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欧洲核子研究组织CERN

> "我们已经做到了技术与WorkNC性能的完美融合，实现了高效率生产。在CERN的本地网络中保存和共享程序，从各个角度确保了车间的可追溯性和高效性。"

WorkNC　CAM软件是世界领先的高效自动化2-5轴CNC编程软件，所有西方发达国家、日韩、中国等汽车制造商以及其他行业的知名OEM厂商都在使用WorkNC。WorkNC凭借其独特的加工优势被广泛应用于汽车、科研、航空航天、3C、通讯、医疗机械、采矿、休闲机械、通用机械、特殊机械、模型制造等领域加工。

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和WorkNC一起揭开宇宙奥秘

WorkNC被一家瑞士研究机构应用于研究宇宙结构的机械零部件加工。欧洲核子研究组织CERN，它拥有世界上最大型的粒子物理学实验室，成立于1954年，坐落于瑞士日内瓦。该机构的物理学家和工程师们利用高度复杂的科研仪器研究宇宙物质基本成分。欧洲核子研究中心CERN使用加速器和粒子探测器等仪器。加速器产生的高能量光束的基本粒子都与其他固定目标碰撞，利用粒子探测器观察和记录这些碰撞产生的结果。

CERN的EN工程部门参与生产这些基础设备的零部件，其中一部分的零部件由他们内部车间自主生产。主加工车间大约有50个工作人员，配备了10台5轴加工中心和一些其他设备。这些设备中其中由来自知名品牌德玛吉和哈默。EN从2016年开始使用WorkNC ，WorkNC帮助他们提高实际加工效率后，他们很快决定加购5套WorkNC。

"没有使用WorkNC之前，我们需要使用三维模型尽可能多地做出多个CAM解决方案进行评估。安装WorkNC的同时也将机床作为正在进行的车间数字化战略的一部分一起连接到IT网络，使得WorkNC CAM解决方案可在车间直接使用，这也是技术人员的目的。" "精度是CERN主要加工车间的核心竞争力，故此精度是我们选择加工中心和CAM软件的首要标准。"

在车间除了日常使用WorkNC 3轴和3 + 2轴加工外，CERN也经常需要用WorkNC先进的5轴加工越来越多的复杂零部件。Pierre Naisson说，因零部件加工材料一般是用实体毛坯，故此需要高效的粗加工策略。他迫不及待地夸赞WorkNC打破常规的波形粗加工策略，既保证了较高的材料去除率，同时也延长了刀具寿命。

"车间技术人员全方位使用WorkNC的功能去控制和编辑刀具路径，如碰撞检测模块。常用的加工策略如等高精加工、3轴全局粗加工及再加工、平面精加工、倒角加工、切线加工和压线加工等。"实际上机前，WorkNC可以分析、模拟及检查刀具路径。"

"有时，在加工阶段之前，我们需要去评估特别复杂的且材料非常昂贵的零件生产的可行性。WorkNC可基于三维模型使我们能够快速地计算出可靠的成本预算及加工时间预判。"

About The Company:

Name:
CERN

Business:
The European Organisation for Particle Physics - Research body

Benefits Achieved:

- Improved quality and reliability from a production point of view

- Generates 3 axis and 3+2 axis toolpaths

- 5 axis programming for machining more complex parts

- Waveform roughing strategy ensures a high material removal rate, while prolonging tool life

- Functionality to load, analyse and simulate toolpaths before running them on the machine

- Allows the company to rapidly provide reliable cost and delay estimations

Comments:

"WorkNC also offers the possibility to load, analyze and simulate toolpaths before running them on the machine itself."

Pierre Naisson
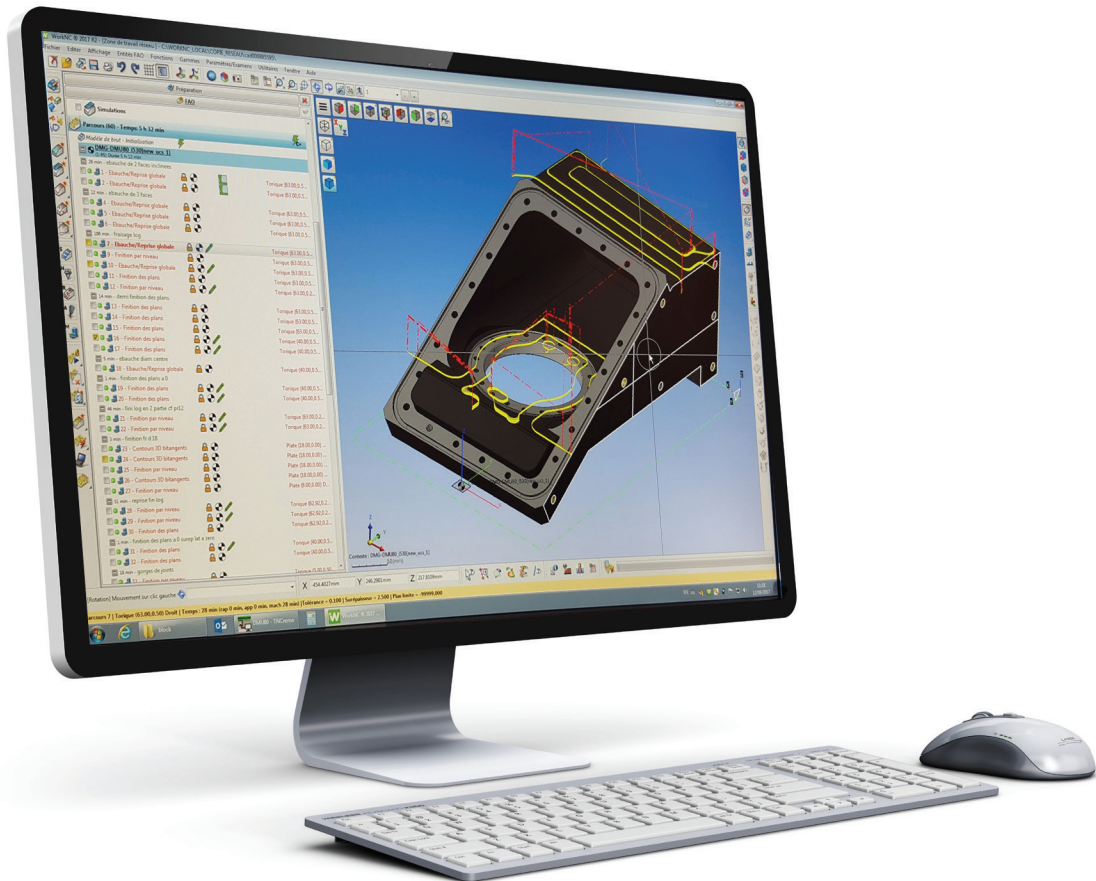Responsible for implementing CAM applications

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Pierre Naisson总结道："我们已经做到了技术与WorkNC性能的完美融合，实现了高效率生产。在CERN的本地网络中保存和共享程序，从各个角度确保了车间的可追溯性和高效性。"
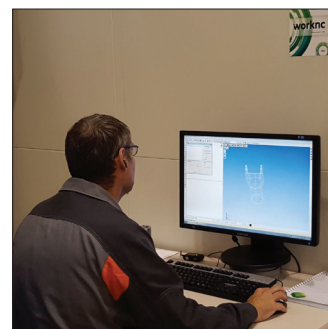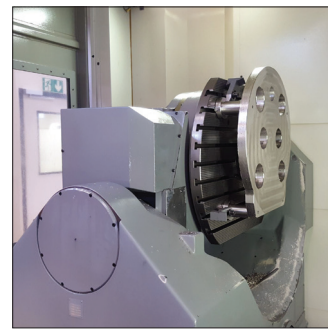
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Software

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> **We have been able to combine the skills acquired by our technicians along with the performance of WorkNC. Together, we have been able to implement a highly efficient production process.**

WorkNC CAM software is the premier automatic CNC software for surface or solid models in mold, die and tooling businesses for 2 to 5-axis CNC programming. WorkNC is used by all western, Japanese and Korean automotive makers and well-known OEMs from a range of other industries.

WorkNC is best of breed, complementary CAM software that enhances all design and manufacturing systems by providing the most reliable, efficient, easy-to-program cutter paths, resulting in unmatched productivity and safety.

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Unravelling The Mysteries Of The Universe With WorkNC

Mechanical components produced with WorkNC are used by a research organisation in Switzerland to study the structure of the universe.

The research body is the CERN, the European Organisation for Particle Physics, located in Geneva since 1954.

The organization's physicists and engineers use highly complex scientific instruments to study the basic constituents of matter. The CERN uses instruments such as accelerators and particle detectors. The accelerators produce high energy beams of fundamental particles which are made to collide with other beams or with fixed targets. The detectors are used to observe and record the results of these collisions.

The EN engineering department at the CERN participate in the production of these components, some of which are manufactured in-house in their own workshops. Approximately 50 people work in the main machining workshop which features around ten 5-axis machining centers, in addition to other equipment, from renowned suppliers such as DMG Mori and Hermle. EN installed its first version of WorkNC in 2016. After realizing just how much the application improved their manufacturing process, they quickly decided to add a further five seats of the software.

The EN teams hardly ever used the CAM application they had before investing in WorkNC. Pierre Naisson is responsible for implementing CAM applications. "Workshop production was based on 2D drawings whereas programming and quality control uses a 3D model. Our wish was to improve quality and be more reliable from a production point of view."

Each technician looks after one machine and is totally responsible for deciding upon the required machining sequences and taking charge of the part. Advance programming tasks were managed by dedicated programmers not working in the workshop.

"We decided to work inasmuch as possible directly with the 3D models and evaluated several CAM solutions before choosing WorkNC. WorkNC was installed at the same time as the machines were connected to the IT network as part of the ongoing workshop digitization strategy. It was also an intention to implicate the technicians and make the CAM solution available for use directly in the workshop."

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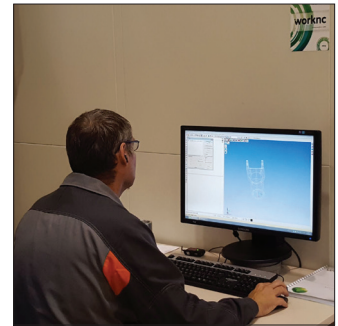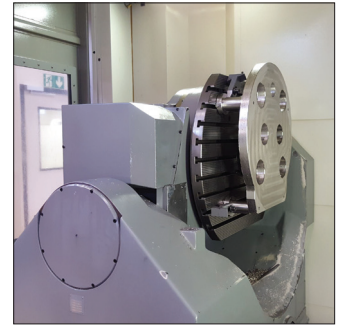Responsible for implementing CAM applications

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"Precision is the core competence of the main machining workshop at the CERN, the number one criterion for our choice of machines… and of course, for our CAM solution."

In addition to its everyday use in the workshop for generating 3 axis and 3+2 axis toolpaths, advanced 5 axis programming is regularly required for machining more complex parts. Parts are generally machined from a solid billet, which Pierre Naisson says requires a highly efficient roughing strategy. He is impatient to roll out WorkNC's game-changing Waveform roughing strategy, which ensures a high material removal rate, while prolonging tool life.

Workshop technicians use the full range of features to control and edit toolpaths, such as the collision management module. Machining strategies such as Z-level finishing, 3-axis undercut remachining, flat surface finishing, chamfering, and tangent to curve are programmed on a daily basis. "WorkNC also offers the possibility to load, analyze and simulate toolpaths before running them on the machine itself."

"Sometimes, before the machining phase, we are asked to evaluate the feasibility of producing particularly complex parts from very expensive materials. WorkNC allows us to rapidly provide reliable cost and delay estimations, based on the 3D model."

Pierre Naisson concludes: "We have been able to combine the skills acquired by our technicians along with the performance of WorkNC. Together, we have been able to implement a highly efficient production process. Programs are saved and shared over the CERN local network which ensures improved traceability and enhanced efficiency in the workshop from all points of view."

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