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Plastic can be incorporated in energy absorbing steering columns to help reduce vehicle weight and enhance driver safety

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- Energy absorbing steering columns were first developed in the late 1960s to cushion the impact of the driver's chest by absorbing much of his or her impact energy in front-end crashes and limit the rearward displacement of the steering column into the passenger compartment.[1]
- Before 1968 (when NHTSA first began requiring the use of energy absorbing steering columns), the steering assembly was the most common source of fatal or serious injuries for drivers involved in frontal crashes.[2,1]
- While the addition of energy-absorbing steering columns did improve driver safety, it also added weight to cars. In 1966 (without energy-absorption), the average passenger car steering column assembly weighed 9.94 lbs. In 1983 (with energy-absorption), the average passenger car steering column assembly weighed 11.90 lbs.[3]

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- Some manufacturers have incorporated plastic components into their steering columns, which helps reduce weight.
- TRW Automotive produces a commercial steering column using plastic components that "weighs approximately three pounds less than comparable designs."[4]
- Douglas Autotech Corp. is a tier 2 supplier that produces composite steering columns (33% glass/nylon for class 6 and 7 international trucks and school buses). Douglas Engineer Dwayne Kubasiak cites that the old design of this sort of steering column weighed around 21 lbs. in the 1990s. In 2001, the same steering column using the plastic composite "is 6 to 7 lbs. lighter," Kubasiak said.[5]
- Delphi has taken the advantages of using plastic in steering columns one step further, developing a new type of energy-absorbing steering column that incorporates lightweight plastic components to reduce vehicle driver injury in a frontal collision by fracturing at predetermined stress levels.[6]
- The new "active energy-absorbing steering column" utilizes plastic in both an energy-absorbing restraining strap and a "break-away" capsule that supports the steering column at the dash panel, but acts like a mechanical fuse in the event of a crash, fracturing at pre-determined stress levels.[7]
- "This steering column automatically adapts within milliseconds of a frontal collision, and takes account of a number of variables in a crash. The variables include the weight of the driver, whether she or he is wearing a seat belt, the vehicle's speed and the severity of the crash." ~Dan Crishon, business line executive at Delphi.[7]

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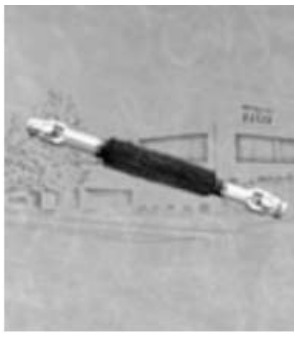
The new active energy-absorbing steering column utilizes plastic to both lightweight the entire module and provide driver safety by fracturing at stress levels determined by accident variables.[7]



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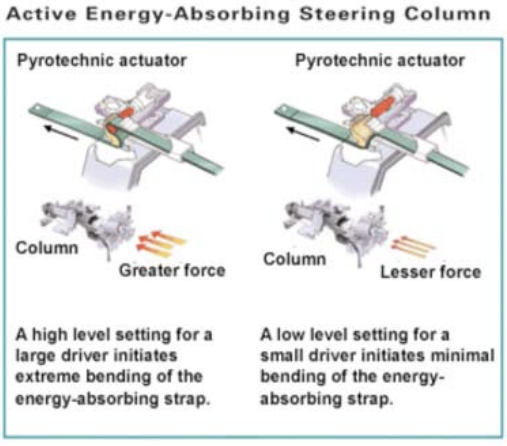
The TRW steering column utilizes non-metallic parts[4]

Additional Information

- "In passenger cars built before the 1967 model year, the steering column was a rigid pole ending in a narrow hub. In frontal crashes, the driver would hit the rigid column, his load concentrated on the narrow hub. Even worse, in some crashes the steering column was propelled rearwards, toward the driver, at a high rate of speed. Steering wheels and spokes were weak and brittle and contained hazardous metal attachments."[2]
- "Federal statistics show energy-absorbing steering columns helped prevent 53,000 deaths from 1968, when they were first introduced as purely mechanical systems, to 2002."[8]
- "Energy-absorbing steering columns are second only to safety belts—and ahead of airbags—as an effective safety device for vehicle drivers, according to a recent report from the U.S. National Highway Traffic Safety Administration (NHTSA)."[7]
- The active energy-absorbing steering column "is designed for a wide spectrum of drivers—from the 95th percentile large male through the 5th percentile small female. This range helps vehicle manufacturers meet proposed U.S. Federal Motor Vehicle Safety Standard (FMVSS 208) regulations."[9]
- This steering column technology is featured on the 2005 Lincoln Town Car, Crown Victoria, and Mercury Grand Marquis.[10]
- In the active energy-absorbing steering column, plastic also plays a key role as C-shaped bushing, which guides movement of the upper steering column jacket over the lower jacket. Plastic in this role provides "durability and dimensional stability, while providing the ability to control the telescopic motion of the steering column in a frontal collision."[8]



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The plastic energy absorbing strap in the active energy-absorbing steering column is a crucial component to its versatility in providing safety to drivers of all sizes.[8]

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Pictures

Person in car with steering column (Courtesy of DuPont)

Active energy-absorbing steering column image – Delphi, http://ppd.delphi.com/pdf/ppd/chsteer/col_energyabsorb.pdf

TRW Steering Column – TRW Automotive Commercial Systems. Intermediate Column http://www.trw.com/extlink/1,,,00.html?ExternalTRW=/images/lclmn.pdf&DIR=2 (accessed June 12, 2007).

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