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BHP Billiton Iron Ore

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To whom it may concern,

A key element in the maintenance of the rolling stock is the re-profiling of wheel sets for the ore wagons. BHP had purchased a custom made Portal Lathe for this purpose in 1992 from Hegenscheidt. The key factor in the design of this prototype machine was the need for a short cycle time in order to be able to handle the huge volume of wheels required to be machined in BHP's ore car repair shop line. This original machine control system was a SINUMERIK 850T and the manufacturer had spent a number of years to customize the function of the machine to BHP's needs.

After ten years of heavy work, in 2001, CNC Design was approached to retrofit the machine with a new SINUMERIK system and to further enhance its capability.
Up to six sets of wheel sets are loaded into a magazine. The operator enters information on the identification and status of the parts. These are then automatically loaded one at a time into the portal lathe where the wheel profile and back to back are measured. This data is used to calculate the optimum metal machining cycle to return the profile with minimum metal removal. The profiles may then be re-measured to check conformance.
CNC Design offered a number of new possibilities including improved part measurement, automatic tool measurement, tool force monitoring, intelligent machining cycles, remote diagnostics and simplified operator interface. The measured data was to be logged and transferred to BHP's central database.

The project proceeded with the development of a new control system based on the SINUMERIK 840D CNC system with 611D digital drives. CNC Design has previous experience with development of measuring and machining cycles for wheel profiling machines. This was further developed to meet BHP's specification.

The location, environment and machine availability for the project presented unique issues. In the Pilbara the temperatures regularly exceed 55 Degrees Centigrade and iron ore dust eventually covers everything. Port Hedland is located in a remote region more than 4000 Km's from CNC Design's Melbourne office. The machine was only available for 4-6 weeks for the retrofit. In short, the project had to be conducted under very difficult environmental conditions, in a remote location and in a very short time.

CNC Design's engineering team fully developed the system software and simulated the operation of the machine. Valuable input into profile measurement and machining was gained by involvement of the Monash University Centre for Rail Technology, a world leader in wheel life optimization. The complete design for the six axes and two spindles system was signed off by BHP before installation commenced.
Due to the location, it was necessary to provide spare parts and all items necessary to the project to site. Installation of the CNC system and drives and other equipment was completed in two weeks and within four weeks the first wheel sets were machined. After five weeks the machine was turned over to production.

There have been significant benefits from this project. Part measurement is faster, more accurate and gives a complete profile instead of discrete points. The machining is better optimized with significant costs savings due to better wheel usage. Automation of the tool measurement, tool monitoring and part loading enable the machine to run fully automatically.
BHP are now so pleased with this project that they are planning to further increase productivity by adding a pre-measurement station and integrating the system into their SAP database.

Overall this has been a very successful CNC retrofit project, I thoroughly recommend CNC Design be taken into account for any similar project.
Please do not hesitate in contacting me on 08 91736436 in regard to this project.

Murray Lynch
Foreman Mechanical.