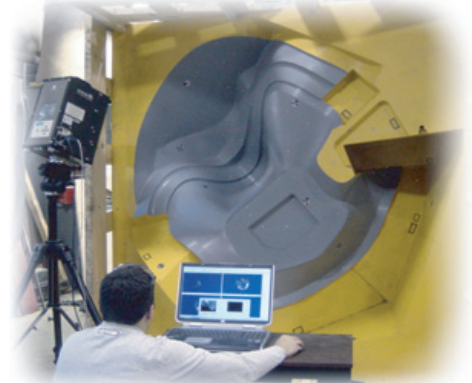
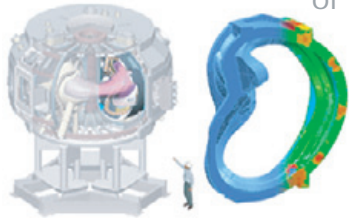




SITUATION

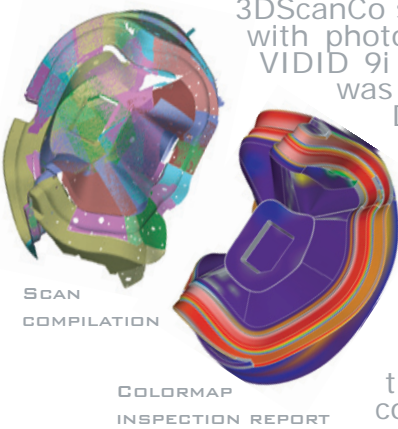
The US Department of Energy has funded the Princeton Plasma Physics Laboratory for advanced research in fusion power. Using a device called a stellarator, the PPPL has been able to generate a million-degree fusion reaction that is magnetically suspended inside the stellarator's experimental and unique shape. The shape of the casting is critical to the suspension of the hot plasma, preventing a meltdown of the entire reactor. The industry's conventional inspection techniques were insufficient at detecting defects in the \$100,000 coils. 3D scanning was necessary to ensure the coils were manufactured and assembled to meet their design intent.



SCANNING THE REACTOR COIL

SOLUTION

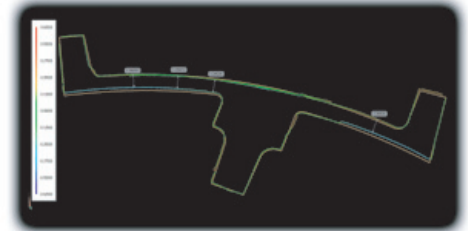
3DScanCo scanned the patterns using the Konica Minolta VIVID 9i in conjunction with photogrammetry to ensure a high level of accuracy before casting. The VIVID 9i enabled 3DScanCo to generate a high-resolution point cloud, which was then exported and aligned with the original CAD data provided by the DoE. Colormap inspection reports were generated that highlighted the areas of the patterns where the original CAD deviated from the actual coil. Inspection reports were generated a second time before the casting was sent for final machining to ensure its accuracy.



SCAN COMPILATION

COLORMAP INSPECTION REPORT

3DScanCo also used cross-section analysis to show deviations in coil thickness across targeted cross-sections. These reports helped ensure casting maintained a minimum thickness, and that an overall level of confidence in the manufacturing and assembly processes was achieved.

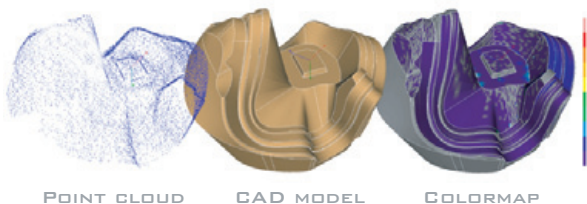


CROSS-SECTION ANALYSIS

RESULTS

Due to the nature of the casting and of the magnetic coils, quality inspections were necessary in order to ensure that the coils are manufactured properly. The level of accuracy in the reports that you provided us with helped us smoothly develop deliverables for Princeton to use within a relatively short time frame.

After working with 3DScanCo and observing their willingness to gather a keen understanding of our end of the situation as well as their own intimate knowledge of 3D scanning, quality assurance and reverse engineering, I highly recommend them to any other business. We will gladly work with them in the future for any of their services when the opportunity arises.



POINT CLOUD

CAD MODEL

COLORMAP

Don Dickert
Chief Engineer
Pattern Services Inc.

TECHNOLOGY

- Konica Minolta VIVID 9i
- Photogrammetry
- Rapidform XOv

TECHNIQUES

- 3D Scanning Services
- Quality Inspection
- Cross-Section Analysis

APPLICATIONS

- Design Verification
- Manufacturing Defect Detection