



The Japan Society for Precision Engineering

Introduction of JSPE Technology Awards 2019

1. Development of miniaturized machine tool with pipe frame structure

Naohiko SUZUKI (Takamatsu Machinery Co.,Ltd.), Yoshitaka MORIMOTO (Kanazawa institute of technology), Yoshiyuki KANEKO (Takamatsu Machinery Co.,Ltd.), Kenichi HIROSAKI (Industrial Research Institute of Ishikawa) and Yuichi OKAZAKI (National Institute of Advanced Industrial Science and Technology)

Advances in high precision machining and reduced part sizes require the development of machine tools that minimize part sizes. We have developed a new CNC lathe with a pipe frame structure. This structure is expected to enable the miniaturization of machine tools while ensuring sufficient space for the discharge of cutting chips. It has been confirmed that the developed lathe has machining precision and machine precision comparable to those of conventional lathes with a cast-iron bed.

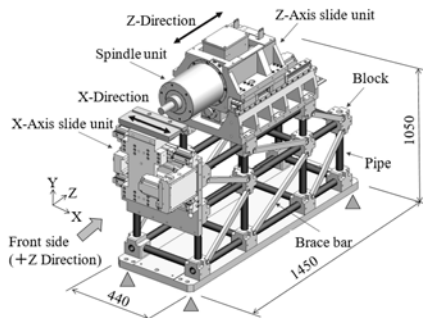


Fig. 1. Structure of newly developed pipe frame CNC lathe.

2. Development of a fully integrated machine tool with built-in robot

Shoichi MORIMURA, Hiroyuki SUGIURA, Kenji IGUCHI, Tatsuhiko YOSHIMURA and Tomohiro SHIBATA (Okuma Corporation)

Since labor shortage has become a major problem at manufacturing sites, automation using robots has become major field of interest. However, due to several issues such as difficulty in handling, robots have not been introduced in many manufacturing sites. To solve these problems, we developed a built-in robot that can move freely inside a narrow machining chamber and integrated it into the machining chamber of the machine tool. We are also

working on integrating the machine tools and robots in operation and control systems. Thus, we realized a novel machine tool that can not only perform the attachment/detachment of workpieces but can also provide in-process support.



Fig. 2. Fully integrated machine tool with built-in robot.

3. Development of long life ball screw using material with high retained austenite amount for high-load drive

Masahiro UEDA, Naruaki ABE, Naoki KAWATA and Hideyuki HIDAHA (NSK, Ltd.)

The newly developed "NSK High Load Drive Ball Screw S-HTF Series" has a long life and load resistance that greatly exceed the specifications of conventional ball screws. When this product is used in an electric injection molding machine, the molding speed and thrust can be increased. These improvements can considerably contribute to the miniaturization and high functionality of molding machines. They are expected to serve as useful machine parts that can meet rising demands for multifunctional and diversified plastic products.

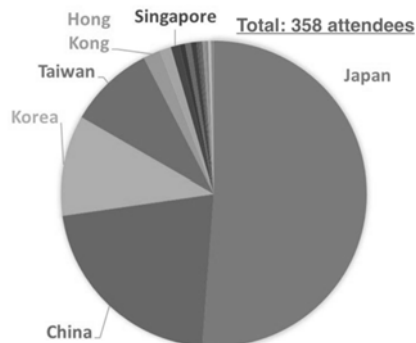


Fig. 3. "S-HTF Series" for high-load drive.

Report of 8th International Conference of Asian Society for Precision Engineering and Nanotechnology (ASPEN2019)

Asian Society for Precision Engineering and Nanotechnology (ASPEN) is an academic society of societies in the field of precision engineering and nanotechnology for Asian researchers. International conferences of ASPEN have been held biannually since 2005 in Asian cities, in order to promote collaboration among societies and to encourage research activities of Asian researchers, especially young promising researchers. The 8th International Conference of ASPEN (ASPEN2019) was held on Nov. 12th through 15th, 2019 in Matsue City, Shimane, Japan (Conference Chair: Prof. K. Takamasu, The University of Tokyo). Matsue was built as a castle town and has been well known as the city of water surrounded by beautiful nature.

There were totally 358 attendees including 7 invited speakers, one plenary speaker and 6 keynote speakers, from 10 countries and regions. A total 272 presentations including 76 poster presentations were presented in five parallel sessions. The topics cover diverse fields closely related to precision engineering and nanotechnology such as manufacturing systems, precision machining, machine tools, precision metrology, micro/nano fabrication processes, additive manufacturing, nano/bio technology, IoT/AI/big data, and so on.



Attendees of ASPEN2019

On Nov. 13th, Young Researcher Night (YRN) was held for the young researchers to get the chance of international communication, to make a new networking around young researchers attending at the ASPEN2019.

At the banquet held at Matsue Vogel Park on Nov. 14th, attendees enjoyed delicious local food and a traditional Japanese dance theater "Iwami Kagura". Best paper awards given to 13 papers and 14 winners of young researcher awards were announced at the banquet.



Group photograph in front of the venue



Opening Session



Traditional Japanese dance theater "Iwami Kagura"

On Nov. 15th, a post-conference tour was organized to visit the Shimane Fujitsu Ltd., an advanced factory for laptop computers and tablets based on the Fujitsu's IOT cloud platform, and Izumo Grand Shrine, which is one of the oldest Shinto shrines dedicated to Okuninushi-no-mikoto known as the deity of nation building and good marriage.

We look forward to seeing you at the next conference of ASPEN, which is scheduled to be held in Singapore in Nov. 9-12, 2021.