



# Zinc Replaces Plastic in Safety Application

**G**overnment mandates for public transportation accessibility by the physically disabled have initiated a growing market for seat belt and wheelchair restraints. A manufacturer of wheelchair and occupant protection systems competes in both the U.S. and Europe with a complete line of wheelchair tie downs, floor rails and occupant protection systems for rail cars, buses and other vehicles converted for disabled transportation.

Retractable belts can hang from side walls, but many must be mounted to the floor and are subject to excessive wear and tear. General hard use, abuse and vandalism in public transportation create a "war zone" for these belts and retractor hardware.

The retractor features a wound spring and a release mechanism, mounted in a housing/belt protector that supports the spring and its retaining hardware. Originally, the retractor housings were plastic injection molded. However, when the plastic housing was damaged, which was often, the spring retainer disengaged, causing the spring to uncoil and prevent the belt from retracting.

To keep the belts in top operating condition, preserve customer satisfaction and avoid unsafe conditions, the manufacturer elected to redesign

the housing. The company's product designers mandated their fabricators to come up with a housing and belt "built like a tank." Zinc die casting rose to the challenge. Zamak 3 was selected as the most cost-effective material to meet the performance and appearance requirements.

The original plastic part comprised two halves joined by a plastic hinge and produced in a single-cavity molding. The housing suffered from fit inconsistencies between the plastic halves, causing the retractor to bulge after assembly. For better part function and manufacturing efficiency, tool design was reconfigured, moving the parting line and producing the housing in separate halves. The part was retooled and ready for production in

three weeks. Die casting now produces excellent fit with the halves held together with screws.

The housings are die cast two sets at a time, in runs averaging 2,000 to 4,000 pieces. Tool life is estimated at 20-30 years. The cast parts are trimmed and an adjuster-control slot

is punched in, if needed. The parts are vibratory finished to a high polish, eliminating the need for any other surface treatment.

Accurate dimensional control is critical to allow the retractor to contain the entire length of the belt and keep it operating smoothly. The housing halves must also be flat and straight to fit properly.

The manufacturer is the first to offer a heavy-duty protector for handicap restraint belts. They feel that switching to die-cast zinc has given them a powerful sales weapon in the battle for this highly competitive business, and the integrity of the protector-retractor assembly has been assured.

*Bowersox Precision Casting, Trainer, PA, die casts the belt protectors.*



**Zinc replaced plastic and produced a housing and belt retainer "built like a tank."**

