

Unified software interface for integrated pipe production

In tube and pipe construction modern electronic control systems are becoming increasingly common. In order to utilise the advantages of these digital systems and ensure integrated communication, it is essential for all departments to consistently use a common and unified interface.

The interface can include CAP (P&I diagrams and planning), CAD (design, coordination), CAM (machine control, production control), CAQ (quality control), CAE (calculations and engineering), PPS (process organization, human resource optimization, basic data management). These individual areas often overlap and cannot be clearly separated.

This interface is designed to tackle tube and pipe production problems including delivery times for special materials, internal flow of material and transport, storage of fabricated parts, changes in design, backflow of modifications and inflexible structures.

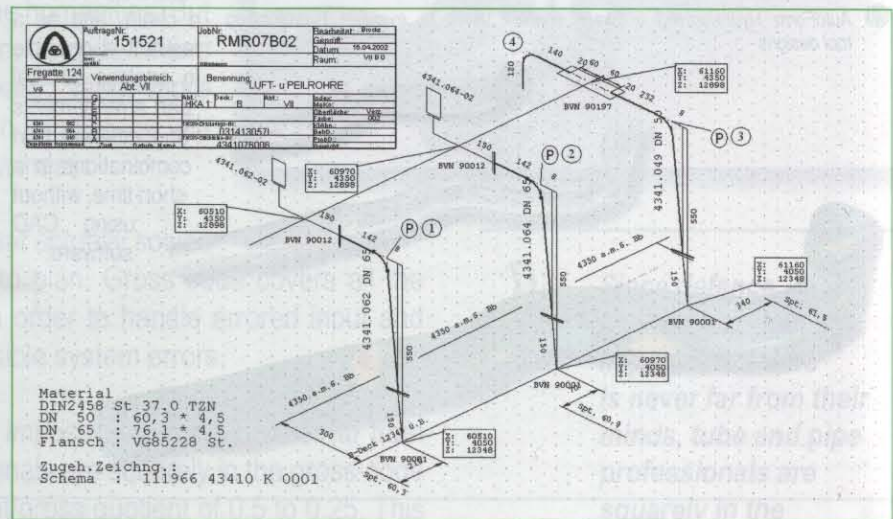
However, in this field the problems are often so complex that the development of a global strategy is simply not realistic and feasible. 3R Software therefore offers a centralized software solution, which concisely illustrates the synergy effects of all production areas. It allows the user to react economically, prevent errors, and quickly make the right decisions.

Based on 30 years of experience, 3R software solutions have been specifically developed to meet the demands of users, with a high level of flexibility and adaptability. This leads to advantages such as increased work speed and quality,

and decreased training time. The cost reduction resulting from these three points should not be underestimated.

In tube and pipe production one consistent and unified system, covering everything from design and planning to construction and fabrication, ensures exhaustive knowledge of the entire process. It also makes the development of suitable interfaces unnecessary, because they have already been integrated.

One unified system, covering everything from design and planning to construction and fabrication, ensures exhaustive knowledge of the entire process



RoniR2D is used to produce P&I diagrams used for the development and rough planning of process facilities

One central database allows every application to access the information of all other applications, creating no new problems for the user when it comes to analysis and tracking modifications. Although it is impossible to develop one piece of software to suit all user requirements, 3R Software provides solutions that streamline the systematically similar or unchanging processes.

P&I diagrams (RoniR2D) are used for the development and rough planning of process facilities, and can reduce task handling time by 50 per cent.

During creation of P&I diagrams the basic dimensions, type of fittings and tube material (including diameter) are selected from a database. Due to the integration into this centralized database

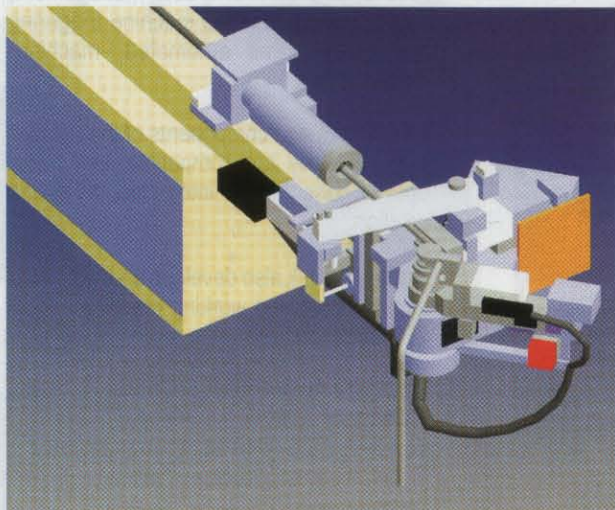
the client can, even in this early stage of the process, have access to a multitude of information. Ordinarily, this information would require weeks to be derived from, for example, an Auto-CAD drawing.

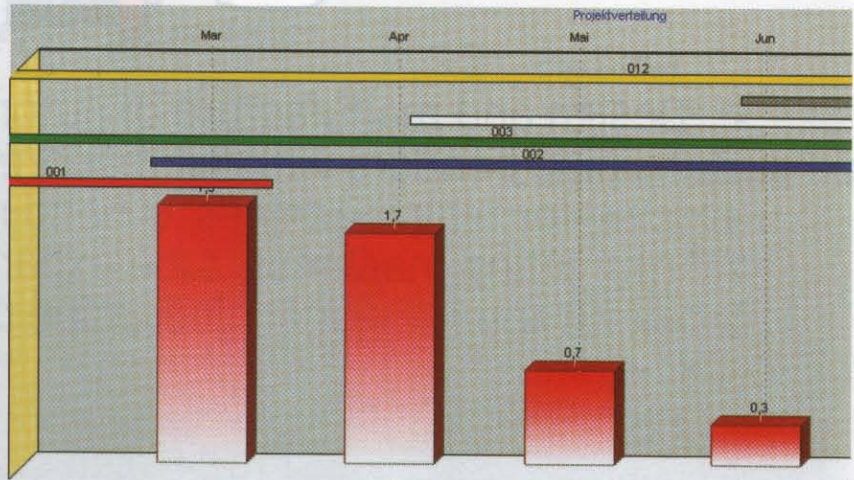
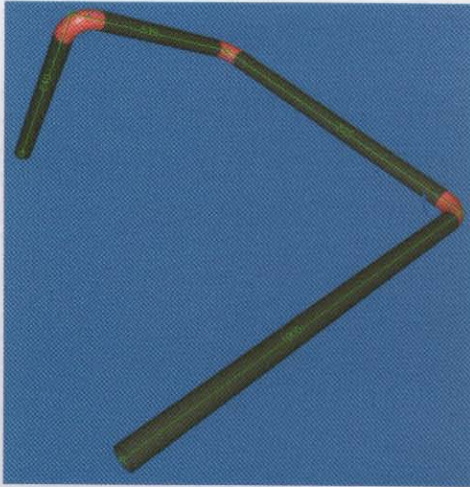
This time reduction can be a great advantage, especially when it comes to the tracking of modifications and changes. The system automatically assigns tube and fitting numbers according to the user's input within fractions of a second.

A manual preparation of an index would require substantial time and effort with every modification or change, and the risk of mistakes during numeration would not be eliminated. Instead, when using RoniR2D lists for parts and fittings are automatically created.

Further systems can utilize the information derived from the P&I diagrams. Since this information can be stored in a centralized database, no interface is necessary. Data redundancy, which can be both storage intensive and prone to mistakes, is generally avoided.

Kolli 3D bending simulation software can test the producibility of tube and pipe





① (Above left) with a centralized database, RoniR3D coordinates 3D tube and pipe production; and (above right) using Ramp, production can be optimized with part lists, drawings, worksheets, and graphs

⏪ RoniR3D is a user-friendly, easy-to-learn system for the coordination of tube and pipe production. In contrast to known 3D-systems, whose features are not streamlined towards special requirements, the user of RoniR3D can resolutely coordinate 3D tube and pipe. The spatial geometry of the tube can be added using various import interfaces.

Because the system, like all 3R-systems, uses the centralized database, the client can load entire schematic drawings and use them as coordination templates.

The user can employ RoniR3D to exactly position fittings and tubes, as well as add flanges and bends. Every 3R data element exists as a 2D schematic symbol, a 3D

symbol, and an Iso-symbol. This ensures complete consistency for all production steps.

RoniCAD is used for isometric projection, and displays a 3D volume model at any point during the design phase. One of the earliest versions of RoniCAD was developed more than thirty years ago. The modern Windows-version has also been used for years by many shipyards, plant constructors and in the chemical industry. Thus RoniCAD offers a proven and efficient 2D- and 3D-design platform, and can also be used with Kolli bending software for analysis of a tube's isometric image during the design phase.

All data necessary to fabricate an isometric projection are calculated automatically. The software includes import interfaces to load and edit tube drawings from several large systems (Unigraphics, Tribon, Medusa, NupasCadmatic).

These isometric drawings undergo a logic test, so that deviations and inconsistencies can immediately be recognised and displayed. RoniCAD is compatible with all currently common database systems and available both as network client and as an individual version.

3R Software's Ramp software can achieve the entire work preparation for industrial tube production, with creation of work packets via use of filter functions. For each fabrication step and selected workstation the user has the option to create part lists, drawings and worksheets including all fabrication relevant information.

Ramp includes process optimization, with automatic availability of transferable CNC

HIGH - THROUGHPUT RATED Full Body Robust Ultrasonic Testing System for Tubes

A new generation, fully automated, ultrasonic testing system for full body inspection of seamless tubes has been successfully commissioned by NDT Technologies Inc. - Montreal, Canada.

The system is equipped with more than 120 test channels and is capable of providing full volumetric and surface coverage of tubes, according to API and Shell standards, for diameters ranging between 3.5 - 16 inches (89 - 406mm).

Longitudinal and transversal flaw detection, as well as 100% continuous thickness monitoring is carried out in real-time and is graphically displayed as "C" scans - open pipe view, where I.D. and O.D. flaws are color-coded. Detection of oblique oriented flaws in fixed or variable angles is available without testing speed reduction.

The test system can be placed directly on the production line where higher throughput rates than previously used are required. A helical drive system ensures consistent high-speed rotational and forward tube motion through the test line, regardless of tube size. These stand-alone helical drive packs can accommodate multiple pipe diameters. The mechanics allow for accommodation of tubes having out-of-straightness deviations and end burrs.

The overall test speed for plain pipe is up to 1m/sec, assuring high production throughput. Optional configuration of the system allows for passing through and testing of upset pipes.

A robust QNX real-time operating system is used to perform high-level data acquisition and processing of hundreds of channels simultaneously.



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Design, Production & Management Software

files, while station worksheets are created and sorted efficiently. Ramp is also used to process tracking and for expediting, using both the date structure of the job numbers and the calculated times for each isometric image.

With generation of completion notices at each individual workstation, the current stage of the fabrication process can be determined and visualized at any time. It is therefore possible to eliminate bottlenecks or planning mistakes at an early stage.

With analysis of human resource management and usage, Ramp offers different ways to determine work time and usage rates. For each single work step (eg welding or bending) a time value can be entered for each element or tube in the database. These values are calculated using company-specific internal processes. Ramp can derive and statistically analyze all material data and part counts from the database using freely selectable filters.

Kolli is a 3D bending simulation designed to test the producibility of individual tube and pipe. As a subprogram of RoniCAD or as stand-alone software, Kolli offers solutions for the bending process of given tubes, so they can be fabricated.

Starting with version 7, Kolli includes a machine editor, a tool editor, and a material manager. These tools are used for the individual display of the local settings and conditions of each tube and pipe shop, in order to perform an exact producibility analysis.

The machine editor is software with an intuitive user platform, which allows measurement of new machines as necessary. The tool editor is designed to accurately represent the tools for the various machine types. The material manager allows the input of material traits, since these have an impact on springback values and the 'actual' cutting length.

Using a selected bending machine, Kolli determines if the tools are available to fabricate a tube design. The software also determines the machine sequence needed to ensure a collision-free and successful bending process. The program can even accommodate flanges, with rotation calculation of the flange during bending.

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Software with an 'open mind' to CAD/CAM solutions

Open Mind Technologies AG, Germany, is a leading developer of CAD/CAM software and post-processors for the design and manufacture of complex moulds and parts.

The company offers an extensive range of products, from 2D feature-oriented solutions for milling standard parts through to software for 5-axis simultaneous machining.

The company's hyperMill® software is used in automotive, tool and mould manufacturing, high performance engineering and aerospace industries. The high-performance and geometry-oriented CAM software offers 2.5D, 3D, HSC and revolutionary 5 axis machining strategies. With one uniform user interface, hyperMill® is the ideal CAM solution, particularly for complex and demanding machining tasks.

hyperMill® offers 2D features for contour milling, pocket milling and drilling cycles, 3D cycles or Z-level roughing and finishing. It also provides special machining strategies such as trochoidal and fillet machining for HSC milling, and sophisticated 5 axis technologies for manufacturing turbine blades, tubes and structural parts.

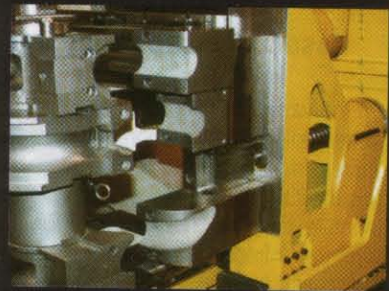
The software includes intelligent features such as Rapid Result technology to automate routine work and reduce programming complexity.

Efficient machining strategies are made possible to optimise tool movements and avoid unnecessary fast travel. Reliable collision checks and automatic collision avoidance modules ensure top-notch process stability.

A range of functions can be carried out including hole and pocket milling, feature-based solid machining, freeform surface machining, deep cavity and dome machining, tube machining and turbine and impeller machining.

Open Mind has recently increased its activities in China, Taiwan and India by opening new branch offices.

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OMNI-X Tube Bending Tools.

We have high expectations for ourselves and believe you should have high expectations of your tooling supplier.



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Thank you for making us your global supplier of choice!

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