



# Robotizing structural steel fabrication

Smart welding and cutting automation

KRANENDONK is the robot technology centre  
for non-repetitive production.

**KRANENDONK**  
*Smart robotics*

# Facing our global challenges together

Steel construction is a vital part of our society. It is closely linked to economical development and has strong regional roots. The industry employs millions of people worldwide and is indirectly linked to even more jobs. Consequently, the impact of global economics is large. Construction companies have suffered from recession, but the outlook is much more positive now.

## London / Great Britain



## Key driver for the global economy

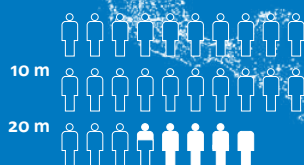
### Influencing local and global economy

Steel is essential to technologies and solutions all around us. Automotive, construction, transport, power, machines but also food and water supply rely on steel. From this viewpoint, steel is more important to our society than ever before. Therefore, steel demand heavily depends on the economic outlook and our global economy. Both steel manufacturers and construction companies have to deal with the volatility of the industry, putting pressure on their cost competitiveness and efficiency.

## New York / USA



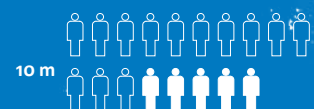
## Mexico city / Mexico



## São Paulo / Brazil



## Lagos / Nigeria



## Overcapacity and globalization increase competition

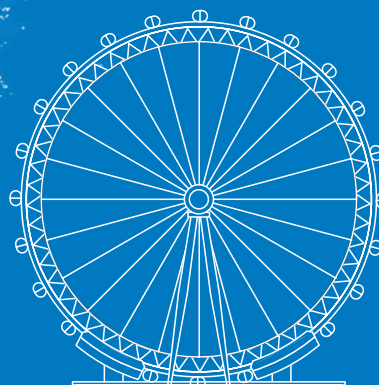
### Manufacturers are increasing efficiency

Worldwide overcapacity results in tough competition. Price drops are common during periods of economic weakness, negatively affecting profitability and putting pressure on steel construction companies. Manufacturers are expected to reduce their production cost per ton and have to respond quickly to market changes. At the same time, companies are expanding worldwide and pursuing open markets. Steel is one of the most internationally traded manufactured products, which makes competition even tougher.

## Giant structures to the mm accurate

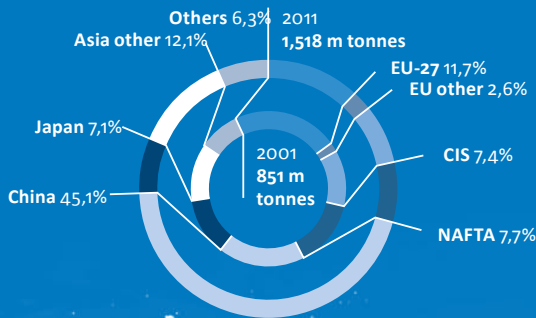
### Linking design and production

Architects and engineers are provided with an enormous freedom of design, supported by advanced 3D design software. It puts pressure on the construction companies, as the designers of the structures demand accuracy to the mm. To achieve this, technological innovations at construction companies are inevitable. The solution for producing these complex designs is 3D CAD. By linking the 3D CAD design and the actual production with intelligent software, highly accurate constructions can be achieved.



# Steel is essential for growth

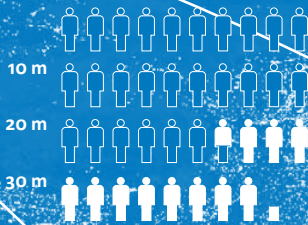
## World production of crude steel



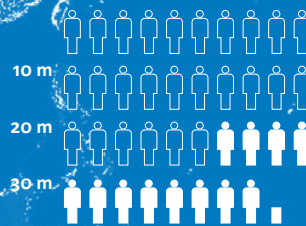
### Ongoing growth in Asia

Steel plays a major role in rapidly growing Asia. Construction companies are seeking for efficient steel solutions to deal with the urbanization and increasing population. They require steel to build new high-rise buildings, bridges, roads and railway lines to facilitate these developments. China feeds the growth in steel demand and take up the largest share. In China's case, this also means the crude steel production has skyrocketed in the last 10 years. And this growth, as well as the increasing importance of steel, is not expected to stop in the near future.

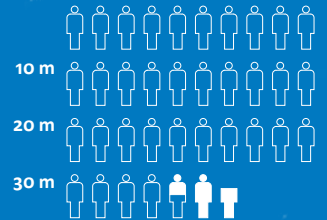
### Guangzhou / China



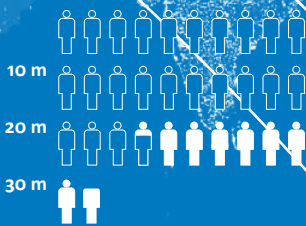
### Shanghai / China



### Tokyo / Japan



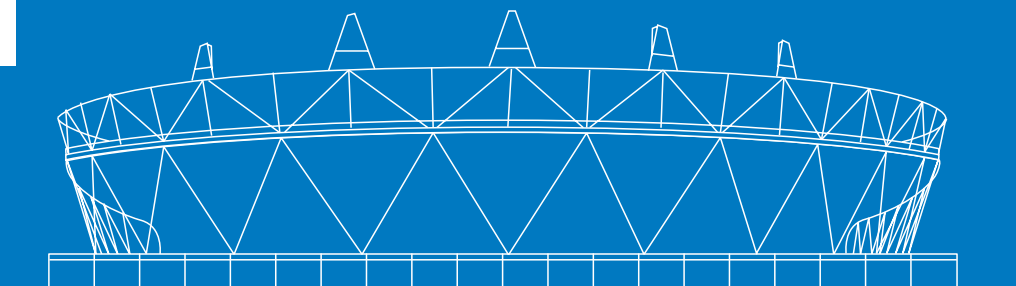
### Delhi / India



## Sustainable factors become prevalent in project design

### Need for perfectly manageable production

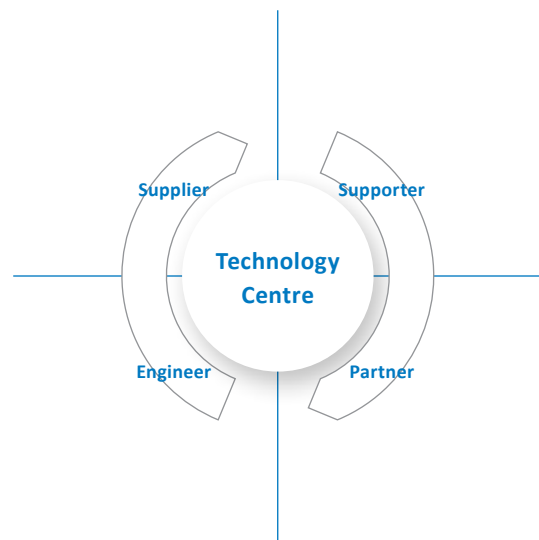
As sustainability factors become more prevalent in construction projects, there is a need to manage and justify all steps in the production process. Insight in the production before it even starts is possible by using advanced software. This gives the possibility to make more sustainable decisions that affect all steps in the steel construction process.



# Cutting edge innovation

## The Robot Technology Centre

KRANENDONK is the robot technology centre for non-repetitive production. We make robot systems suitable for non-repetitive tasks, by developing smart sensors and software. KRANENDONK can maintain a Technology Centre position by simultaneously being an engineer, supplier, supporter and partner, and connecting to all stakeholders.



### Smart robotics

Traditionally, industrial robots are used for repetitive tasks. We develop sensors and software that make our robots smarter. It means we can automate non-repetitive production processes. This unique competence opens a world of opportunities for manufacturers. We use our skills to build fully automated production shops, where all processes are integrated and aligned.

### Cutting edge technology

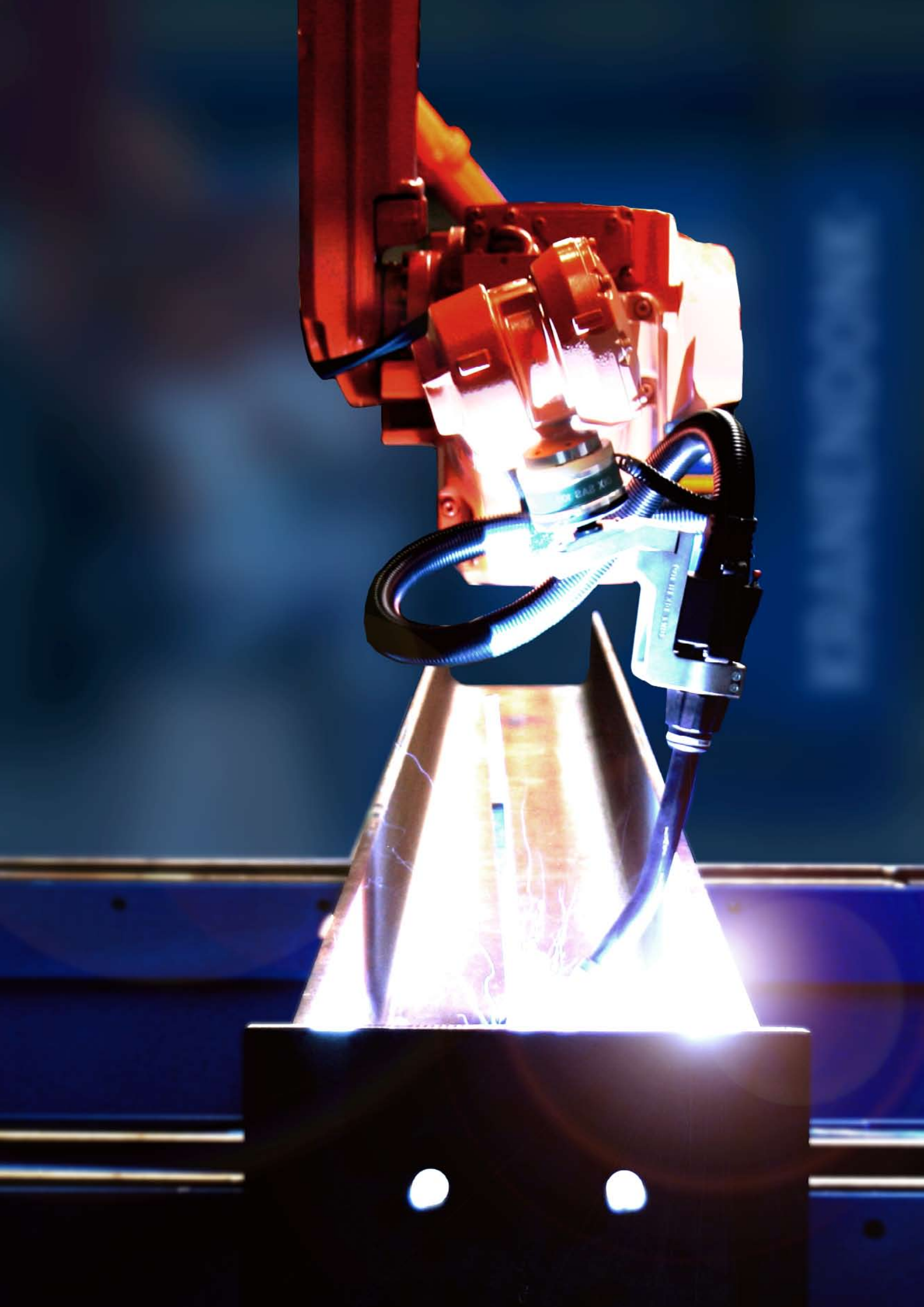
Our wide knowledge on robotic automation makes us excellent problem solvers. We assist you from an early stage, to create an optimal production flow for your factory. This way, we jointly create a tailored automation plan that raises productivity and saves costs. The culture for innovation within KRANENDONK makes sure we always deliver cutting edge technology at the highest level.

### Innovating steel construction

We implement cutting edge technology for steel construction companies. While robotics are still fairly new to the steel construction business, our experiences in the industry dates back to the 1980's. Our robotic beam cutting lines build on this experience. Currently, we are supplying the 3<sup>rd</sup> generation with ten-thousands of engineering hours in it. It makes working with KRANENDONK a secure step.

### Developing towards the future

The margins are tight in today's steel construction markets. It drives us to build robot lines that make a difference and help you to gain a strong competitive edge. Our Beam Assembly Line is the world's most advanced robot line for structural steel. It paves the way to the future of structural steel, where robot technology will make the difference.



# Solutions for efficient and unique steel processing

## Automating key parts in the process chain

When building steel structures, processes have to be aligned to deliver projects within time and budget. KRANENDONK offers advanced robotic systems to automate key parts in the process chain. Working for leading construction companies, we are often involved in consulting new automation plans. Our solutions are focused on enhancing efficiency and flexibility of steel construction fabricators.

In the process we focus on:

**Beam processing** Realizing cost savings in the beam processing shop, by using the flexibility of robots.

**Beam assembly and welding** Assembly of plates to beams requires smart robot technology, that combines hardware, sensors and intelligent software.

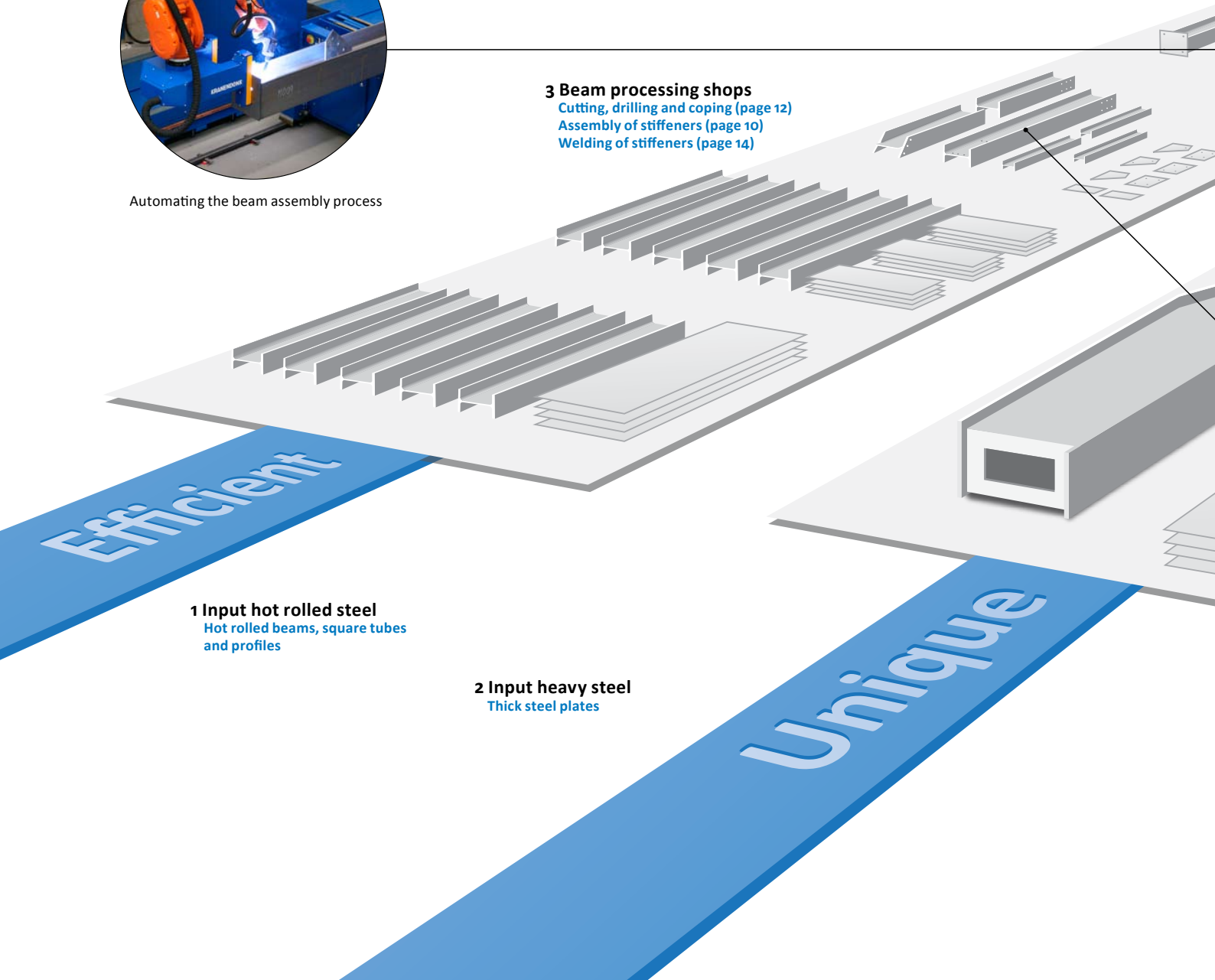
**Heavy robot welding** Robot welding of continuously changing products is our expertise. The key is in smart software and sensor technology.



Automating the beam assembly process

## 3 Beam processing shops

Cutting, drilling and coping (page 12)  
Assembly of stiffeners (page 10)  
Welding of stiffeners (page 14)



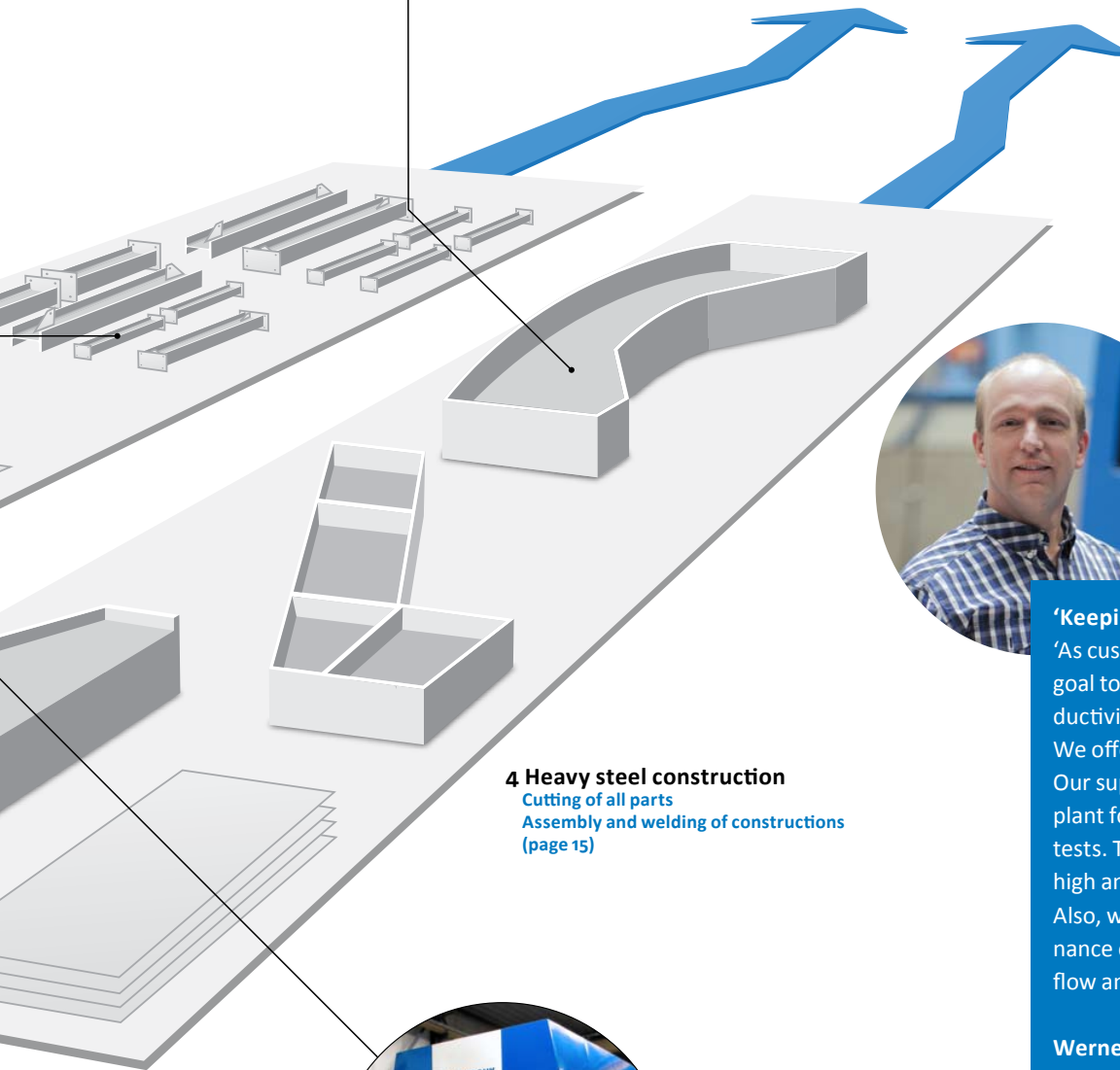
**1 Input hot rolled steel**  
Hot rolled beams, square tubes  
and profiles

**2 Input heavy steel**  
Thick steel plates

Unique

Efficient

Heavy welding of unique assemblies



#### 4 Heavy steel construction

Cutting of all parts  
Assembly and welding of constructions  
(page 15)



The all-in-one beam processing cell



#### 'Keeping your flow running'

'As customer support manager, it is my goal to maintain the highest possible productivity of your KANENDONK equipment. We offer a full pack of services to do so. Our support engineers regularly visit your plant for inspections and performance tests. This way, we keep your productivity high and reduce downtime to a minimum. Also, we train your operators and maintenance crew. In this way, we improve your flow and keep it running.'

#### Werner Smeitink

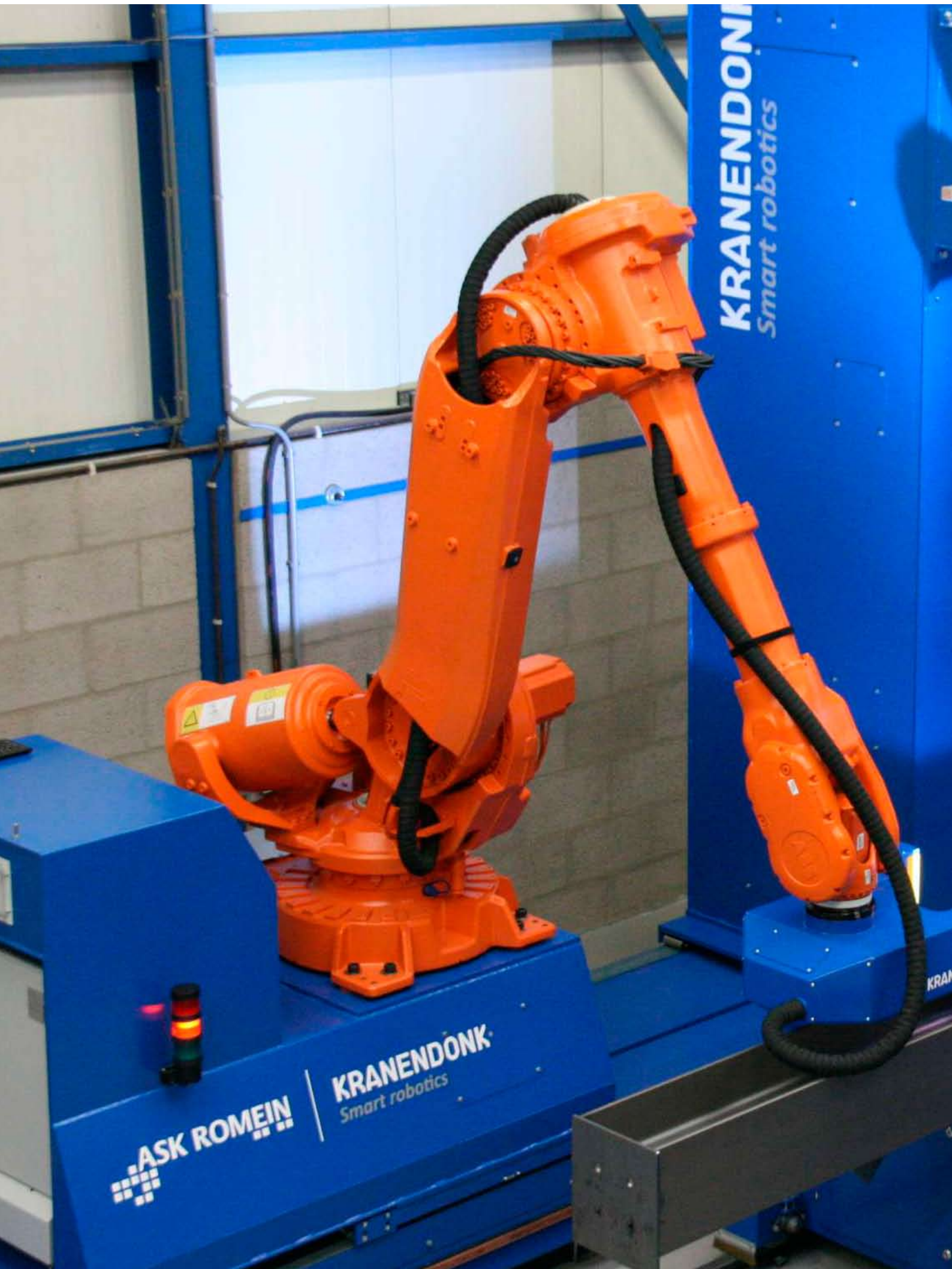
Manager Customer Support

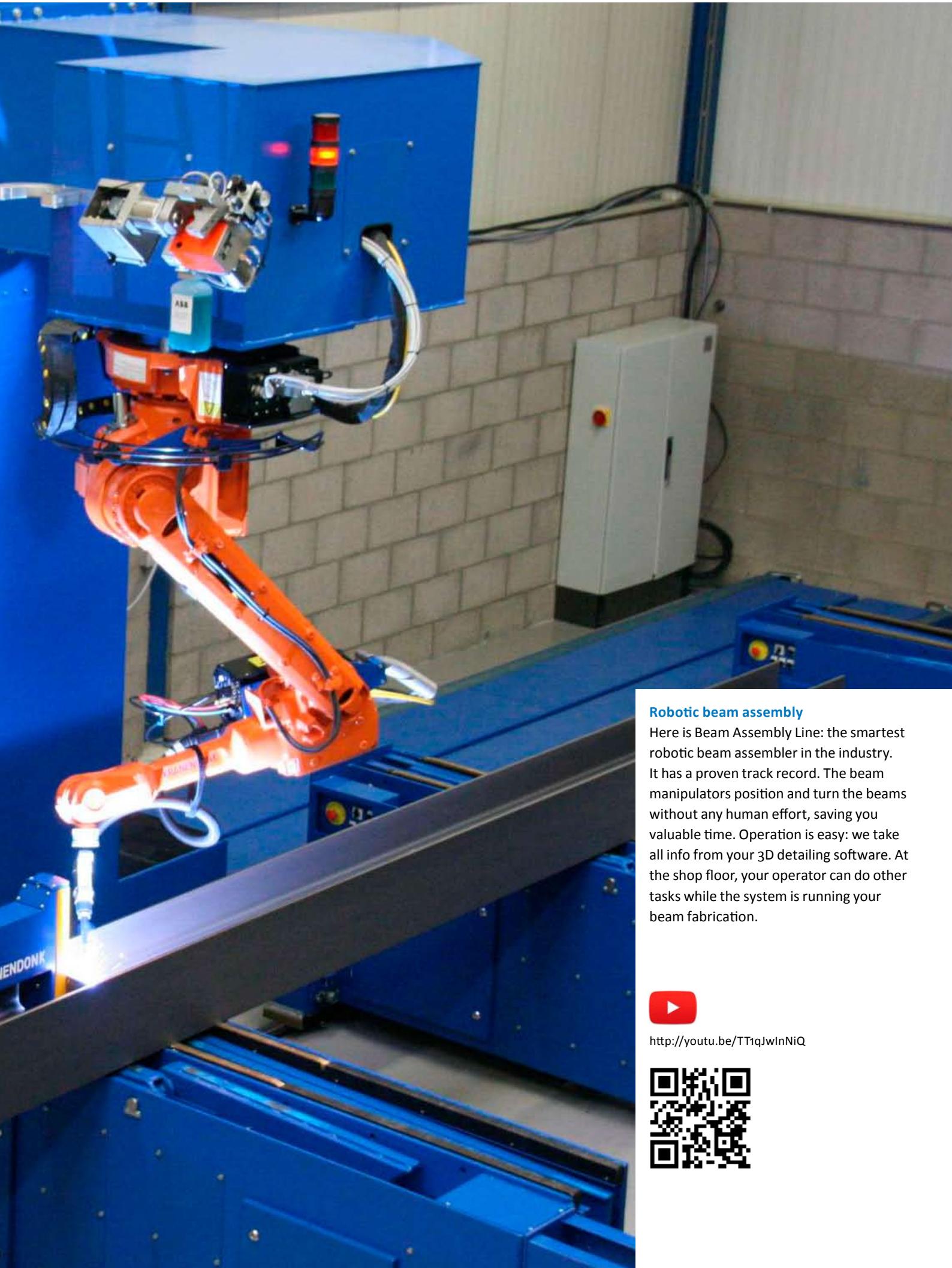
#### Helpdesk

Holland +31 344 655 443

Japan +81 832 425 444

[support@kranendonk.com](mailto:support@kranendonk.com)





#### Robotic beam assembly

Here is Beam Assembly Line: the smartest robotic beam assembler in the industry. It has a proven track record. The beam manipulators position and turn the beams without any human effort, saving you valuable time. Operation is easy: we take all info from your 3D detailing software. At the shop floor, your operator can do other tasks while the system is running your beam fabrication.



<http://youtu.be/TT1qJwlnNiQ>



# Here's the *proven* steel beam assembler

A big step in productivity and quality

The Beam Assembly Line brings quality and productivity in steel construction to a new level. The robots accurately pick, place and weld steel plates to beams. It brings large cost savings and raises production quality.

## Easy to operate due to advanced software

The Beam Assembly Line brings many technologies together: robot vision, automated welding, advanced software and integrated logistics. All systems work together to create a machine that is easy to operate and that adapts to the changing conditions in structural steel shops. This results in high quality production that is very consistent.

## Realizing large cost savings

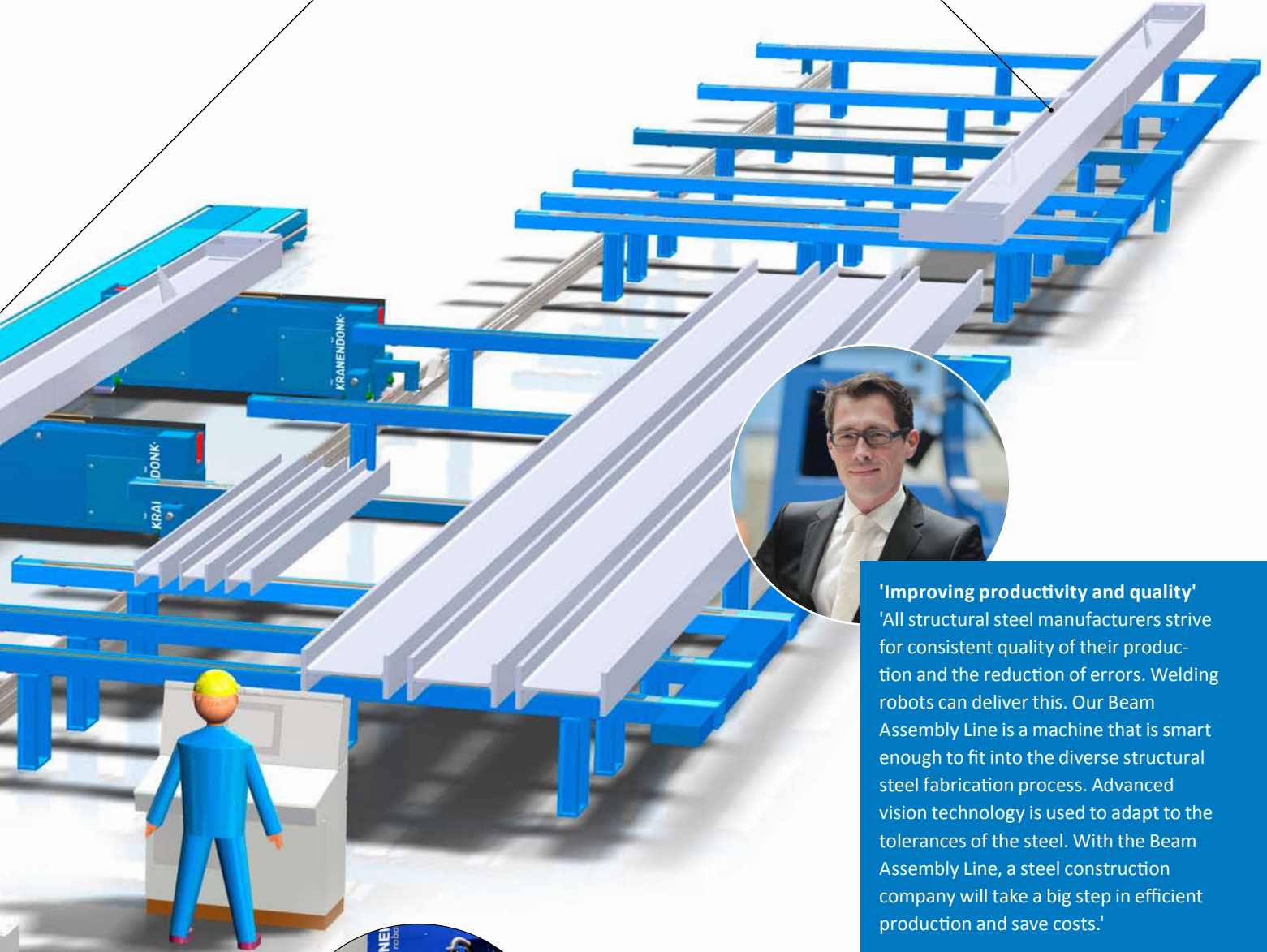
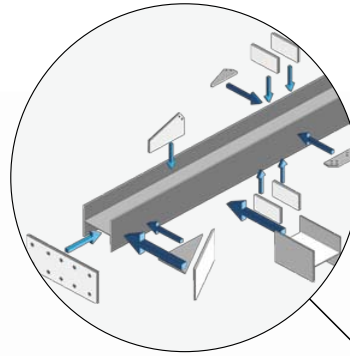
Mounting and welding plates to steel beams is one of the most labour intensive processes in the steel construction shop. Robotizing this process leads to huge cost savings. The Beam Assembly Line can run 24 hours a day, and needs only one supervisor.



Consistent robot welds

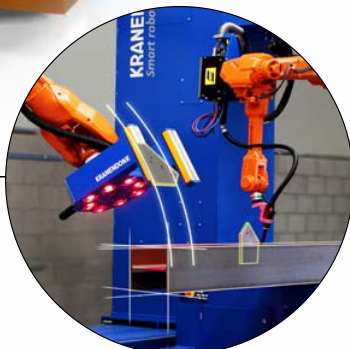


Automatic assembly of attachments



**'Improving productivity and quality'**  
'All structural steel manufacturers strive for consistent quality of their production and the reduction of errors. Welding robots can deliver this. Our Beam Assembly Line is a machine that is smart enough to fit into the diverse structural steel fabrication process. Advanced vision technology is used to adapt to the tolerances of the steel. With the Beam Assembly Line, a steel construction company will take a big step in efficient production and save costs.'

**Jelle Janssen**  
Sales manager  
[j.c.a.janssen@kranendonk.com](mailto:j.c.a.janssen@kranendonk.com)



Automatically pick and place parts with vision technology

# Increasing efficiency with all-in-one beam processing

## Robotic beam processing line

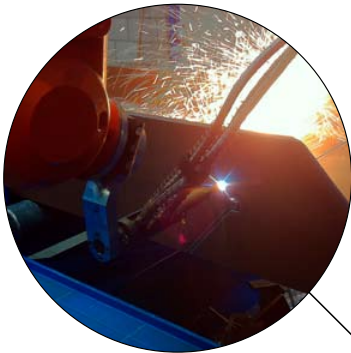
Steel construction companies are confronted with tighter budgets, putting pressure on the production process. Robotic beam processing brings the solution. Our robot beam processing line replaces multiple machines. With this all-in-one solution, you will improve efficiency and flexibility.

### Lowering your costs per ton

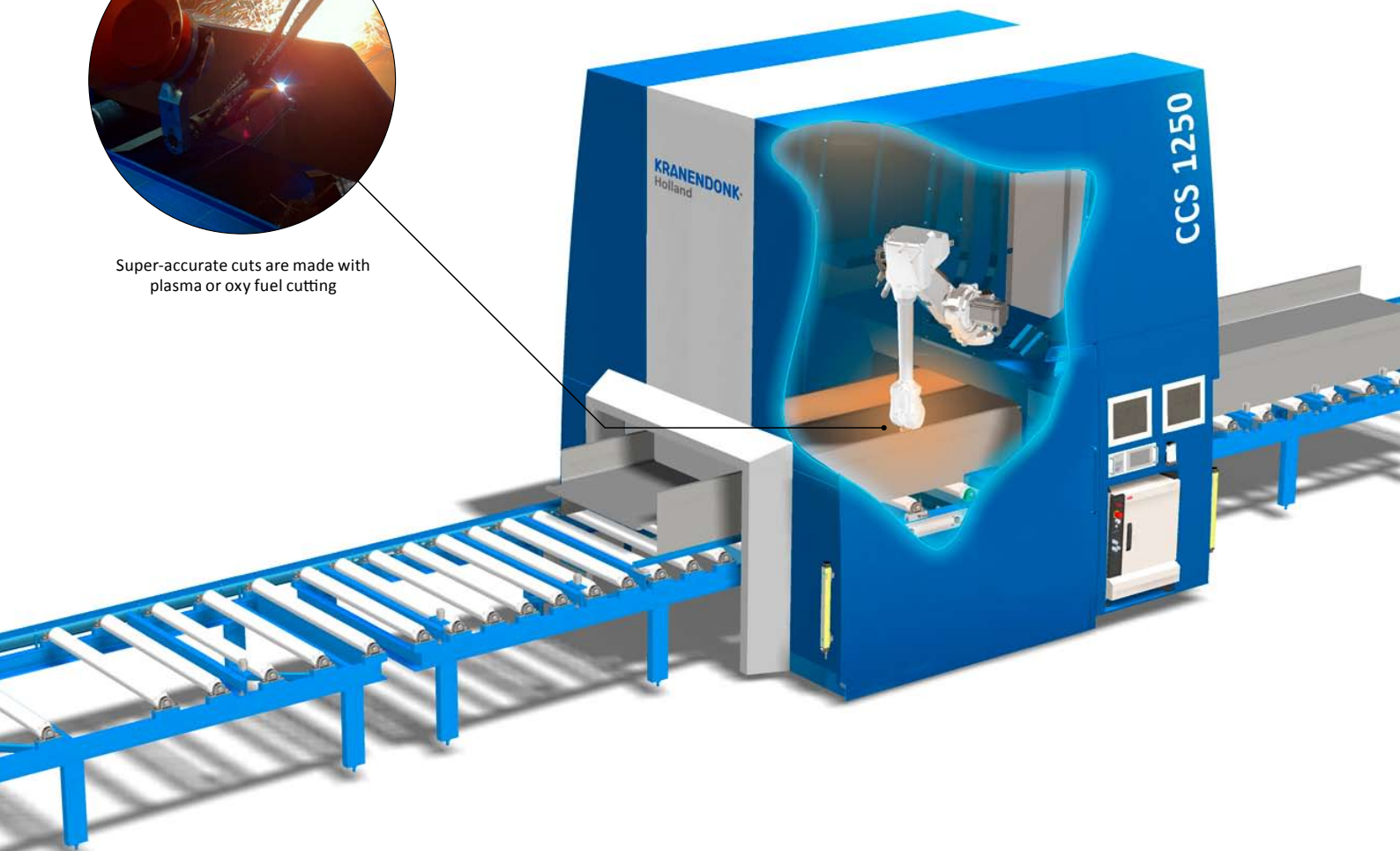
Structural steel plants use a large variety of machines to process beams. Sawing, drilling, marking and coping are all separate operations, but these can be combined into one solution. By using the flexibility of robotics, our beam processing line can perform all beam operations in one cell.

### The most trusted supplier

KRANENDONK has been delivering robot cutting lines for more than 25 years. It makes us the most experienced supplier in the market. Our engineers know the situation at the shopfloor. We use this knowledge to make our cutting lines easy to control and easy to maintain.



Super-accurate cuts are made with plasma or oxy fuel cutting

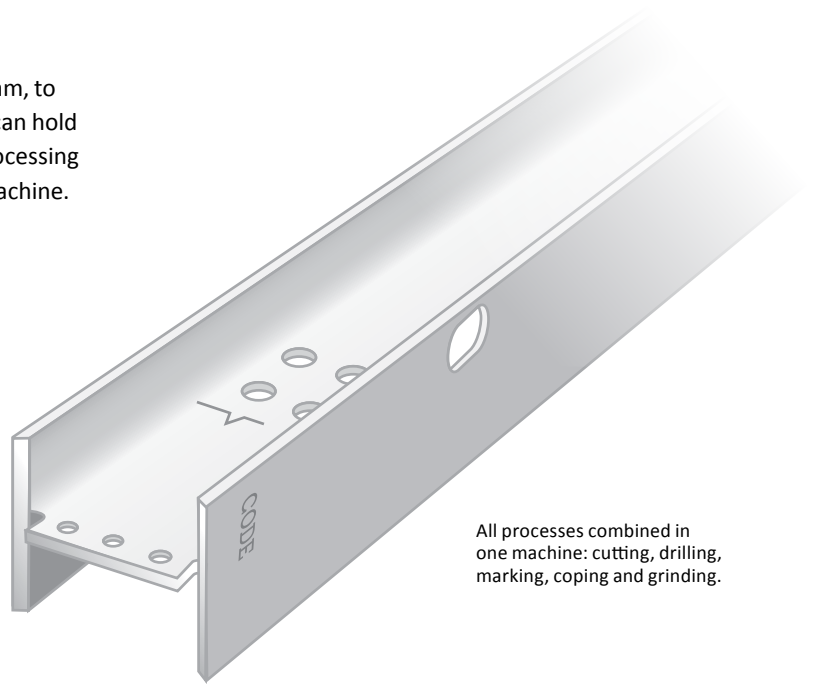


All-in-one Beam Processing Cell

## One solution for all operations

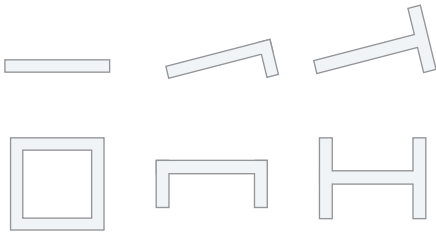
### Using the flexibility of robotics

A robot can easily reach all places on the beam, to make 3D cuts and holes on all sides. Also, it can hold different tools. This way, our robot beam processing cell performs all the required tasks in one machine.



All processes combined in one machine: cutting, drilling, marking, coping and grinding.

### Profile types



### Easy to use with touch controls

In the past, robot programming was a challenge. We have solved this by developing sophisticated software, that allows the operator to enter only parameters. Our software is open to the end user, which allows adding of custom shapes and adding functionality. During daily production, all process steps run automatically from infeed to outfeed. On top of this, direct CAD interfacing is possible to further increase efficiency of the production line.



A touch interface, remote control and camera systems

### The most experienced supplier of robotic cutting lines

Robotic beam cutting is a perfect solution for steel fabricators who want to remain flexible and agile. The robot cell takes care of multiple processes, for a fraction of the investment in a conventional drilling-sawing line. In the mid-1980's, KRAMENDONK was among the world's first companies to develop a robotic beam cutter. Our machines are used by dozens of companies all over the globe. We have used this large experience to develop the completely redesigned 3<sup>rd</sup> generation robot cutting line, which was introduced in 2012. Our excellent track record in robotic beam processing gives you the most reliable product in the market.

# Robot welding, without any programming

## Self-programmed robot welding for structural beams

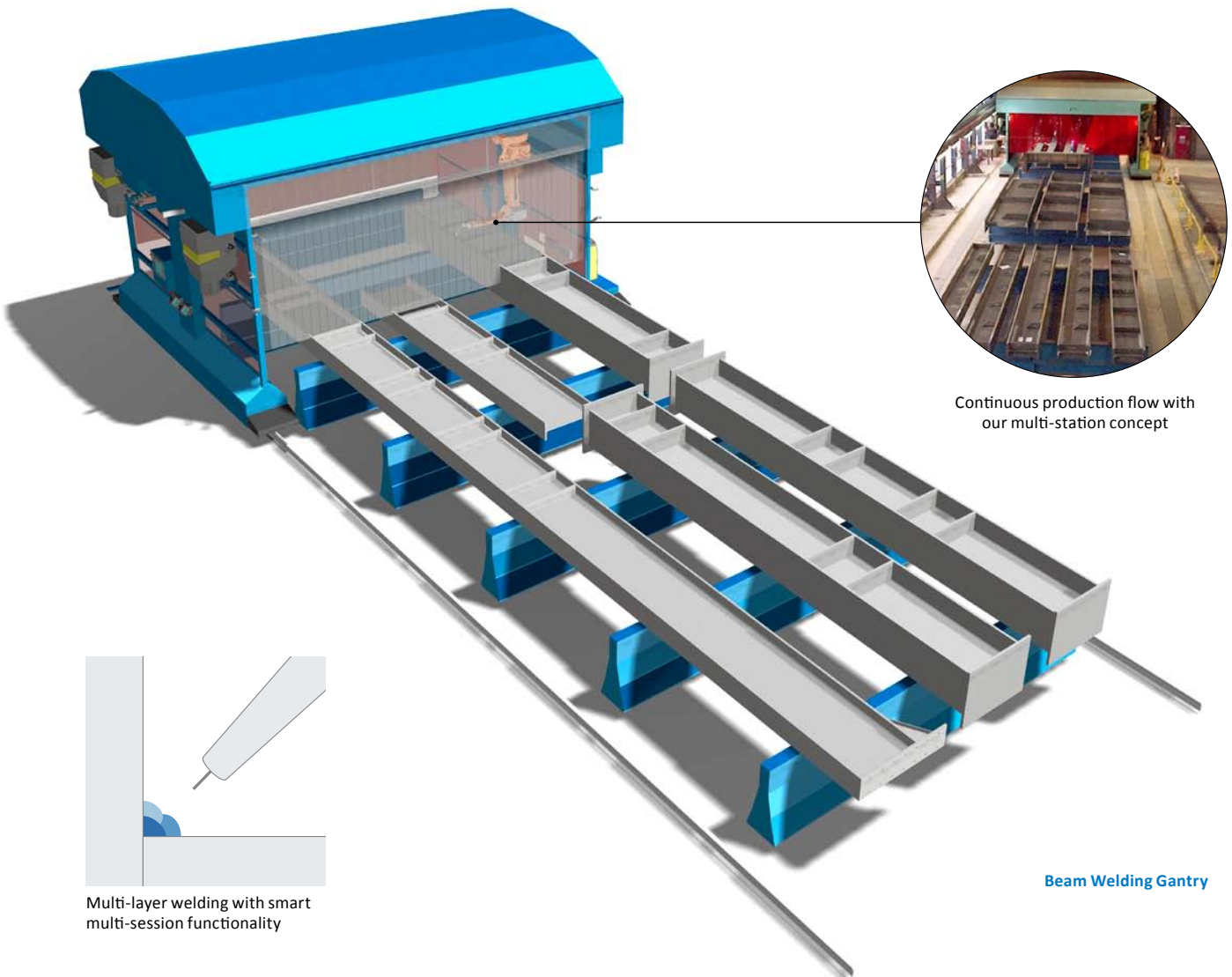
In steel construction, no product is the same. Welding automation has to be flexible enough to cope with this versatility. Our robot lines are self-programmed, which means that no time is lost in setting up of the system. It raises quality and accelerates your business.

### Robot welding for quality and productivity

Robots boost your productivity and make your quality highly consistent. The robots use sensor technology to produce perfect welds, every time. Multiple robots can smartly distribute their work, to prevent distortions due to heat input. All these technologies boost your productivity and quality.

### Gaining more with automatic programming

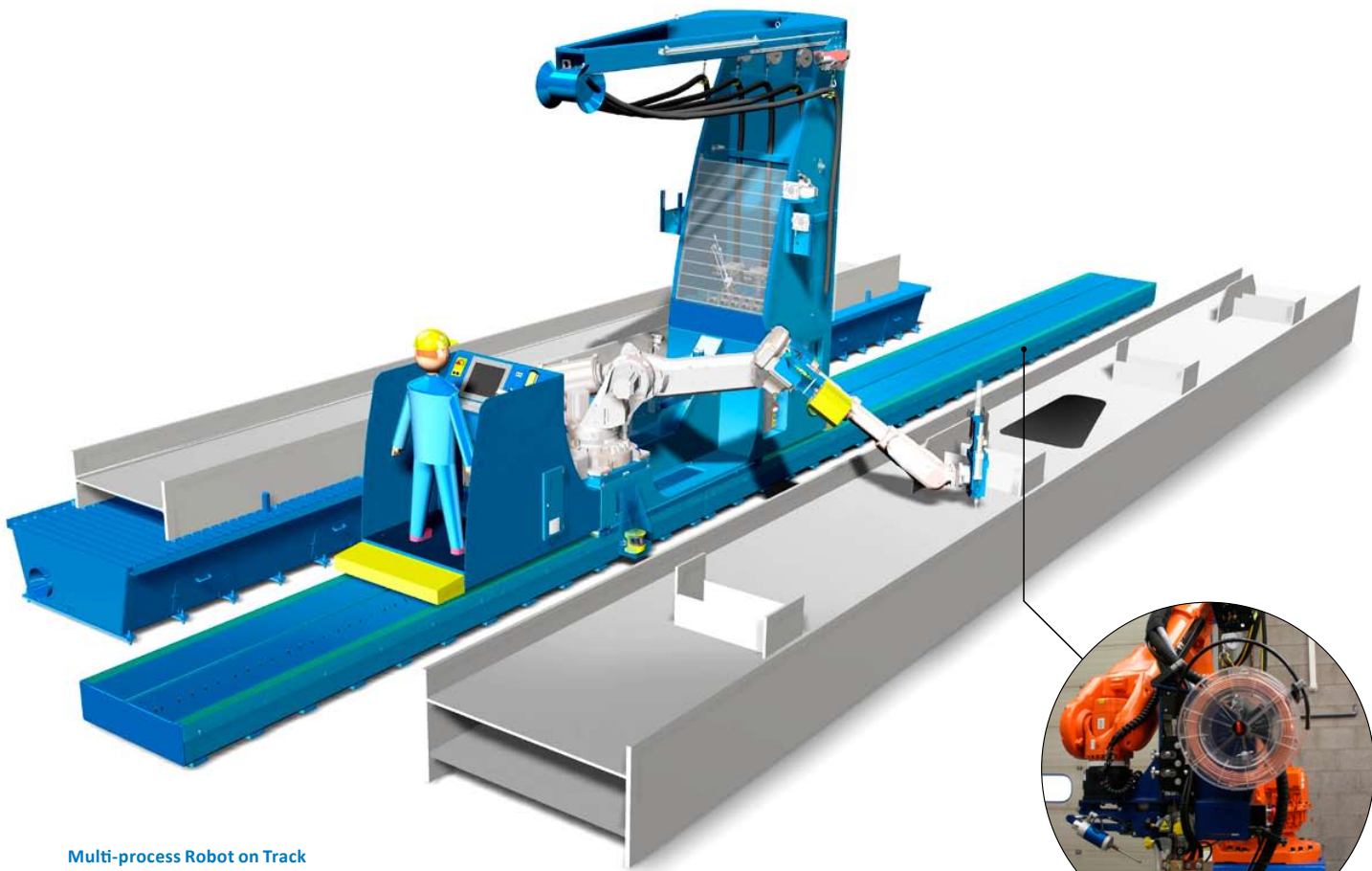
The largest benefit of KRANENDONK robot welding lines is the drastic reduction in programming time. The robots are easy to setup: based on product-families or directly linked to CAD. This eliminates manual programming time. It makes the welding of continuously different designs possible.



Continuous production flow with our multi-station concept

Beam Welding Gantry

Multi-layer welding with smart multi-session functionality



Multi-process Robot on Track

Multi-process, also robotic subarc welding (SAW) available

#### Adapting to steel tolerances with smart sensors

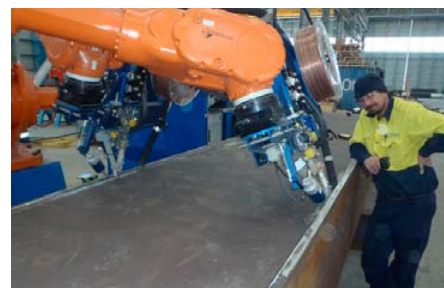
Make welding man-independent requires intelligence and adaption to the real world product. For this reason, the robots are equipped with sensors and are able to compensate for deviations (tolerances). In this way, the theoretical data and the real world product are connected. This makes sure that every weld is perfect, securing quality for construction companies.



Automatic welding of one-off products

#### Our proven welding technology will save costs

Robot welding for non-repetitive production is the core business of KRANENDONK. The technology is mature and proven, which means that a KRANENDONK robot welding line is a secure investment. Many references in the steel construction industry prove that robot welding will make the difference to improve quality and productivity. It leads to less rework and saves cost in the total production flow.



Smart safety sensors enable close process monitoring

KRANENDONK is the robot technology centre for non-repetitive production. By implementing intelligent robot technology, we enable manufacturers to produce more efficiently and effectively. We supply custom build solutions that are cleverly integrated into material and data flows.

KRANENDONK was founded in 1983. We started our company as a supplier of custom automation systems for industrial applications. Over the years we have specialized in advanced robotics for heavy steel applications. Today we offer an innovative approach that creates a range of automation opportunities for manufacturing companies.

In the near future we see technological and macro-economical developments putting pressure on the production process. Advanced automation is spreading into new areas. Integrated process and centralised operations are decisive factors in choosing the right equipment. KRANENDONK will keep assisting companies in transforming their production processes to make them more efficient, flexible and ready for the future.

**Head office**

Kranendonk Production  
Systems BV

Tiel, The Netherlands  
P.O. Box 6147  
+31 344 623 944

[info@kranendonk.com](mailto:info@kranendonk.com)  
[www.kranendonk.com](http://www.kranendonk.com)

**Branch offices**

Kranendonk Japan  
Nakano-cho 11-13 1F  
Shimonoseki, Yamaguchi  
750-0004 Japan

Kranendonk RINAS Development  
Greve, Denmark