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Intelligent Optimization Methodology and Computer Code (BIP of ATP project - GIGAS 1.0)

The Generalized Intelligent Grinding Advisory System (GIGAS) is a software-based optimization tool that uses mathematical models and experimental data to reduce grinding times by 10-65% and costs by 10% with little to no capital investment.

Grinding processes in manufacturing are diverse and complex with many variables affecting the process. Traditional grinding techniques believe a slow, very fine grind produces a smooth surface finish. Conventional optimization strategies try to produce the same results f often involve the use of trial and error and are of limited effectiveness.

The Generalized Intelligent Grinding Advisory System (GIGAS) has been developed to optimize complex manufacturing processes. This software based optimization incorporates mathematical models and experimental data to allow grinding to be done as quickly as possible, while maintaining or improving the desired surface finish. To optimize an installed grinding machine, a user with little training can input the type of machine, materials being ground, the desired outcome along with several other variables, and the software will optimize the process. With this technology, manufacturers could typically see a 10 to 15 percent reduction in grinding times, with reductions of up to 65 percent possible, along with a 10 percent reduction in cost. As this technology is software based, it requires little to no capital investment and has a return on investment of under one year. The current market for this technology is $10 billion. The software currently supports surface, cylindrical plunge, and cylindrical traverse grinding processes, but can easily be expanded to other grinding processes such as centerless and internal grinding.

Advantages:

-Automated grinding optimization

-Supports multiple types of grinding optimizations

Technology ID

64677

Category

Robotics & Automation/Simulation, Digital Twins, & Industrial Automation
Artificial Intelligence & Machine Learning/AI-Integrated Imaging Systems & Industrial Vision and Inspection

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Potential Applications:

-Materials

-Manufacturing

-Software

TRL: 7

Intellectual Property:

Provisional-Patent, 2006-11-30, United States | Utility Patent, 2008-11-26, United States | CIP-Patent, 2012-03-12, United States | Provisional-Patent, N/A, United States

Keywords: grinding optimization, intelligent grinding, manufacturing software, process optimization, surface finish improvement, reduced grinding time, cost reduction technology, automated grinding, GIGAS, cylindrical grinding, traverse grinding, plunge grinding, Application Software, Grinding, Materials and Manufacturing, Software