

Setting the wheels in motion – Interpipe improves its wheel machining processes and saves time with Esprit CAM

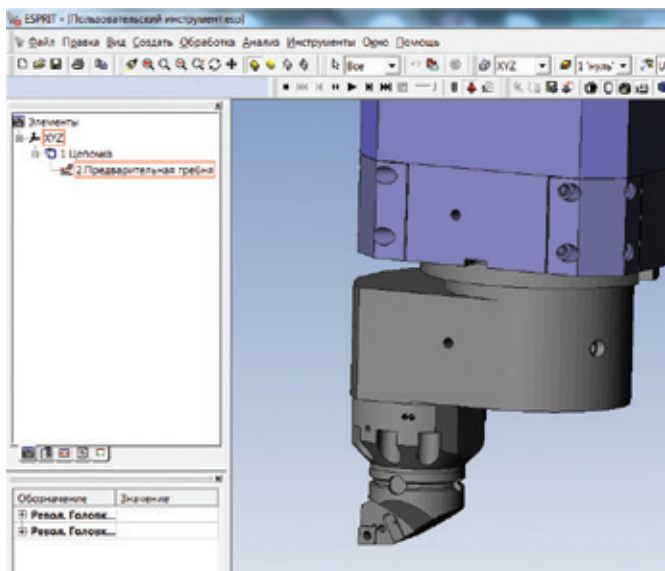
Catalin Kreis, DP Technology Corp

Based in Dnipropetrovsk, Ukraine, Interpipe produced more than 1.1mn tons of seamless pipe in 2012 (the last year for which industry-wide statistics were available), making it one of the top ten producers in the world. Interpipe is also the third-largest producer of solid-rolled railway wheels in the world, producing more than 250,000 tons in 2012. The company largely serves the oil and gas, railroad, heavy machinery and construction industries around the world, with most of its sales going to Europe and North America.

In the past, Interpipe programmed machining operations on the individual machine tool controls. However, creating programs this way was complicated by the fact that each machine control used different programming methods. Another limitation was that Interpipe programmers had no way to validate the program, short of running the part on the machine. This approach was prone to errors that could damage tools and work pieces, and also consumed valuable machine time.

In an effort to overcome these difficulties, Interpipe engineers worked with Twist Engineering, a computer aided design

Custom tool developed in Esprit



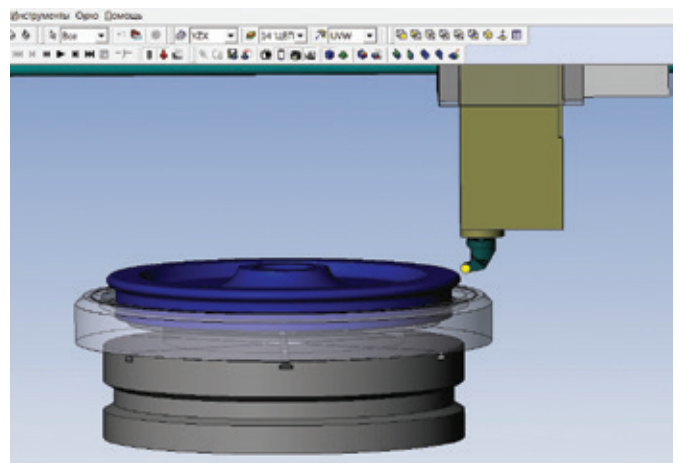
(CAD) and computer aided manufacturing (CAM) reseller also based in Dnipropetrovsk. After studying the machine tools and machining operations used by Interpipe, Twist application engineers recommended that the company implement the Esprit CAM software system from DP Technology.

Esprit's functionalities best fitted Interpipe's needs, and included milling machining from two to five axes, turning machining from two to 22 axes, wire EDM from two to four axes, multitasking mill-turn machining, B-axis machine tools, and high-speed three- and five-axis machining.

In order to demonstrate the capabilities of the Esprit CAM system, Twist application engineers produced an NC program for machining a railway wheel on a vertical turning machine with two synchronised turrets. After finishing the program, the application engineers simulated the machining operation with Esprit. They used Esprit to configure the simulation with virtual machine settings, such as setting the limits of motion of the machine tool axes, in order to match the actual machine tool as closely as possible. After simulating the program in Esprit they made a few minor changes to the program then ran it on the actual machine tool. The program ran perfectly the first time on the machine tool and provided a substantial reduction in cycle time.

Based on the success of the results, Interpipe management decided to purchase Esprit and also contracted with Twist Engineering to develop 3D models of machine components

Simulation of a machining operation in Esprit



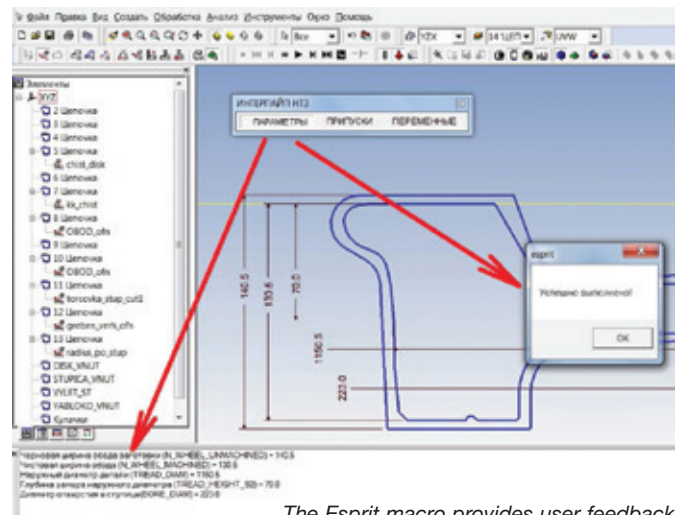


Actual machining operation matching the simulation

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Microsoft Visual Basic - Definitive (Model View)
File Edit View Insert Format Database Tools Debug Help Window Help
Application.OutputWindow.Visible = True
Dim FC As Esprit.ParamsChain
Dim I As Long
Dim PI As Esprit.Params
Dim P2 As Esprit.Params
Dim XI As Dialog
Dim setup As LathMachineSetup
Set setup = Document.LathMachineSetup
' setup.sua objParam
Dim WSA As Double
xid = InputBox("Введите sua objParam" & vbCrLf & vbCrLf & "1 - Базисная" & vbCrLf & "2 - Базисная")
If WSA = 2 Then Goto Vstart
If WSA = 1 Then Goto Vstart
Call MsgBox("Sua objParam определена на эсприт" & vbCrLf & "Законч обработка")
setup.CustomSettings() = 0
setup.CustomSettings() = 0
setup.CustomSettings() = 0
setup.CustomSettings() = 0
setup.CustomSettings() = 0
setup.CustomSettings() = 0
' = 1
  
```

Macro developed in Esprit



The Esprit macro provides user feedback

and special tooling and post-processors for several of its machines. Interpipe provided detailed specifications of the machines and Twist application engineers developed the post-processors.

In addition, Twist application engineers worked with Interpipe to develop add-ins or macros to optimise the use of Esprit for its operations. Esprit's open architecture enables users to customise the program and create new modules using an application programming interface (API) based on the Microsoft Component Object Model (COM) and Microsoft Visual Basic for Applications (VBA) language. Existing Esprit components can be used in these modules and they can be constructed within the existing graphical user interface (GUI).

Furthermore, Twist application engineers developed three macros within Esprit for Interpipe. The first provided data transfer directly from drawings into NC programs; the second enabled the machine operator to enter additional finishing and roughing stock allowance at the machine control; and the third synchronised the program to machining element adjustments made by the operator. The macros use an interactive user interface to deliver prompts and provide feedback to the operator.

After working in close collaboration with the Twist Engineering team, Interpipe successfully implemented Esprit CAM, which

greatly increased machine tool throughput by reducing cycle time, reduced programming time and eliminated the need to use valuable machine tool hours to validate NC programs.

For more information about Esprit, contact:

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