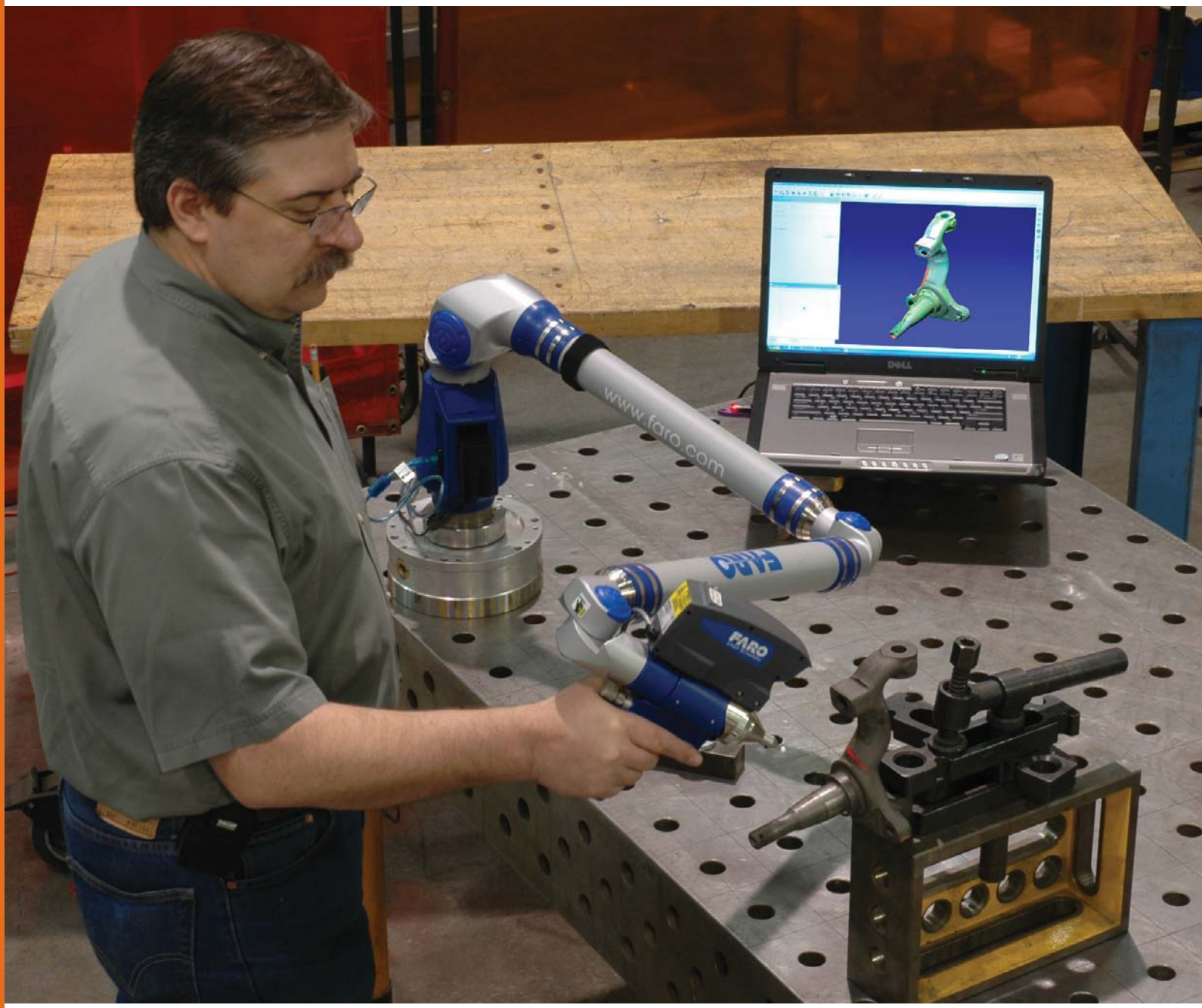
Automotive / Reverse Engineering and Inspection

Chassisworks Realizes a New Realm of Possibilities using a FARO ScanArm



Chassisworks digitizes a variety of items and has experienced many benefits since implementing their new FARO solution. For Chassisworks, the improved processes and capabilities are the greatest value. A better product, a better fit, and in a shorter development time are the real returns.

FARO®

For over 35 years, Chris Alston has remained committed to the development and manufacturing of components for street and race chassis applications. His company's investment in technology – both on the factory floor and in their business systems – has been critical to their continued success. Their ability to continuously invent and refine products is made possible by their in-house research-and-development center.

Chris Alston's Chassisworks (www.cachassisworks.com) has the largest selection of chassis and suspension parts in the automotive aftermarket industry. Comprised of five distinctly different product brands, Chassisworks serves performance enthusiasts and racers in the domestic muscle car, drag race, and sport truck markets. The company manufactures suspension components, chassis, roll bars and cages, steering, brakes, interior sheet metal, and many other components for drag race and street car applications.

Problem

A large portion of Chassisworks product line consists of direct-fit parts and systems that mount on to vehicles and must fit around various OEM components and features. Smaller scan items range from suspension components such as spindles or control arms to complete engines and transmissions. Development of larger products such as suspension and steering systems or chassis bracing requires scanning of large sections or, in some cases, the entire undercarriage of a vehicle.

To provide more options and choices than anyone in the chassis business, Chassisworks starts with state-of-the-art engineering software and continues through with a multi-million dollar CNC machining department. The company uses Pro/ENGINEER to create three-dimensional, digital assemblies of a complete product. This allows them to do a "fly through" of the model to verify its form, fit, and function. The investment in computer-aided design goes far beyond what is commonly referred to as CAD as Chassisworks can design a product, model it, and check all structural aspects of size, fit and usability — before they cut even one piece of material.

That's not to say that once material is cut that the resulting product doesn't need to be measured. Far from it. Tools such as gauge blocks and calipers were used for smaller items or tape measures and plumb bobs followed by trial and error fabrication. For larger, more complex measurement projects such as front clip and firewall pieces, work was outsourced to a company using FARO devices.

As many manufacturers and quality experts realize, manual measurement and data collection are prone to human error and misinterpretation of the final results. Many of Chassisworks' measurement projects are OEM vehicle frames and stamped sheet metal unibody structures with non-geometric surfaces and features. This makes accurate measurement extremely difficult using traditional tools.

Solution

That is where more advanced, state-of-the-art measurement solutions come in. Chassisworks has been using FARO solutions in-house since 1988 when they acquired the now legacy FaroArm Silver with a ball probe and ArthroCAM software. At that time, there were few alternative options available that were capable of the types of measurement data they were looking to collect.

Since then, Chassisworks upgraded to the FaroArm Platinum with the Laser Line Probe. The resulting 8-foot ScanArm provides the flexibility and data collection the company needs. The mobility of the entire system easily allows for leapfrogging to

capture data from a large area into a single point cloud. Simply put, leapfrogging is a technique used with portable measuring devices like the FaroArm or ScanArm that extends their working volume by measuring reference points before and after moving the device, allowing data captured from a large area to be collected into a single point cloud. The portability of FARO devices also allows Chassisworks to use their equipment in multiple locations in their own facilities or even at offsite locations.

"We found that not only was our accuracy of measurement improved, but also the detail in the data was astounding," said Scott Rieger, Engineering Manager at Chassisworks. "In the past, we'd take measurements only in key areas and we would find that more information was needed and that additional measurements were required. Now we can simply reference the surface scan model for both measurement and visual reference."

Chassisworks has also implemented new software as part of the overall solution – PolyWorks® by Innovmetric – which has made the manipulation, clean up, and management of data much easier. " "The software is very straightforward and easy to learn," said Mr. Rieger. "Maybe the hardest thing was learning how to actually use all of the data that we can now collect. In fact, the amount of detail in our recorded data has been increased exponentially using the laser line probe."

Chassisworks uses their ScanArm primarily at the very beginning of their product development process. The level of detail obtained by the FARO Laser Line Probe enables them to identify subtle differences between vehicle model years or changes from OEM to reproduction parts that may require a revision to their own design or a slightly different design to achieve a proper fit. Some of these differences can go unnoticed with the naked eye and are often difficult areas to measure, such as a recessed or angled surface along a contoured panel. Now they can easily and correctly design a product that properly seats and provides a secure mount. They use FARO to create an extremely accurate scan model from which they can reverse engineer aftermarket products. They can use the model to determine design requirements, but it is also an excellent representation of how the final product will appear once installed.

Return on Investment

Chassisworks digitizes a variety of items and has experienced many benefits since implementing their new FARO solution. They may develop multiple product systems or variations of a product for a single vehicle application; some of which are developed much later than the first project. With a complete surface scan, there is no need to go back and measure the same vehicle again to check for adequate clearance for new products that they may not have originally planned. They can simply verify fit to their scan model.

For Chassisworks, the improved processes and capabilities are the greatest value. A better product, a better fit, and in a shorter development time are the real returns.

"Using FARO products has really opened a new realm of possibilities for us," said Mr. Rieger. "The types and levels of sophistication in product systems we can develop are almost limitless."