# 2003 ATLA Annual Convention
# Products Liability Section
# Restraint Litigation Update: Shoulder Belt Failures
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When it works properly, the seat belt is indisputably the most important safety device in an automobile. When it fails, the seat belt can allow or even cause serious injury and death. A typical auto crash can be viewed as having two collisions. The first collision occurs when the vehicle impacts another vehicle or fixed object. The second collision occurs when a vehicle occupant impacts the interior or is ejected. The second collision immediately follows- the first collision- often only by milliseconds. Seat belts are designed, in part, to prevent the second collision or minimize its injury causing effects. Shoulder belts, in particular, are designed to prevent or reduce injuries to the upper body, including the chest, neck and head. The seat belt offers the head very little protection from striking interior components of the vehicle, when the shoulder belt fails.

The heart and soul of the shoulder belt is the retractor, which locks the seat belt webbing and holds the occupant in place. When the retractor fails to properly lock, excessive webbing pays out of the retractor and results in seat belt slack. Sometimes as little as a few inches of slack can mean the difference between an injury-free event and catastrophic or fatal injuries. In a frontal collision, for example, a properly locked shoulder belt should prevent injuries due to contact with the steering wheel, windshield or A-pillar. When the retractor locks fails to lock or locks late the occupant may move forward and contact these objects.

Conventional seat belt retractors are designed with an internal pendulum or ball sensor, which swings forward during rapid deceleration as in braking or upon impact. However, many times, this system can fail. If the teeth on the retractor spool do not engage the latch plate quick enough, then excessive slack is spooled out before locking. In order to lessen this slack, manufacturers introduced web-grabbers devices. These devices, discussed below, sense the impact and create tension immediately before impact.

Retractor spool out cases often turn on the forensic evidence found on the belt system. This physical evidence, called "load marks", is typically left on the belt webbing, inside the retractor, buckle, or D-ring when the retractor locks under accident conditions. The necessity of forensic evidence makes it almost impossible to prove without the vehicle and its components.

## THE ESCORT RESTRAINT SYSTEM

From 1987 until 1990, Ford designed the restraint system for the Ford Escort, and TRW supplied the parts. Ford safety philosophy in that time frame was stated in a February 1, 1984 Directive from D. E. Peterson that Ford "design its products not only to meet or exceed all applicable laws and regulations, but also to advance the state-of-the-art wherever practicable …." [T]he issue of cost should not preclude consideration of possible alternatives, and priorities should be based on achieving the greatest anticipated practical safety benefit. …. [T]his Directive supplements the everyday responsibilities of the company's product engineering … to make its products safe to the fullest practicable extent."

Similarly, in December 1987, Mr. Peterson issued Policy Letter No. 7, which stated that it was Ford's "long-standing policy to design and build vehicles that meet or

exceed applicable laws and regulations, and to advance the state-of-the-art in safety wherever practicable." Within that same time frame, however, Ford policymakers were more interested in saving money in the Escort than how its restraint system worked. Ford planned to shop out design responsibilities for the 1990 ½ CT-20 Escort to Mazda in order to save $2,700 per vehicle in design costs.

According to a 1988 Ford document, it was planned that the CT-20 restraint system beginning in the 1990 ½-model year would have a web grabber. The purpose of a web grabber, or similar devices called web locks or web clamps, is to prevent spool out. One Ford document showed that a web clamp retractor had 72% less payout. But Ford documents showed a web grabber would cost $4 in 1988 terms. The 1990 ½ restraint system dropped the planned web grabber and actually cost $16.31 per vehicle less than the previous year model.

**WEB GRABBERS**

The 1991-1993 Ford Escort had a conventional TRW retractor without a web grabber or web-clamp. Ford knew that the absence of a web grabber or web clamp permitted a large difference in "head excursion" in frontal impacts, resulting in huge differences in expected HIC. What is it about the ball sensor's retractor in the CT-20 that allows such a defect? By November 12, 1992, Restraints Engineering had already proposed replacement of the "unique CT-20 ball sensor retractor" which apparently is in no other Ford product.

A Competitive Teardown Review document in 1990 suggests that engineers at Ford were under the impression at that time that the post-1990 Escort would have a web grabber. They pointed out that its deletion when airbags were installed in the vehicle

beginning in the 1990 model year would save $7 per restraint system. It is clear that before the 1993 model year, Ford had web grabbers in use in many of its restraint systems, including the 1992 Escort in Canada. Did the 1991-1993 Escort restraint system pass Ford's internal 700 HIC crashworthiness requirement without a web clamp? Of the 15 crash tests run by Mazda for the 1991 Escort, six of them failed Ford's internal HIC criterion of 700.

Some documents suggest Ford realized it made a mistake by leaving the web grabber out of the Escort restraint system. In October 1990, Restraints Engineering Department head R. E. Jones told Ford engineers: "Ford will not consider motorized belts in future programs." Similarly, on May 6, 1992, Ford, Mazda and TRW held a "TRW Web Clamp Review." The minutes made clear that next generation Escort restraint systems would have web clamp retractors. Ford knew that web clamps reduced the dynamic payout during a frontal crash from 80 millimeters at a force of 10 kN to only 21.5 millimeters at 10 kN. This is a reduction of payout from four inches down to one inch.

**OTHER SIMILAR INCIDENT EVIDENCE**

FMVSS 209 requires that the emergency locking retractor "lock before the webbing extends 25 mm …." This is about one inch. Does the 1993 Escort passive belt pass this standard? Five witnesses testified in *Force v. Ford Motor Company* who were among the hundreds that turned in complaints to Ford Motor Company that the passive belt system in their Ford Escort/Mercury Tracer did not lock up in frontal impacts.

One commentator notes,

> [t]he primary reason the evidence is so important is that it has high probative value and trustworthiness attached to it. Indeed, it could be

> fairly said that other incident evidence is the single most probative evidence on the question of whether the product that forms the basis of the claim is defective. After all, if you want to know if a particular condition is dangerous, what better evidence could you have than information that shows you how the condition manifests itself during real world use?"1

The 1991 Escort restraint system had not been on the road a year when Ford customer Daniel Faust first notified Ford that his seat belt "failed to retract" in a frontal collision leading to neck injuries. After Mr. Faust, complaints, which are logged in Ford's Master Owner Relations (MORS) system database, rolled in. To date, hundreds have been injured in exactly the same manor and 51 prior to our client's injury. The five witnesses who testified simply told their story of how the shoulder restraint failed to lock up or locked up late allowing each of them to contact a portion of the vehicle's interior. From the standpoint of pure logic, the strongest evidence a plaintiff can adduce is evidence that shows that the defect has manifested itself on other occasions while being used in a reasonably foreseeable manner.

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1 Francis H. Hare, Jr., Admissibility of Evidence Concerning Other Similar Incidents in a Defective Design Product Case: Courts Should Determine "Similarity" by Reference to the Defect involved; *American Journal of Trial Advocacy, Vol. 21:3, Spring, 1998.*