TeZet technology makes bending child's play

Hose (left) and mandrel are laser measured with parallel visualisation for correction against CAD-data.

Freeform bend-measured tube with complete data sets for correction against CAD and bender.

Freeform bend with selected zones for correction against CAD and bender.

Masterpiece inspection of two freeform bent tubes – deviation 0.071906mm.

Freeform bending, a new philosophy in tube bending, demands visionary software for tube measurement, as well as tube editing and processing software. TeZet has solved this problem with a laser measuring module for freeform bent tubes as part of TeZetCAD, the tube-specific software which is clearly 'state of the art'.

It starts in the CAD design department. Tubes are generated out of planes, rather than the traditional centreline. These theoretical free forms have to be read into the software via a 3D IGES module where they are converted to bending data for processing by the tube bender to produce a freeform bent tube.

Because this technology does not follow the traditional tube bending procedure, which was generated from straights and bends, it demands a new philosophy. It is well known that a desired value and the actual value are often poles apart; the software should not only trim

traditional points – whole fields must be sorted to a repeatable correction computation formula. The freeform bent tube must fit in a reliably repeatable way after no more than two or three bending tests.

Because a freeform bent tube has no reproducible fixed lengths and radii, it cannot be measured in traditional tactile way, nor with a non-contact infrared fork probe, but only with a 3D line laser. This is of crucial significance for the advancement and improvement of the data interpretation from the laser scanner. The well known numberless taken points, better known as 'point clouds', must be adapted to cope with a tube philosophy which needs to be as flexible and versatile as the merging and diverging bends of a freeform bent tube.

On the face of it chaos and order are polar opposites, but they can be joined by a complex computing algorithm to produce a satisfying result.
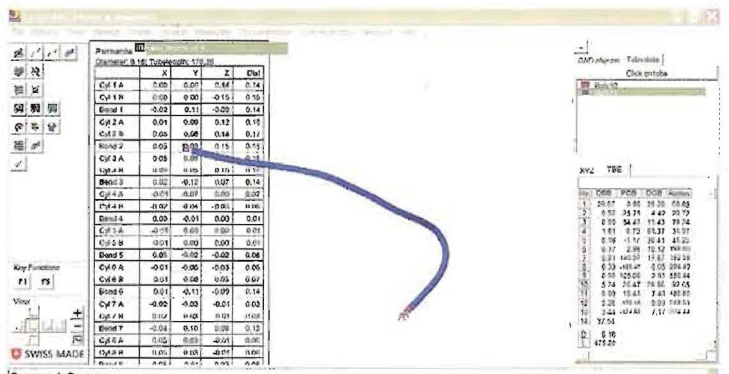
In parallel to the measuring
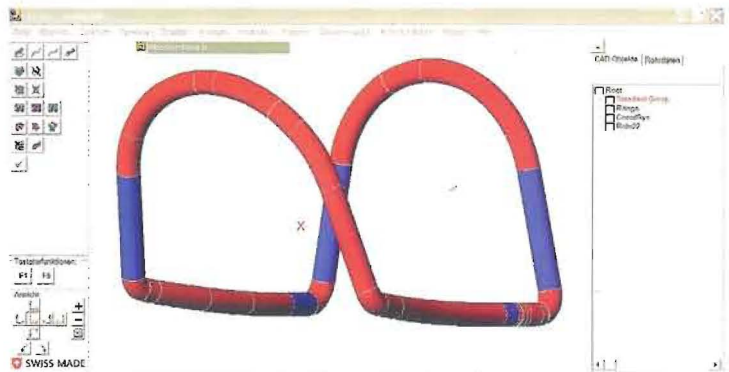
procedure, the graphical image formation of the measured tube on the monitor is exceptionally fast because of the real-time calculation of tube data. This makes the 3DLaser-Modul in TeZetCAD for freeform bent tubes

look like child play. As always, with enough effort behind the scenes the final result looks easy.

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