

## Everything's coming up hydraulics

Edited by Alan L. Hitchcox

It is mid-summer, so most of us aren't thinking about next New Year's Day. But engineers, designers, and technicians at Phoenix Decorating, Pasadena, Calif., are hard at work procuring everything they need for the floats they will enter into the 2008 Tournament of Roses Parade, which — as it is every year — will be New Year's Day in their home town.

### Technology evolution

For generations, floats in the parade have become more spectacular and sophisticated every year. Not surprisingly, then, the floats of yesteryear seem primitive to today's high-tech motion, pyrotechnics, digital sound, and multi-function lighting. Float builders began incorporating motion into floats in the 1940s. These simple systems often consisted of an unseen human operator inside the float who would pull cables that transmitted simple motions to one or only a few motion axes. As builders introduced more motion, some form of automated power transmission had to be incorporated.

Mechanical and electromechanical systems are used, but hydraulics has become the method of choice for many float builders because hydraulic actuators can transmit more torque and force from a smaller envelope than any other power transmission technology. The largest and heaviest part of the system — the hydraulic power unit — generally is placed in the base of the float, where space is relatively plentiful and the weight of the HPU keeps the float's center of gravity low.

### A new solution

Typically, Phoenix Decorating disassembles a float after a parade, then stores most of the hydraulic system components for re-use in subsequent years' parades. Sean McMinimy, production manager at Phoenix Decorat-



**Hidden away within this Tournament of Roses Parade float, hydraulics provides the power for all the motions of a fire-breathing dragon. Inset photo shows filter-breather that prevents ambient moisture from entering the reservoir.**



ing, mentioned that once a float has been dismantled, hydraulic reservoirs are stored with fluid still in them for several months. Consequently, changes in ambient temperature and humidity can cause water to condense in the fluid. In the past, technicians would pump the wet hydraulic fluid through a water removal filter — a practice that was deemed more practical than completely draining the oil from the reservoir.

More recently, a simpler solution was suggested by Mike Brio, of Rupe's Hydraulics, San Marco, Ca. In addition to hydraulic system troubleshooting, repair, design, and other services, Rupe's Hydraulics supplies Phoenix Decorating with T.R.A.P.™ filter-breather elements from Donaldson, Minneapolis. Brio explained that T.R.A.P.™ filter-breathers contain a deliquescent drying agent that

captures humidity from the air as it is drawn into the reservoir. Warm, dry air exiting the reservoir removes moisture from the deliquescent material, so T.R.A.P.™ breathers reportedly last longer than desiccant filter-breathers.

Last year, Phoenix entered 27 floats into the Tournament of Roses Parade. Of their 13 award winners, five had T.R.A.P.™ filter-breathers installed on them. Among the most impressive of these was *Once Upon an Time*, which featured a fire-breathing dragon. Powered by a 350 in.<sup>3</sup> engine, the float contained a 60-gal reservoir and 40-gpm pump running at 1500 psig.

*For more information on T.R.A.P.™ filter-breathers from Donaldson, call (800) 846-1846 or visit their website at [www.donaldson.com/en/ih](http://www.donaldson.com/en/ih).*