

Versatile bending simulation software

IN order to fully use the potential of a bending machine it is essential to provide it with valid data. Correct lengths for each segment of the tube have to be calculated to determine the cutting length for the entire tube. Material traits have to be taken into consideration, or the tube will not be fabricated according to specifications due to springback. The machine and tool layout also need to be examined, to make sure the tube does not collide with the machine or its environment during the bending process.

While experienced operators can often spot potential difficulties early on, the time it takes to solve these problems and to calculate the required data manually often negates many advantages of the bending machine. Because of these concerns, RoniKolli7 by 3R software solutions was designed to facilitate the bending process. The software calculates the actual CNC bending data, ie traction (feed), rotation and bending values, calculates the cutting length of the tube, and calculates overbending due to springback, as well as the resulting length adjustments. It also graphically simulates the bending process to test for collisions, and generates customisable worksheets with all relevant information for the tube shop.

Improvements to the latest version of RoniKolli7 include faster graphical display of bending processes. It is now possible to simulate flanged and flared tubes, and to calculate the CNC data accordingly, and users can display welding seams and determine their optimal position. The software is split into the main application, which calculates the CNC data and simulates the process, and three sub modules, which provide machine, tool and material data for the simulation.

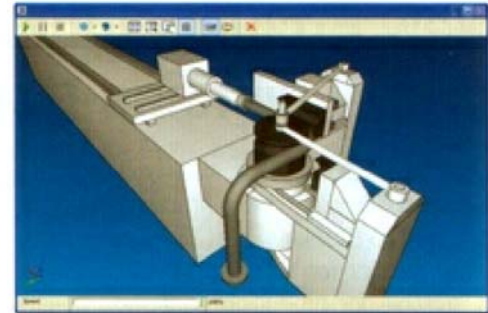
The MachineEditor is used to create 3D models of the bending machines. The machine is measured on-site, so it is possible to integrate special modifications immediately. Because each machine's motion sequence is faithfully implemented, the user can create models of mandrel, roller and induction bending machines, with one or more bending heads and levels. The level of detail is determined by the user: with a high level of detail a high level of accuracy can be achieved, but the measuring process takes longer.

The ToolEditor is used to create 3D models of the available bending tools. Each tool can be assigned to exactly the machines that can mount it, to make sure that the simulation does not use incompatible machine-tool combinations. Tools for mandrel, roller and induction bending can be created, and it is possible to construct multiple tool levels, correctly aligned with each other, by using the convenient Tool Wizard.

The MaterialManager sub module is used to create a database of materials and their traits, allowing the calculation of overbending and reductions, so the CNC data can be adjusted accordingly.

The main RoniKolli7 software allows the user to select the required machine and tool, and to create the geometry of the tube. Tube segments can be defined by entering either Cartesian coordinates, or the raw bending data (traction, rotation and bending angle). This data is automatically adjusted depending on the selected material, and can be tested for collision.

Using the previously created tool and machine models, the software can accurately test even complex geometries, and can independently look for solutions within



① Screenshot of a bending simulation

certain parameters. It is often possible to bend a tube if a particular rotation direction or the bending order is reversed. Correction feeds are another option the software can test.

More complex bending machines, such as double-head benders, offer more options than single-level unidirectional benders. Once a feasible bending sequence has been determined, the CNC data is adjusted accordingly, and can be transferred to the bending machine.

Besides other 3R applications, output files from a large variety of construction or measuring programs can be imported without loss of data. Tested and adjusted CNC data can be exported in multiple formats, to be used either directly at the machine, or in other programs for further processing.

RoniKolli7 can be used as an addition to an existing IT framework or in combination with other 3R products. It can be used in workshops of any size with any number of machines or tools, or by construction departments, to avoid production problems, delays, and damage to machines and equipment.

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