



# THE FUTURE OF ROBOTICS IN CNC GRINDING

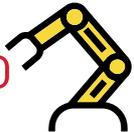
**ANCA**  
CNC MACHINES

SALES FIGURES IN ROBOTS IN 2015 ARE

UP **15%**

PREDICTING **DOUBLE DIGIT** PERCENTAGE GROWTH<sup>1</sup>

CNC GRINDERS ONLY HAVE

**1.5%** 

OF MACHINE TOOLS WITH ROBOTS<sup>2</sup>

SINCE 2014 THE NUMBER OF ANCA CUSTOMERS ORDERING CNC GRINDING MACHINES WITH ROBOT LOADERS INCREASED FROM:



THIS IS CHANGING WITH ROBOTS BECOMING INCREASINGLY AFFORDABLE AND EASY TO PROGRAM

**ADDING CAPABILITY**

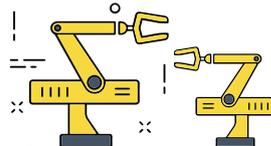
A MARKET FIRST IS ANCA'S NEW MULTI-ROBOT PRODUCTION CELL.



**DUAL ROBOT TECHNOLOGY** OPENS THE DOOR FOR **UNLIMITED POSSIBILITIES FOR THE INDUSTRY**, NO MATTER HOW COMPLEX.



**REDUCES CAPITAL EQUIPMENT, IMPROVES PRODUCTIVITY, REDUCES WORK IN PROGRESS AND INVENTORY.**

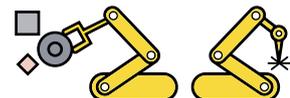


**A LARGER ROBOT DEVOTED TO** WHEELPACK CHANGES AND PART LOADING, WHILE A **SECOND, SMALLER ROBOT IS FREE TO "MULTI-TASK"** OTHER OPERATIONS WITHIN THE CELL.



**BETTER CAPABILITY TO MANAGE COMPONENTS** THAT ARE DIFFICULT TO HOLD, SUCH AS TURBINE BLADES AND KNEE JOINTS.

**IT ENABLES TWO PROCESSES RUNNING AT THE SAME TIME.** FOR EXAMPLE, THE LARGE ROBOT CAN LOAD WHEEL PACKS AND PARTS INTO THE MACHINE WHILST THE SMALLER ROBOT UNDERTAKES SECONDARY OPERATIONS SUCH AS METROLOGY, LASER ETCHING, OR PART WASHING.



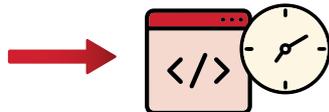
**USER-FRIENDLINESS MEANS GREATER USEFULNESS**

**IN THE PAST CUSTOMERS WERE CONCERNED ABOUT:**

- THE AMOUNT OF TRAINING REQUIRED TO USE ROBOTS.
- ROBOT MAINTENANCE - HOW TO RECOVER FROM A MINOR CRASH OR CREATE A NEW PALLET.
- HOW TO INSTRUCT THE ROBOT ON CHANGING FROM ONE PART TO ANOTHER OR INSPECTING A TOOL DURING A BATCH RUN FOR EXAMPLE.



**NEW PRODUCT DEVELOPMENTS** MEAN SOFTWARE PACKAGES ARE NOW AVAILABLE TO **SIMPLIFY COMPLEX REQUIREMENTS.**



FOR EXAMPLE, ANCA'S **ROBOTEACH** SIMPLIFIES ROBOTIC PROGRAMMING TO **SAVE HOURS OF SET UP TIME.**

**ROBOTICS WILL BE PART OF DAY TO DAY OPERATIONS**



THE CNC MARKET HAS SEEN THAT WHAT INITIALLY SEEMS LIKE A CUTTING-EDGE PRODUCT CAPABILITY, BECOME INDUSTRY STANDARD.



AS WHEN A CNC CONTROL WAS ADDED TO A MANUAL GRINDING MACHINE, ROBOTICS ARE A SIMILAR GAME CHANGER.



EXPANDED CAPABILITIES WITHIN ROBOTICS AND INCREASINGLY USER-FRIENDLY AUTOMATION SOLUTIONS ARE MAKING THE FUTURE AN EXCITING ONE.

<sup>1</sup> [HTTP://WWW.IFR.ORG/FILEADMIN/USER\\_UPLOAD/DOWNLOADS/WORLD\\_ROBOTICS/2016/EXECUTIVE\\_SUMMARY\\_WR\\_INDUSTRIAL\\_ROBOTS\\_2016.PDF](http://www.ifr.org/fileadmin/user_upload/downloads/world_robotics/2016/executive_summary_wr_industrial_robots_2016.pdf)

<sup>2</sup> [HTTPS://WWW.KUKA.COM/KUKA\\_WP\\_WZM\\_EN.PDF](https://www.kuka.com/kuka_wp_wzm_en.pdf)

# THE FUTURE OF ROBOTICS IN CNC GRINDING

Factories around the world are investing like never before on robotic assistance. For users of CNC grinding solutions, things are beginning to get interesting.

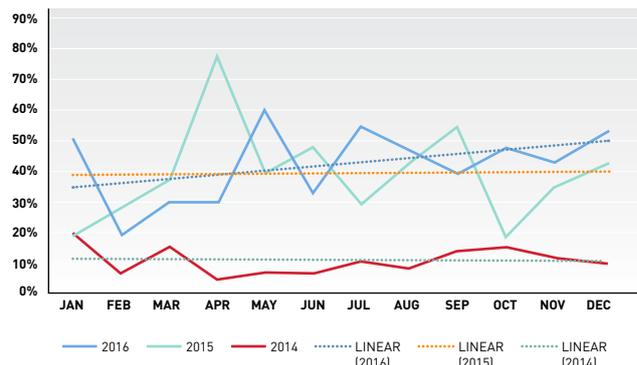
In high- and low-wage countries, interest in the many benefits of industrial robots has never been higher.

Released last year, the International Federation of Robotics (IFR) Industrial Robots report showed unit sales figures in 2015 up 15 per cent on the year before, reaching an all-time high of 253,748. Since 2010, technical improvements in robots and automation have turbocharged investment, according to the report. Furthermore, double digit percentage growth is predicted to continue every year up to 2019<sup>1</sup>.

However, within CNC machining, robotics applications have been dominated by machine tending. Overall, the benefits enjoyed by industrial users of robots - such as accuracy, productivity and capacity utilisation – have been under-realised by machine tool users. According to 2012 IFR research, only 1.5 per cent of machine tools were being automated in conjunction with robots<sup>2</sup>.

However, this trend is starting to shift, with robots becoming increasingly affordable and easy to program - making the technology more accessible to the CNC grinding market. Global influences are also having an impact, such as the South Korean government stipulating that working hours be reduced, driving industry to look for alternatives to traditional labour.

Figures out by leading tool and cutter grinder ANCA found that since 2014 the number of their customers ordering CNC Grinding Machines with robot loaders has increased from 10% to 50% of all machines sold.



As the pace of change picks up, other improvements have meant robotics have greater capabilities and have more flexible applications in the grinding process. With increased capability, simple automated loading applications have been followed by wheelpack changes and now newer possibilities.

## ADDING CAPABILITY

A recent innovation and a market first has been ANCA's multi-robot production cell.

<sup>1</sup> [http://www.ifr.org/fileadmin/user\\_upload/downloads/World\\_Robotics/2016/Executive\\_Summary\\_WR\\_Industrial\\_Robots\\_2016.pdf](http://www.ifr.org/fileadmin/user_upload/downloads/World_Robotics/2016/Executive_Summary_WR_Industrial_Robots_2016.pdf)

<sup>2</sup> [https://www.kuka.com/KUKA\\_WP\\_WZM\\_en.pdf](https://www.kuka.com/KUKA_WP_WZM_en.pdf)

<sup>3</sup> <http://cerasis.com/2016/01/27/role-of-robotics-manufacturing/>

It has been predicted that factory robots will have the ability to integrate several different manufacturing operations on a production line as they become more capable<sup>3</sup>, and this is demonstrated by the new cell solution.

It works by having a larger robot devoted to wheelpack changes and part loading, while a second, smaller robot is free to “multi-task” other operations within the cell. This opens a whole range of machining possibilities as one CNC grinder can essentially become a flexible manufacturing cell.

Customers who have already invested in this technology have found that having two robots in the one manufacturing cell has been successful in managing components that are difficult to hold, such as turbine blades and knee joints. In these examples the smaller robot loaded the parts into a fixture and the larger robot loaded the fixture into the machine.

“Another application that is made possible by having dual robots is to have two processes running at the one time. For example, the large robot can load wheel packs and parts into the machine whilst the smaller robot undertakes secondary operations such as metrology, laser etching, or part washing - at the same time the main component is being ground,” according to ANCA co-founder Pat Boland.

Enabling multiple manufacturing operations on a single machine cell has obvious benefits such as reduced capital equipment, better productivity and reduced work in progress (WIP) and inventory.

Boland continued, “What is exciting about this new dual robot technology is that it opens the door for unlimited possibilities for the industry, no matter how complex the grinding requirements. To date we are seeing this applied in component manufacture within the aerospace and medical industry, but has wider potential in other industries such as automotive.”

The world-first system has been provided as a turnkey solution to a number of customers globally so far and will be exhibited at EMO Hannover fair in late 2017.

## USER-FRIENDLINESS MEANS GREATER USEFULNESS

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Within industrial robotics, there is a push to make machines simpler to program and use through more intuitive HMIs and programming and other means, with companies sometimes even using the word “teach” in place of “program” for their robots<sup>4</sup>.

The benefits of having a robot simple enough to be programmed for a new task by a line worker - rather than having to commission, employ or train a specialised technician - are obvious.

Boland continued: “Traditionally many of our customers were afraid of the amount of training required to use robots with our machines. The first area of concern was robot maintenance - how to recover from a minor crash or create a new pallet. The second was the daily interaction of the operator with the robot - how to instruct the robot on changing from one part to another or inspecting a tool during a batch run for example.”

“We invested in developing software packages that simplified what had been very complex requirements and now have RoboTeach to facilitate easy robot maintenance and RoboMate for operators to set up a grinding application.”

ANCA released its RoboTeach solution last year, delivering greatly simplified programming on its robotic automation products.

Cutting the task from several hours to under 30 minutes, RoboTeach enables an unskilled operator to program the Fanuc LR Mate 200iD loader used on the RoboMate Loader<sup>5</sup>.

It uses a touch probe (held in the robot gripper), a sphere (held in the machine work head), and the grinding machine’s built-in high positional accuracy, and guides an operator through the calibration process.

Its other product, the RoboMate loader, enables an operator to be trained on a single automation system. Loading parameters; such as tool pick-up height, or collet insertion depth, are controlled by the RoboMate software which has the flexibility of running multiple tool types within a pallet.

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<sup>4</sup> <http://cross-automation.com/blog/easy-program-teach-mode-future-robotics>

<sup>5</sup> <http://www.anca.com/Products/Accessories/RoboTeach>

Not only does the RoboMate increase output with full robot automation, it also reduces training requirements.

### **ROBOTICS WILL BE PART OF DAY TO DAY OPERATIONS**

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The CNC market has seen that what initially seems like a cutting-edge product capability, becomes industry standard over time as the technology is refined and improved.

Boland concluded: “As when my business partner and I added a CNC control to a manual grinding machine, I see robotics as a similar game changer to the market. We are now actively developing our own robotic solution for our customers.”

Within CNC grinding and elsewhere in manufacturing, expanded capabilities within robotics and increasingly user-friendly automation solutions are combining to make the future an exciting one.

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<sup>6</sup> <http://www.messe-stuttgart.de/en/fachdental/journalisten/pressematerial/detailseite/text/amb-2016-robots-on-the-rise//detail/PressText/>