Zinc cuts gear cost in half--and that's just for openers

The Andersen® Venting Roof Windows, like the company's vertical windows, are designed to let the light in, not the elements. A key component in the venting roof window design is the concealed operating hardware, a patented Andersen feature.

A criteria for the operating hardware is durability and dependability. Another is keeping component production costs from going through the roof. Die-cast Zamak 3 satisfies both criteria.

A worm/helical gear set, either manually cranked or remotely activated through an electric motor package, operates the linkage attached to the roof window frame. Originally, the helical gears were machined from brass, reinforced with a formed steel insert and installed with a plastic washer/spacer.

The assembled gear's cost became a factor when product development engineers began looking for ways to trim it. Other materials and processes were considered, but finally, die-cast zinc proved to be the answer.

High performance ZA-8 alloy was considered first. However, testing of die-cast Zamak 3 disclosed that its performance was comparable to the steel-reinforced component to be replaced. Zamak 3's fluidity also makes it easy to cast in trimless pressure-casting machines.

While the tooling itself required precision machining to form the gear-tooth cavities in the mold, the gear it produces is net shape. The per-piece savings on this precision part quickly provided full payback on the tooling.

While zinc alloy is less costly than the brass it replaces, the casting is designed with ribbed cavities, cutting material cost even further. This resulted in an additional 30 percent material and weight savings. Although the weight saving potential of zinc was not a major issue here, it emphasizes another design advantage of die-cast zinc.

When the castings are ejected from the die, the sprue and gate are punched out and the small hole where the linkage connects is reamed to size—all on the same fixture. The gears are tumbled and ready for assembly.

The production capabilities of the zinc die casting process appeal to Andersen as well. It offers the flexibility to readily increase gear production to accommodate future growth in new construction/remodeling and the increased demand for roof windows.

The die caster of these precision Zamak 3 helical gears is Hartzell Manufacturing of St. Paul, Minnesota.

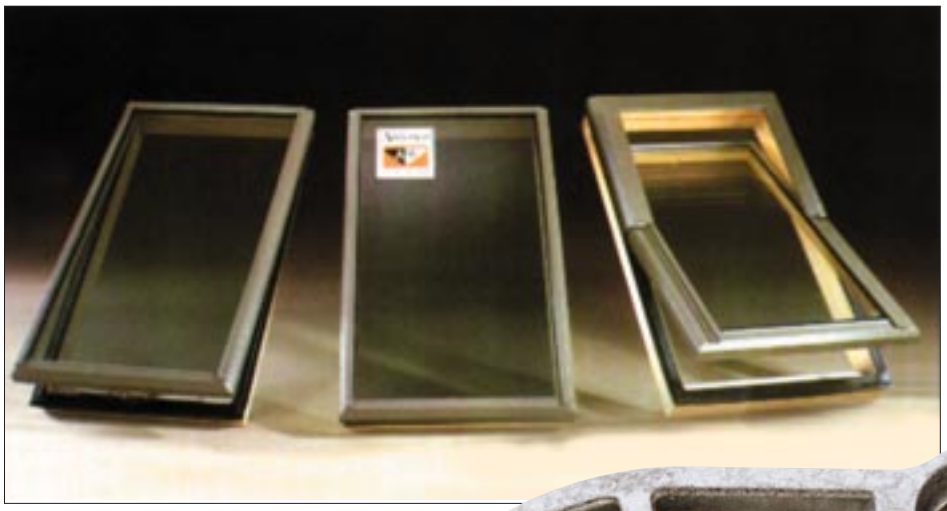

Photo courtesy of Andersen Windows, Inc.

Value analysis of a worm/helical gear set for the Andersen venting roof window yielded a net-shape zinc die casting that cut cost without loss of operating performance. The helical gear measures 2-1/4 in. x 1-7/8 in. x 0.275 in.