primary part of the side structure that is pushed inward is more likely to be below the thorax of an adjacent occupant, thereby resulting in smaller injury-producing loads to the occupant's thorax. Further, LTVs typically have higher sill and side structures than passenger cars. Those structures limit the loads transmitted by a passenger car directly to the door, thus reducing the door contact velocity to the occupant.

Because of these differences, the fatality rate for occupants of LTVs in all side impact crashes is less than half of that for passenger cars. The LTV occupant side impact fatality rate per million registered vehicles is 25.7, as compared to 53.3 for passenger cars.

Although NHTSA recognized in the NPRM that ''the problem of thoracic injuries in side impacts is not so great for LTV occupants as it is for passenger car occupants,'' the agency tentatively concluded that side impact protection requirements should apply to LTVs in a manner that would reduce the thorax-related fatalities and serious chest injuries in vehicles struck in side impacts. Most of these casualties would occur in crashes in which a vehicle other than a passenger car is the striking vehicle. (The two types of striking vehicles that are most likely to cause severe chest injuries in side impacts are standard pickups and compact pickups. These vehicles cause 26 percent and 16 percent of all such injuries, respectively.) NHTSA tentatively concluded therefore that it would be appropriate to establish side impact protection requirements for LTVs that simulated the type of multi-vehicle crash that causes the greatest number of

[1] See ''Preliminary Economic Assessment, NPRM for Light Trucks, Buses and Multipurpose Passenger Vehicle Dynamic Side Impact Protection, FMVSS No. 214'' (June 1994), accompanying the June 1994 NPRM, NHTSA Docket 88–06–N23–001.

[2] For the thorax, TTI(d) must not exceed 85 g for passenger cars with four side doors, or 90 g for cars with two side doors. It is generally more difficult for manufacturers to achieve lower TTI(d) for two-door cars than four-door cars, given that the door on a two-door model is typically wider than on a four-door model. For the pelvis, peak lateral acceleration must not exceed 130 g's.