



Application Story: Brooklyn Technical Services

CREEP FEED GRINDER RETROFIT SAVES MONEY, IMPROVES PRODUCTION

The situation was not a good one. The Honeywell Engine and Systems facility in Greer, South Carolina had three creep feed grinders controlled by PLCs with positioning capability. The machines had become prone to failures and crashes. Two of the machines were no longer in use, as a result. The decision was made to retrofit all the machines with CNCs and the customer turned to Brooklyn Technical Services of Brooklyn, Connecticut for assistance. Owner Cliff Divine had previously retrofit six machine tools at the customer's facility with CNC packages. This Honeywell unit produces turbine engine components, working primarily in high nickel-based aircraft materials.

"My objective here was to devise a cost-effective retrofit solution that would be easy for the machine operators to utilize," Divine explains. "I selected the Siemens SINUMERIK 802D for this grinding application because it provides a lot of value for the customer in a compact package. In addition, Brooklyn Technical Services was one of the first retrofitters to use the 802D in a grinding application and we had excellent results for our customers." Brooklyn Technical Services specializes in the retrofit and rebuild of creep feed grinders and roll grinders, working on such brands as Blohm, aba z&b, Maegerle and Waldrich Coburg.

The existing onboard components of the creep feed grinders in this case also lobbied for the CNC chosen, remarks Divine. "Because the machine had Siemens analog servo drives and motor packages, we were able to save a significant amount of money. By using a Siemens AD14 interface board, we were able to use all the existing servo drive and motors."

As a result, Brooklyn Technical Services initially developed a series of custom dressing and grinding cycles for this application. The cycles

utilize a series of permanently definable user variables. In this case, the retrofitter was able to assign a series of plain text commands into the user data table. The value that the operator enters is stored until the operator changes that value. Divine noted that other controls required the entering of this information at each use of the cycle. By using plain text, the operators are more readily able to recognize the use of each variable. As Cliff Divine explains, "Who knows what the programmer has user variable R20 designated for? Or what letter 'B' signifies, when in one cycle it might mean grinding feedrate and in another cycle it means dress amount? Simple language like grinding feedrate, wheel surface speed and dress amount are much easier and faster for the operator to understand. And, there are fewer chances for error." He also explained Brooklyn Technical Services is able to place checks within the part programs to verify the values entered by the operators fall within a specific range, thus preventing crashes and scrapped parts.

The Siemens SINUMERIK 802D combines all CNC-, PLC-, HMI- and communication tasks in the panel control unit (PCU). This maintenance-free PCU integrates PC-based hardware and the PROFIBUS interface for the drives and the I/O modules. The CNC can control up to four digital feed axes. The spindle is also fully controlled by the PCU. In addition to the digital interface via PROFIBUS, it also offers an analog interface for the spindle.

In this application, the CNC controls the axis and spindle movements of the creep feed grinder. The programs are stored in the machine's memory and the CNC is linked to the host DNC at the customer location. Cliff Divine comments further on the operator interaction, "Because the user data are all plain

Above Left: A creep feed grinder, retrofit by Brooklyn Technical Services with a Siemens SINUMERIK 802D CNC, at the Honeywell Engines and Systems facility in Greer, South Carolina. The retrofit has substantially improved production while overcoming crashes and machine failures the customer was experiencing.

Above Right: The control unit combines all CNC, HMI, PLC and communications tasks into a single panel control unit with PROFIBUS interface to the I/O modules.

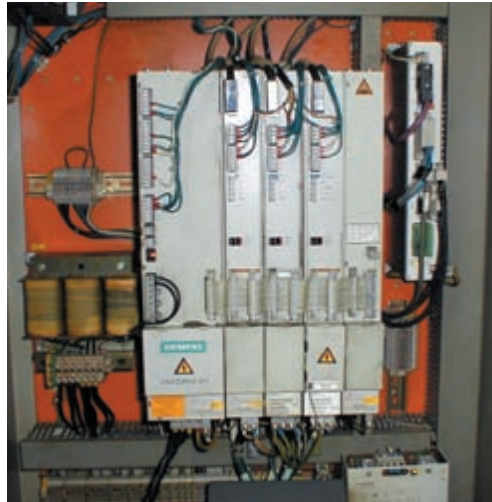


text and the values stored remain after each cycle, the operators find the set-up to be very easy and fast. We provided set-up programs that allowed the operators to jog the grinding wheel to the part and automatically calculate and load the fixture offsets. Our initial dress program sets the wheel diameter and pre-dresses the form into the wheel without operator intervention. In fact, one of the night shift operators told us it was the easiest machines he'd ever run."

The machines have been running for nearly a year, since the retrofit and, to date, not a single crash or machine failure has been reported. As Honeywell manufacturing engineer Dan Hicks comments on the retrofit, "It's the best grinder I ever saw for \$35,000 (the cost of the retrofit)."

Brooklyn Technical Services has served the aerospace, hydraulic pump and motor, paper industry and job shop market sectors since its inception in 1993. They have developed a reputation for CNC retrofitting and currently install all levels of controls on the machines they rebuild.

In commenting on the support Brooklyn Technical Services receives from their CNC supplier, owner Cliff Divine remarks, "The people in the Siemens controls applications department are some of the best I've ever encountered. I've been working with CNC on machine tools for over 30 years and have dealt with all the major controls suppliers in the industry. I chose to work exclusively with



Left: Typical turbine blade processed

Right: By utilizing a single Siemens AD14 interface board, Brooklyn Technical Services was able to maintain all the Siemens servos and motors on the machine, thus saving the customer considerable cost.

Siemens some years ago because of their application engineers. The sales engineers have worked with me to specify the right control for each application. Often times, they've been able to satisfy my requirements when other CNC suppliers said they could not. When I purchased my first CNC from Siemens, they sent an applications engineer to my facility to train me. I was amazed they did this at no cost. Other CNC suppliers wanted to charge me by the hour for their training. I simply couldn't be more satisfied with the results I've gotten from the products and the people at Siemens."

Divine further notes the Siemens CNC packages are adaptable to his machine needs. "Through the use of their machine data tables, an integrator can easily enter the pertinent data on the machine. It seems every eventuality has been incorporated into these controls. Siemens has already integrated most of the components. Through the use of function blocks in the PLC, there is little needed to set up the machine control panel or the set-up panel... even the display is pre-defined. This approach has saved me hundreds of hours of integration time. Most other CNC suppliers require reinventing the wheel on each control scenario." For a grinding application, that might be no pun intended. ■

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