October 8, 2024

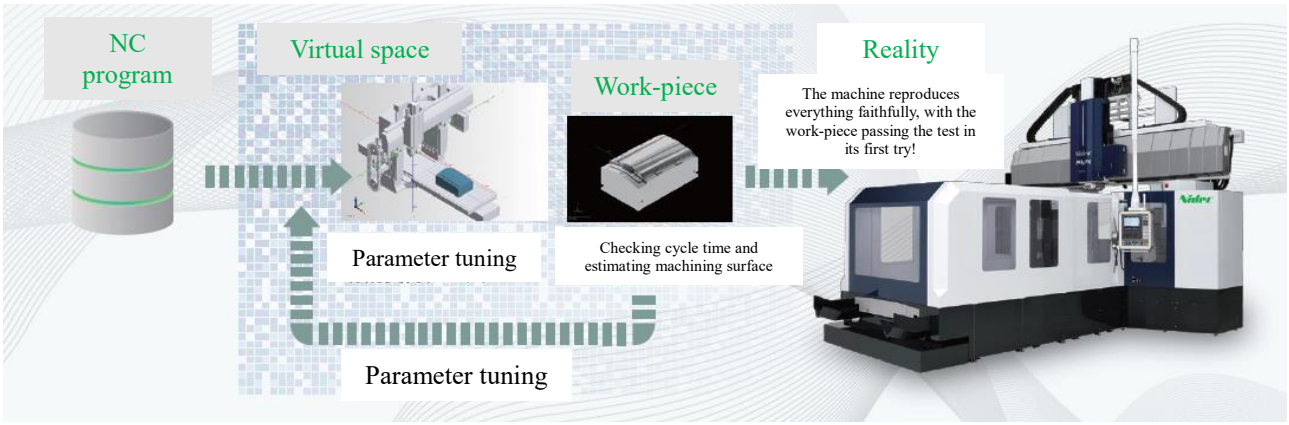
Nidec Machine Tool Develops Digital Twin Platform for Machine Tools, and Unveils It at JIMTOF2024, Proposing an Efficient and Manpower-saving Production Method for the Future

- **The Company will exhibit MVR-Hx, a double-column five-face machining center with high desktop simulation and reproducing capabilities to contribute efficiency improvement and manpower reduction.**
- **The Company will propose new solutions to issues facing users.**

Nidec Machine Tool Corporation ("Nidec Machine Tool" or the "Company") today announced that it has developed a digital twin platform that, in a machining process using a large machine tool, reproduces an actual world highly accurately by using simulation. The platform performs verification and tuning in a virtual space to improve machining program's data to the ultimate level of completion, and uses the Company's machine tool that can reproduce data faithfully to speedily machine a work-piece at a target quality level. The digital platform will help reduce the number of actual equipment-based processes amid the metal-processing industry's serious labor shortage caused by a declining workforce and people's unwillingness to work in the manufacturing industry.

The aforementioned technology will be demonstrated for the very first time at this year's Japan International Machine Tool Fair (JIMTOF2024), to be held at Tokyo International Exhibition Center (Tokyo Big Sight) from November 5 – 10, under the topic, "Proposal on an efficient and manpower-saving production method for the future."

Illustration of digital twin technology



This technology analyzes processes in mental component machining works that consume a lot of operators' time, and factors that reduce machine utilization. The newly developed application software uses digital technology and AI to solve such issues. This application software uses a virtual space (on a personal computer, or PC) to simulate a machining NC*[1] program that was made to operate machines, to improve the degree of perfection to the ultimate level. This is why, at a factory, operators can obtain a deliverable of a target quality level only by starting the machining process, and without performing advance verification using the actual machine or a work-piece (a material to be processed).

Normally, prior to starting any machining process, a mechanical operator is required to check and set various machining conditions (*e.g.*, movement interference, cutting load, and cycle time), and repeatedly correct those programs and perform a test-cutting procedure. Such debugging*[2] processes take time, and the machine utilization remains low with the actual machine, resulting in a low productivity. By offering the application software, with which anyone can perform these works easily, the Company is ready to help improve productivity and reduce operators' workload.

Specifically, the software program brings a PC- and monitor-based 3D image into a virtual space to check machines' movements and work-pieces' conditions accurately. This software enables an operator to check, among others, machining time, machined surfaces, and movements in a virtual space, without having to

perform debugging or test-cutting with an actual machine. Furthermore, the Company's highly reproducible double-column five-face machining centers can perform machining at a certain quality level without relying on people or places, enabling remote and multiple-place production.

At JIMTOF2024, Nidec Machine Tool will use a PC and MVR-Hx, a double-column five-face machining center that the Company produces, to perform demonstration using Fanuc Corporation's digital twin technology, and offer new solutions to issues facing users.

Nidec Machine Tool's demonstration at JIMTOF2024 will include:

№	Issues (concerns) facing users	Nidec Machine Tool's proposed solutions
1	It's hard to foresee movements and interference of a five-face machining program with an attachment (inside a work-piece and a machine).	Use a virtual space to visually check the movements and interference of the machine, including its attachment.
2	The mechanical utilization does not improve after an actual machine-based debugging to check a machining program and a cycle time.	Run the program in a virtual space, and perform high-speed processing to shorten the time for the check.
3	When checking a processed surface's quality level, one has to use an actual machine to test-cut a work-piece every time a change is made to the program or the machine's parameters.	Perform a trial-and-error process by simulating various cases in a virtual space until the surface is machined to the required level.
4	Commercially available CAD/CAM or simulation software cannot check the information in Sections 1 – 3 above at once.	The Company offers its original platform that can check the information in Sections 1 – 3 in a series of cycles.
5	How do you raise the quality level of a mold's machined surface easily?	The Company uses the newly developed "FMII*3" to offer a high-quality machined surface.

*1. "NC" stands for "numerical control."
*2. "Debugging" means to search for and specify the reasons for, and the source-code location of, any malfunction or defect discovered in a test after a programming glitch or mistake, to fix the malfunction/defect so that the program runs as intended.
*3. "FMII" stands for "fine mold," which is the second generation of Nidec Machine Tool's original mold-machining control functions.

-###-