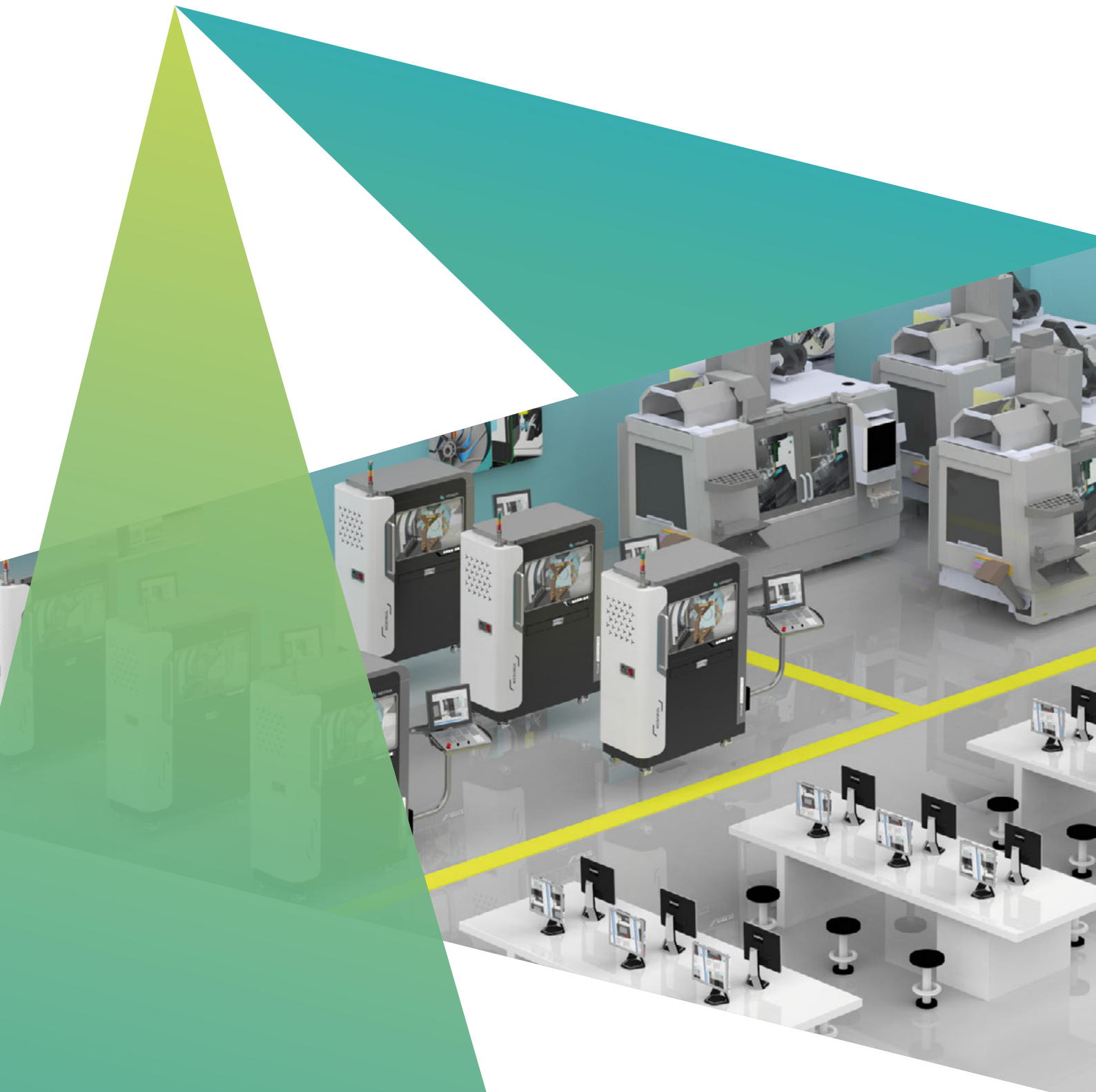


HxGN Machine Trainer

Multi-axis CNC and CMM machine trainer simulator



Multi-axis CNC and CMM machine trainer simulator

A Hexagon solution

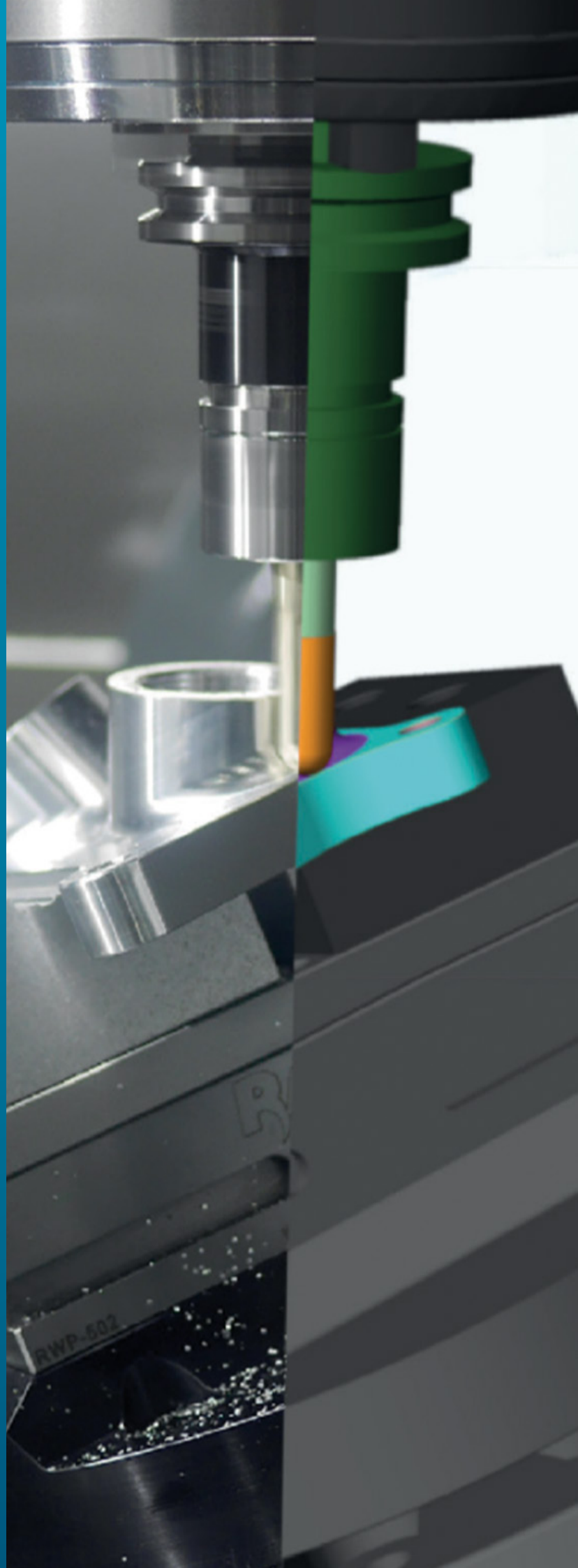
The Hexagon Machine Trainer is a new operator-programmer training method, entirely imagined and developed by Hexagon. Thought like a flying simulator and certification tool, dedicated to CNC machining and CMM machines. The program is based on the new generation of NCSIMUL intelligent simulation software, which is a perfect combination of software and hardware, efficient, practical, and easy to learn.

Thanks to modelled machine kinematic Digital Twins, the HxGN Machine Trainer provides 3 to 5 axis milling, Mill-Turn and CMM machines scenarios, using a realistic simulation. It's an powerful, innovative and intuitive additional training tool along the traditional CNC and CMM machines. Specific situations, such as collisions, machine restarts can be emulated to mimic operational or emergency procedures.

The HxGN Machine Trainer fully meets technical requirements for education and manufacturing companies, as a safe tool to learn and validate new procedures. In a world where technical skills availability is an increasing challenge, the HxGN Machine Trainer will allow a faster progression for new high qualified talent in the manufacturing job market.

HxGN Machine Trainer provides the perfect illustration of Industry 4.0 digital thread application to the shop floor operation. As a standard, it includes machining instruction documents and G-code machining programs transfer, in order to define tool set-ups directly on the control panel and prepare for machining.

After virtually machining various practical work scenarios, the student will control the part with the Metrology option. Machining and inspection reports, automatically generated, as well as OEE rates will be available for analysis as a part of the continuous improvement process.



HxGN Machine Trainer

Integrated equipment with teaching and practical training, program verification, machine tool and coordinate measuring machine safety simulation

Machine Tool

Practical training for 3-5 axis Milling and Mill-Turn machines

The HxGN Machine Trainer is designed to create realistic machine preparation scenarios and be used as a professional training equipment. The HxGN Machine Trainer provides interchangeable CNC control to cover various types of machine languages mentoring.

The HxGN Machine Trainer incorporates the industrial NCSIMUL simulation software, HEIDENHAIN and SIEMENS operating control simulators, 2 physical CNC panels, a large industrial display, a touch screen, a machine tool handwheel, the CNC signal tower light, a programmable logic controller and a machine tool simulation mechanism.

Learning is modernised with the CNC simulation

Usually, high-value equipment is required to train CNC machine tool operators as they are aiming to work on expensive machines. This implies significant investments in machine equipment, supplies and maintenance for schools or training centres.

The virtual CNC machine trainer comes with NCSIMUL software connected to and driven by the CNC panel, to learn how to pilot a CNC virtually, prior to go on the real one. It reduces tremendously costs, training time, lag due to availability while simulating and optimizing machining programs.

Advantages and technical features

The HxGN Machine Trainer links theoretical teaching and practical manipulations to transmit necessary know-how to machine operators and programmers.

Thanks to the Machine Digital Twins and the realistic CNC environment renderings, the CNC simulator

reduces training equipment costs and increase trainees' confidence through different CNC User Interfaces. The system provides a comprehensive machining processes understanding.

- Industrial CNC simulator, including 3-5 axis Milling and Mill-Turn machines;
- Includes control emulators HEIDENHAIN and SIEMENS, identical to the real machine tool CNC User Interfaces;
- Available with the CNC panels for HEIDENHAIN and SIEMENS machine tool operation panels, both optional to match the teaching needs;
- Fully functional machine-tool handwheel, which can be used to move and position the machine tool axis;
- Equipped with a three-color tower indicator light, activated by the machine status, mimicking the tower light effects of a real machine tool;
- Integrates the world-class CNC machining simulation software NCSIMUL to provide the best 3D graphics kernel in the industry;
- Machining noises and coolant animation are simulated;
- When a collision occurs, an audible alarm and the tower red light are activated at the same time;
- Collision alarm: As a collision occurs, the simulation machine tool gives a buzzer alarm and the tower light turns red at the same time;
- Emergency: When depressing the emergency stop button, the machine tool stops immediately and emits an audible alarm;
- Unlike a real CNC, the HxGN Machine Trainer can easily be moved around the shopfloor or in a classroom;
- The 40-inch industrial display maximizes the realistic machine tool simulation;
- Comes with training material and learning scenarios;
- Displays machine status, machine origins, axe positions, machining speeds and feed rates, cutting tool compensations and other extensive machine data in real time;
- Includes CNC macro and conversational machining languages currently available on the market;
- Flexible: schools and training centres can customize Machine Digital Twins to match the machines available on the shopfloor, integrating specific machine codes;
- Optional: Several CAD/CAM software can be interfaced for sharing projects;

Optional : Coordinate Measuring Machine (CMM)

HxGN Machine Trainer also integrates coordinate measuring machine (CMM) simulation functionalities.

Through the I++ Simulator software, the HxGN Machine Trainer hosts a wide selection of CMMs digital twins, of different sizes and brands, to simulate their mechanical design.

Advantages and technical features

To observe the current course of a measurement routine, including collision risks, it is necessary to be able to visualize the CMM, its probing head, the probe, the probe changer, the part and the fastening system. Thus, our software will make it possible to simulate the entire ecosystem related to the measurement.

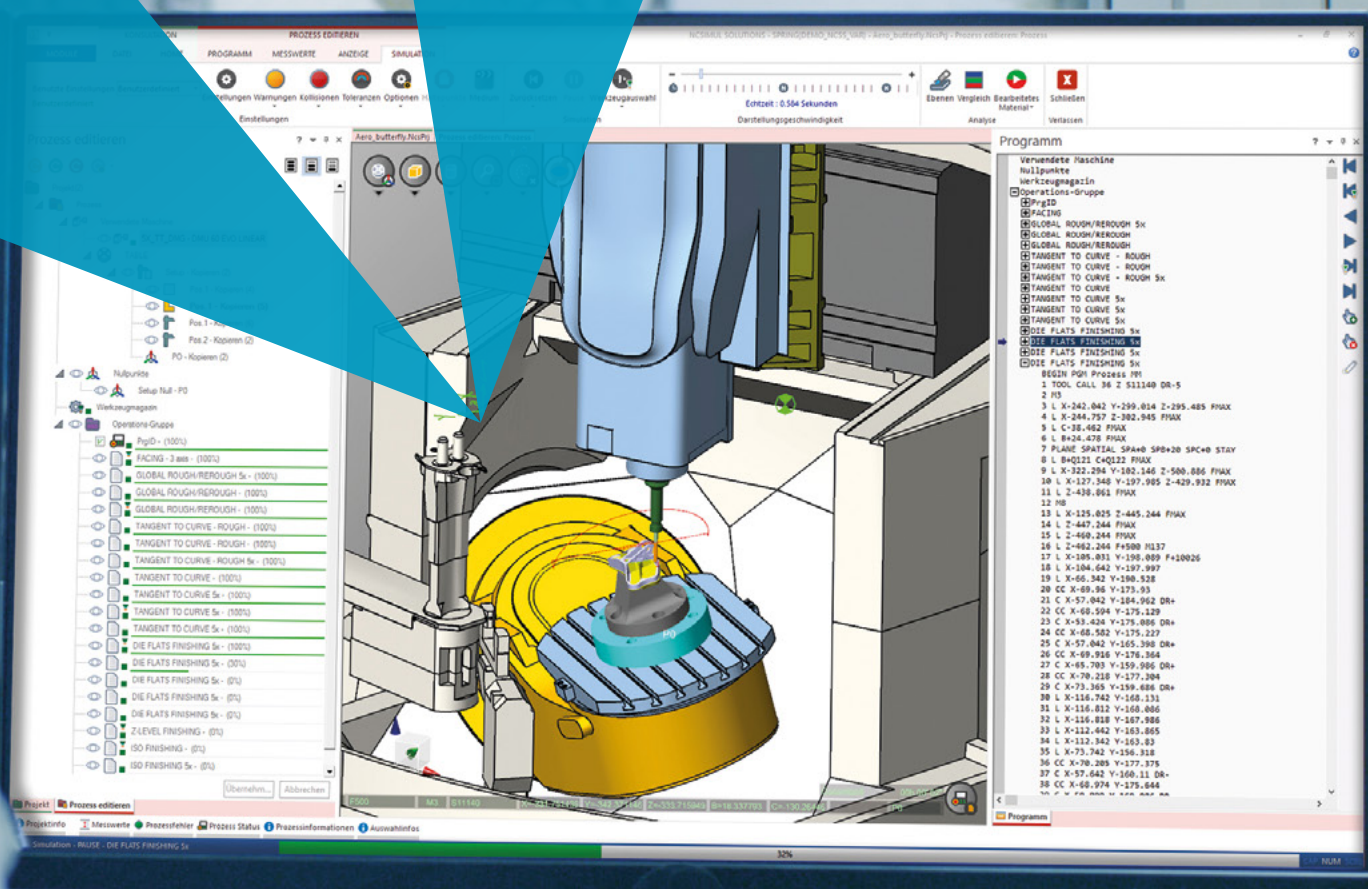
I++ Simulator, like a real CMM, will receive operating instructions from a 3D Metrology software, such as PCDMIS or QUINDOS. Through its communication protocol, respecting to the I++DME standard, I++ Simulator can also collaborate with other solutions available on the market.

The I++ Simulator software will therefore make it possible to simulate existing measurement routines and thus facilitate the development of new programs, in learning mode or offline mode with the CAD model. It does not require any particular know-how, the reality blends into the virtual and you feel like being in control of the real CMM.

In addition to the HxGN Machine Trainer, our offering can include a set of PCDMIS or QUINDOS offline licenses for workstations installation and thus, provide a more complete educational solution. Like the company practices, the software is used to prepare measurement works using CAD models and inspection requirement, and therefore generate a measurement program. The result will then be transferred to HxGN Machine Trainer for tests.







NCSIMUL

Intelligent CNC simulation solution

NCSIMUL combines the digital development of “Industry 4.0” with the real requirements of CNC machining, practically and conveniently. Therefore, NCSIMUL is more than just a G-code verification software solution. It also provides a digital platform to certify, optimize, document, and manage CNC programs for the entire workshop.

NCSIMUL is based on virtual machines, the Digital Twins of real machine tools. CNC programs are parsed and validated for possible errors or inconsistencies, reducing on-machine prove out and programming time. Also, programs can automatically be optimized for increasing cutting quality, decreasing cutting time and saving cutting tools.

Your team can benefit from continuously updated data in a seamless workflow with the certified documentation.

NCSIMUL supports the simulation for most of the CNC machine tools available on the market, virtually building a complete realistic machining environment. NCSIMUL is deployed and applied by many OEMs, small, medium and large sized companies, and their suppliers, in various industries and around the world, including mechanical engineering, automotive, aerospace, defense, transportation, energy, medical technology, maximizing the workshop productivity for manufacturing companies.

High-speed 3D CNC simulation

G-code simulation verifies your cutting tool path to ensure the CNC program used is safe and collision-free. The program certification includes collision check for part fixtures, indexing, and initial movements. After post-processing the program with the CAM, NCSIMUL reads the final machine code to ensure that you always use safe and correct machining program, on the actual machine tool.

- High-performance G-code certification includes G-code decoding, full CNC program verification, interactive tool path simulation, automatic error detection, and delivers an accurate machining cycle time.
- Motion simulation: Provides experiences of realistic simulation and material removal by detecting errors and collisions during machining (such as rapid feed rates in material, machining with spindle stopped or machining over the flute length), and includes probe devices macro verification.
- Part inspection: Overcut/residual inspection of materials compared to the design model can be displayed quickly and easily based on tolerances dynamic 3D sectioning enables further analysis of the internal part structure and measurement of thickness and hole depth, etc.

Powerful intelligent optimisation

The intelligent optimization module of NCSIMUL can reduce part machining cycle-time by eliminating unnecessary slow cutting feeds while protecting parts from overspeed or spindle overloads.

NCSIMUL Optitool and Optipower intuitively optimizes your programs in 3 steps: The first step is analysing cutting conditions of the CNC program; the second step is defining an optimization strategy; the third step is writing a newly optimized CNC program.

Optitool users can reduce their machining cycle with over 35% time savings, while selecting the simple and yet efficient air-cutting optimization strategy.

In addition, Optitool optimizes cutting tool feed rates in material by regulating a constant Chip-Flow or Chip-Thickness while controlling the amount of Feed per Tooth.

While optimizing a cutting tool-path, Optipower will use the power consumption value to cap the machine feed-rate. The feed rate is limited by the maximum machine spindle torque.

Digital documents

Effective collaboration requires real-time access to the latest data for all team members involved in the manufacturing process to eliminate misunderstandings caused by outdated or redundant information. NCSIMUL ensures each team members can collaborate by using the latest data validated in the final programming step.



Hexagon is a global leader in digital reality solutions, combining sensor, software and autonomous technologies. We are putting data to work to boost efficiency, productivity, quality and safety across industrial, manufacturing, infrastructure, public sector, and mobility applications.

Our technologies are shaping production and people-related ecosystems to become increasingly connected and autonomous – ensuring a scalable, sustainable future.

Hexagon's Manufacturing Intelligence division provides solutions that use data from design and engineering, production and metrology to make manufacturing smarter. For more information, visit hexagonmi.com.

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