Cobalt™ Makes the Differential

Dale Speakes is a designer and prototype fabricator in the Pacific Northwest. He's spent years on the racing circuit, building cars and managing racing teams. He started using Ashlar-Vellum software with version 2.7 when he had *to learn CAD—and do it quickly.*

Recently, Speakes was confronted with a special problem. He was contracted by Dennison International to reverse engineer the differential for the 1957 Ferrari Testa Rossa prototype, owned by vintage racecar enthusiast Jon Shirley. In this unique car, Ferrari used a special cam and pawl differential to complement the 300hp, 3.0 litre, V-12 engine and 4-speed manual transmission for racing.

When Mr. Shirley first met with Speakes he immediately asked, "What software are you using?" Shirley, former president of Microsoft, knows the importance of software. Speakes originally chose Ashlar-Vellum wireframe CAD software because of its intuitiveness, however, he was relatively new to their Cobalt™ 3D modeling program. "At that time, I had been using Cobalt for less than a year."

Borrowing the parts from another car in Shirley's collection, Speakes reverse engineered the differential and associated components. A coordinate measuring machine was used to collect the profile data of the cams, which was imported into Cobalt. Using the polar duplicate and mirror tools, Speakes recreated the inner and outer cams in which the pawls ride.

Says Speakes, "In the 1950's the machining technology would not hold to today's high standard. Using Cobalt we removed the cam profiles' anomalies and optimized the symmetry of the parts."

Speakes prefers using Cobalt for all of his design work. "The software's strength is free-form design coupled with the flexibility to use sketches and constraints when desired." Creating an assembly, he quickly checked tolerances, making adjustments. Sketches and constraints let him change dimensions, automatically updating the model. He commented,

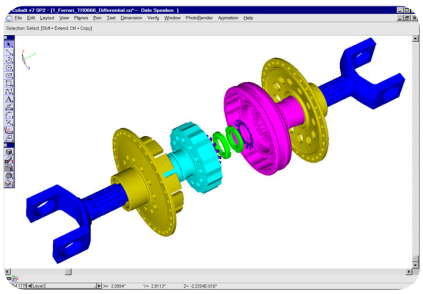
"Cobalt's intuitive interface and ease of use allow me to maximize my billable hours on any project."

Speakes appreciates Cobalt's ability to create engineering drawings directly from his model, which helps him hold his subcontractors accountable for their work. "If a great design can't be communicated with industry-standard drawings it won't get built."

Speakes holds three patents. He believes creativity, leveraged with the intuitiveness of Cobalt, breeds success, and continues using it to design and fabricate everything from aircraft parts to architectural pieces.

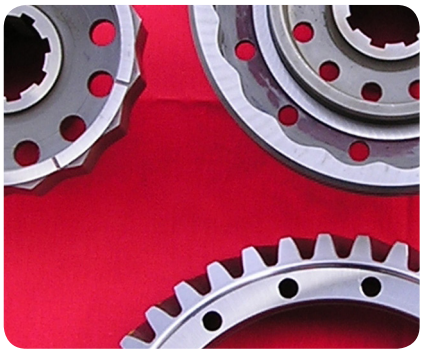
The fully restored Testa Rosa sold for a record-breaking $16.4 million—the highest price ever paid for a car at auction—at the annual Pebble Beach Concours d'Elegance at Monterey Car Week in August of 2011 to an unidentified buyer.

The fully restored Ferrari won Best-of-Class in 2006 and sold for a record-breaking $16.4 million in 2011 at the Pebble Beach *Concours d'Elegance* in Carmel, California.



Above: Speakes used Cobalt CAD and 3D modelling software to reverse engineer the Ferrari's missing cam and pawl differential.

Below: The completed cams.



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