



# The Japan Society for Precision Engineering

## Introduction of JSPE Young Engineer Awards 2021

This award is presented to creative young researchers and engineers who have accomplished remarkable results in the field of precision engineering for their efforts and dedication to motivate them to conduct further research.

● **Hiroaki KUWAHARA (Toshiba Corporation) and Takahiro MIZOGUCHI (Motion Lib, Inc.)**

**Development of a force sensorless percussion device for rationalization of generator inspection**

In this work, which examines percussive inspection, the reactionary force applied to a percussion device at the time when it is struck is regarded as a reverberant vibration, and both the percussive function and the echo vibration detection function were thereby achieved by one device. This technology can be expected to expand the extent of the practical application of automatic percussive inspections, such as realizing the stator wedge looseness detection of turbine generators. It can thus be evaluated as having high industrial value. Therefore, it is recognized as an achievement worthy of the JSPE Young Engineer Award.

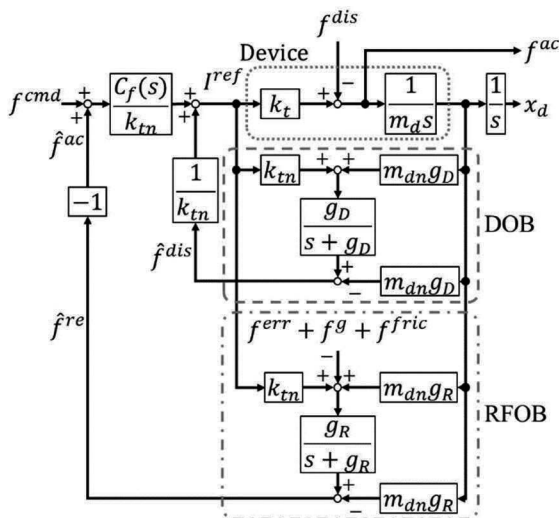


Fig. 1. Force control system of the proposed device

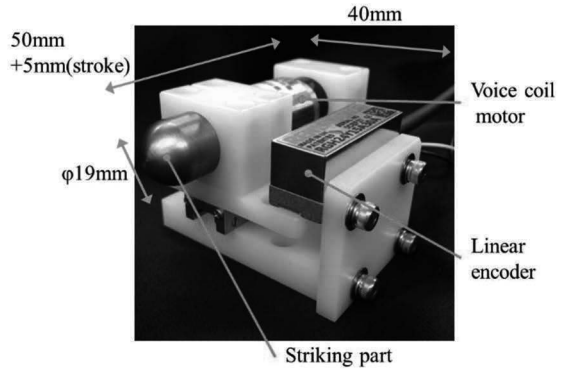


Fig. 2. Structure of the proposed force sensorless percussion device

● **Takashi MIZOGUCHI (JTEKT CORPORATION)**  
**High-quality and high-speed additive manufacturing for casting die of alloy tool steel**

This work proposes high-grade and highly efficient process parameter-setting guidelines for alloy tool steel, which has been difficult to build until now in metal additive manufacturing using lasers. With a particular focus on the generation of cracks and voids that lead to the decrease of mechanical properties, the effect of high-speed additive manufacturing has been demonstrated by conducting detailed crack observation and crystal orientation analysis (EBSD analysis) as well as by conducting considerations related to laser energy density. This technology is expected to contribute greatly to the popularization of metal additive manufacturing and is recognized as an achievement worthy of the JSPE Young Engineer Award.

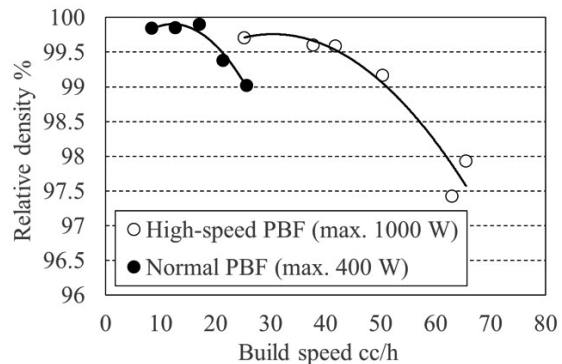


Fig. 3. Relationship between build speed and relative density

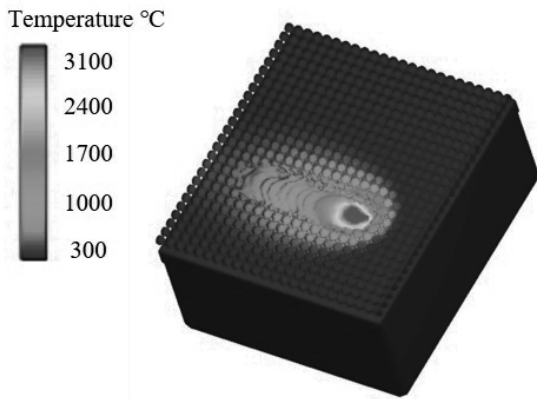


Fig. 4. Result of thermal fluid analysis

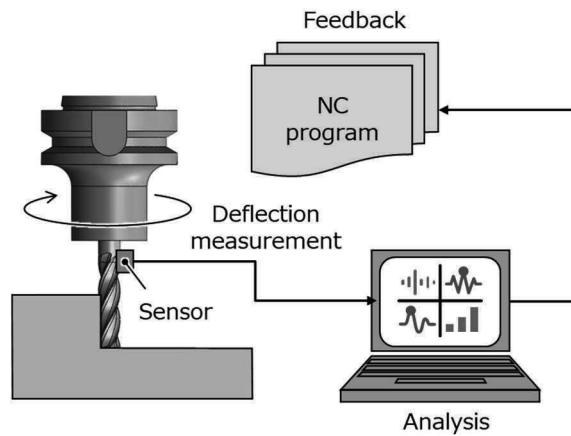


Fig. 5. Schematic of in-process measurement system of tool deflection

● **Ami NOMURA (Hitachi, Ltd.)**

***In-process measurement of tool deflection for improvement of productivity and accuracy***

This achievement has developed an in-process tool deflection measurement technique that can improve machining accuracy without a decrease in machining efficiency, by directly measuring tool deflection during machining and compensating the tool path based on the amount of deflection amount. This technology promotes the digitization of the know-how of skilled people in the field, and it can be expected to be applied to parts processing in a wide range of fields such as aircraft, construction machinery, automobiles, etc. Therefore, it is recognized as an achievement worthy of the JSPE Young Engineer Award.

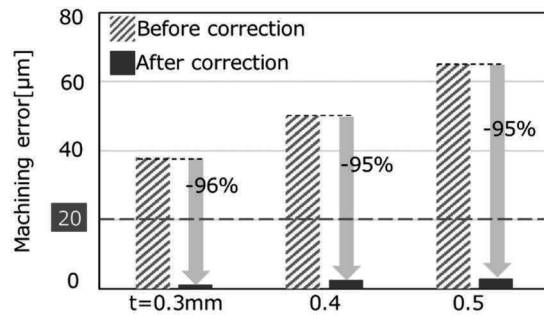


Fig. 6. Experimental result under internal turning

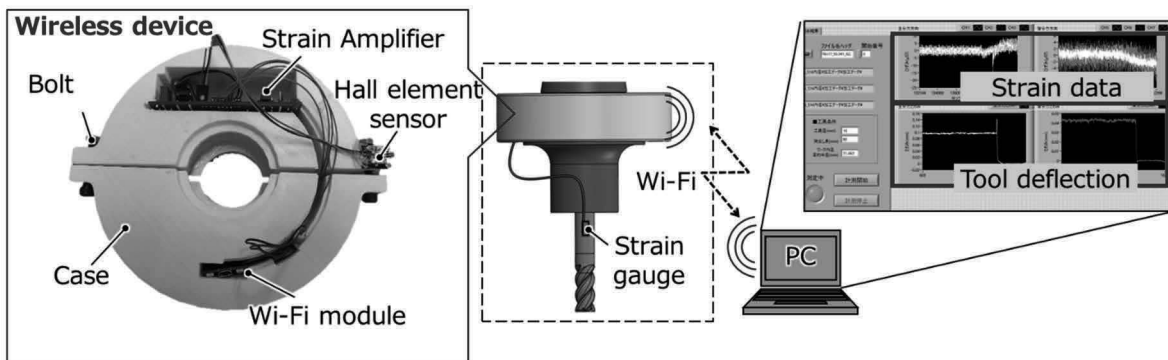


Fig. 7. Tool deflection measurement using wireless communication device