ENGIPLAST

Measuring thermal expansion

Case: Shell Pernis - *Measuring the thermal expansion of heat exchangers*

In order to accurately measure expansion behaviour as a result of a temperature increase, an accurate measuring technique is required. In addition, this should be done in a non-contact way because of the heat. A 3D laser scan provides the solution. Using this method, fast and reliable measurements of thermal expansion are obtained.

In order to determine the actual expansion behaviour of a set of coupled heat exchangers, the scan took place at two different moments. The first measurement was taken under cold conditions. The second measurement was taken during the production process – under hot conditions. The measurements were taken at a number of fixed points within the system – in this case the nozzles were chosen. By measuring the exact location, we were able to accurately establish the expansion behaviour.

These results were used in the stress analysis that was performed in order to compare the actual situation to the theoretical one. This proved necessary because problems occurred in practice that had not been anticipated in the theoretical situation.

In 2003, Engiplast started 3D laser scanning and processing the scanning results into 3D models and measuring reports. Engiplast has gained a wide experience with this measuring technique, especially in the process industry.

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