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NEW DRIVE SYSTEM FOR MOLDING MACHINES

Eccentric crank replaces ball screws

Thanks to their high efficiency and precise movements, all-electric molding machines have replaced many of their hydraulic counterparts over the past dozen years or so. And nearly all of these machines have something in common — they use ball screws and timing belts to handle the motion associated with injection. Moog Inc. has taken another route to all-electric injection.

At the 2006 National Plastics Exposition in Chicago, the company showed off an electric injection unit that uses an eccentric crank to drive the forward motion of the injection screw. The reasons why, according to Burkhard Erne, a Moog engineering manager, come down to inertia and longevity. "Timing belts give you a lot of inertia," he says. "Ball screws wear out, and have to be replaced." He adds that ball screws tend to lose some of their accuracy — to backlash — even before they need to be replaced.

Moog's eccentric crank, which sits atop a gear box behind the screw, addresses both problems. The beefy steel crank will last as long as the machine itself, Erne reports. What's more, the inertia of the system drops dramatically. Consider that the demo unit at the

show, which would go on a 200- or 250-ton molding machine, can accelerate to its full 600 mm/sec injection speed in just 35 msec.

Injection power on the electric injection unit is 300 kW. "This much power on a unit this size is usually found only on a hydraulic machine with an accumulator, not on an all-electric machine," notes Erne, who adds that the system would be suitable for thin-walled, high-speed molding applications.

The motor's integrated resolver, which feeds back angle and angular velocity of the crank, controls the unit's injection speed. Feedback from a load cell controls the injection pressure.

Rounding out this all-electric system is a Moog servomotor, which handles the screw's rotary motion.

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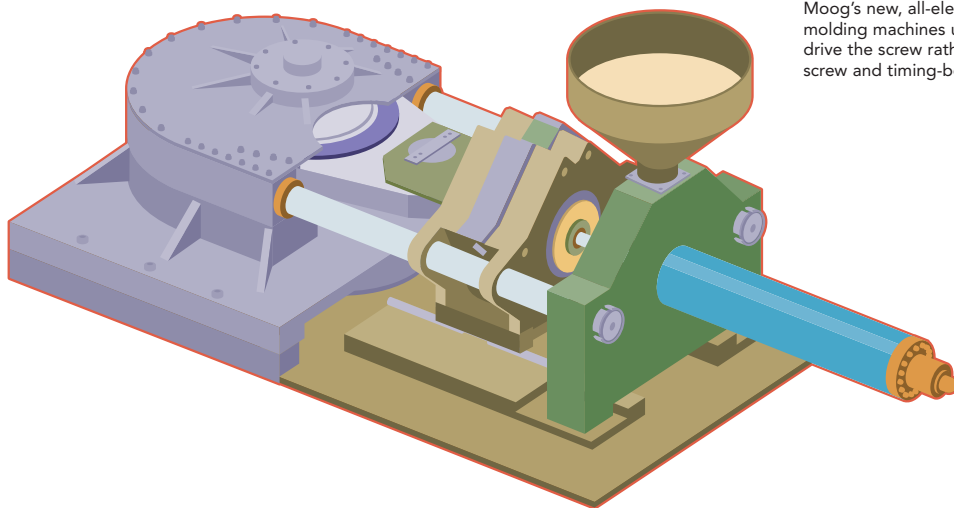
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For more information on Moog's electric injection unit, go to

<http://rbi.ims.ca/4935-528>.

ECCENTRIC CRANK

Moog's new, all-electric injection unit for molding machines uses an eccentric crank to drive the screw rather than the usual ball screw and timing-belt arrangement.



Submit your ideas for this section to Randy Frank, Design News, 225 Wyman St., Waltham, MA 02451, 480-236-9913, rfrank@ieee.org.

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