The Tracker in Ship-Building

Building boats is both an art and a science; the art of design and the science of knowing which materials to use. Getting the balance right between the two is extremely important in the construction of racing yachts for the America's Cup.

The New York Yacht Club "Young America" decided to have 2 identical boats built, USA 53 and USA 58.

The hull was the most critical element in the design of the boats. It had to be strong, lightweight, but nonetheless sturdy. With dimensions of 21.3 m to 3.6 m and 2.4 m, with specified tolerances of ± 3 mm across the entire length of the hull, the bodies of the boats presented the ship-builders with unheard-of challenges. The problem involved checking each phase of construction on-site against the CAD criteria quickly, reliably and, most importantly, cost-efficiently and, where necessary, making corrections. The answer was to use FARO's LASER TRACKER. It allowed samples to be measured over large distances and areas to be digitized with pinpoint precision. This perfect solution was used to digitize the surface of the hull and to compare it with the CAD data. It allowed even the slightest discrepancies between the original surface and the target surface to be discovered and to be displayed on-screen. The result was so good that there was ultimately no need to smooth the surface of the hull with filler.

Then disaster struck for "Young America". USA 53 almost sank when it was just off the coast of New Zealand because part of the deck came loose, tearing the boat's hull apart. They turned to FARO for help. A section measuring about 2.5 m was removed from the hull to be replaced by a new piece. The task facing them now was to join all three parts (bow, stern and mid-section) with a perfect fit. Using the data collected during the first phase of construction, the bow and the stern were first of all aligned so that the new mid-section would fit between them. The bow and stern were then fixed in place, and a wooden device was attached to the outside of the hull. This enabled the new mid-section to fit in without any difficulty.

And what was the outcome? USA 53 only deviated from its original size and shape by 0.5 mm and was back in the water just three weeks after the accident.