Global Positioning System: The Early Years

ST. LOUIS GEAR SHEDS LIGHT ON ANCIENT NAVIGATION DEVICE

Before retiring from St. Louis Gear in 2000, Roy Harmon liked to tinker. Since the customer base at the time was seasonal, Harmon was looking for a project to keep himself busy. The engineer decided to challenge himself by designing a "South Pointing Chariot," a device he had read about in the book *The Evolution of the Gear Art* by Darle Dudley.

The book describes the "South Pointing Chariot" as a device dating back to 2,600 B.C. that was used by the Chinese to navigate the Gobi Desert. Considered one of the earliest known relics of gearing from ancient times, the chariot was not only geared but contained a very complex differential gear train. The Chinese were able to produce this equipment using primitive hand tools.

The chariot is a two-wheeled vehicle that includes a small figure connected to the wheels by means of differential gearing. The device was created so that the figure would point south and continue to point south regardless of which direction the chariot was going. This would prevent desert travelers from getting lost while patrolling the Gobi.

The intricate design and engineering capabilities of the chariot suggest that there must have been earlier gear-related devices going back to 3,000 B.C. According to Dudley's book, however, the earliest written records of gearing date back to 330 B.C., leaving a blank space of almost 3,000 years during which gear devices must have been in use. "Since there are no written records covering this interval, we must await the spade of the archeologist to fill in our knowledge," Dudley writes.

Dudley notes that both the Egyptians and Babylonians were probably using gearing devices in prayer wheels, clocks, temple devices and water-lifting equipment as far back as 1,000 B.C. But the "South Pointing Chariot" remains one of the few artifacts unearthed by archeologists that allow gear heads to examine ancient design capabilities first hand.

Using photographs from Dudley's book, Harmon took it upon himself to recreate a model version of the "South Pointing Chariot." Today, the company displays the chariot at trade shows, where they receive many questions and inquiries about the device from gear aficionados—including curious members of the Addendum staff at last year's Gear Expo in Indianapolis.

"It's just one of the many reminders left behind by a man that dedicated 40 years to this company," says Alan Chatfield, vice president of operations at St. Louis Gear. "Employee development and experience such as this is one of the strengths and core values within our company."

Harmon was not alone in his enthusiasm of the chariot project. Some web research has uncovered similar "South Pointing Chariot" projects made from wood, car parts and even LEGOs. More detailed examples of the ancient device can be found at the Museum of Natural History in Bejing as well as the National Palace Museum in Taipei, Taiwan.

From the result of Harmon's work, the replica is spot on, though Chatfield notes that it took the engineer a couple of passes to get the device just right.

"Roy has said that his first attempt would have left you stranded in the desert," Chatfield says. "Once he realized that the diameter of the wheels must match the distance between them, a slight modification easily corrected the problem."

Have any information on historic devices that involved gears? Drop us a line at *publisher@geartechnology.com* and tell us about it for a future article in *Gear Technology*.