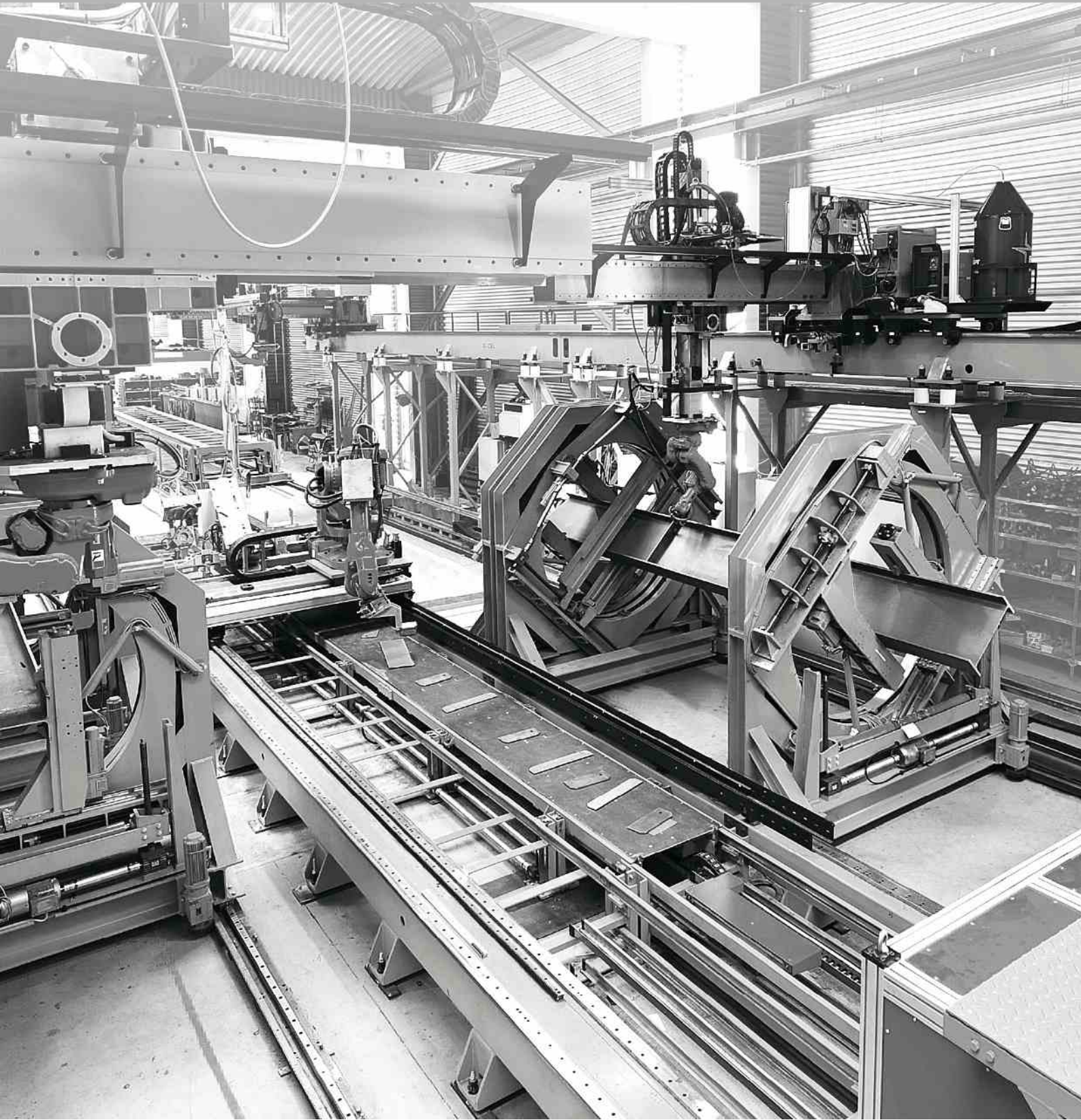


# STEEL BEAM ASSEMBLER

with fully  
automatic controls

Cut costs. Boost quality.



# STEP INTO A NEW DIMENSION OF STRUCTURAL-STEEL FABRICATION

How high-precision robots will revolutionize your work process.

The SBA from ZEMAN fundamentally changes the structural-steel fabrication process. The parts for attachment are delivered, positioned on the steel members and welded 100% automatically. Swiftly, accurately, cost-effectively and of course in top quality. **The many benefits are overwhelmingly convincing.**

## *With conventional fabrication*



### **Time-consuming**

Laborious handling and manipulation of the steel members.

### **Cost-intensive**

Skilled shop personnel are expensive and hard to recruit.

### **Reading errors**

Engineering and detail drawings are often misinterpreted, necessitating subsequent corrective work.

### **Defect rate**

Wherever humans work, mistakes are bound to occur.

## *With computer-controlled SBA*



### **Fast**

Time-savings of up to approximately 85 %.

### **Cost-effective**

Reduced manhours, lower energy and warehousing costs.

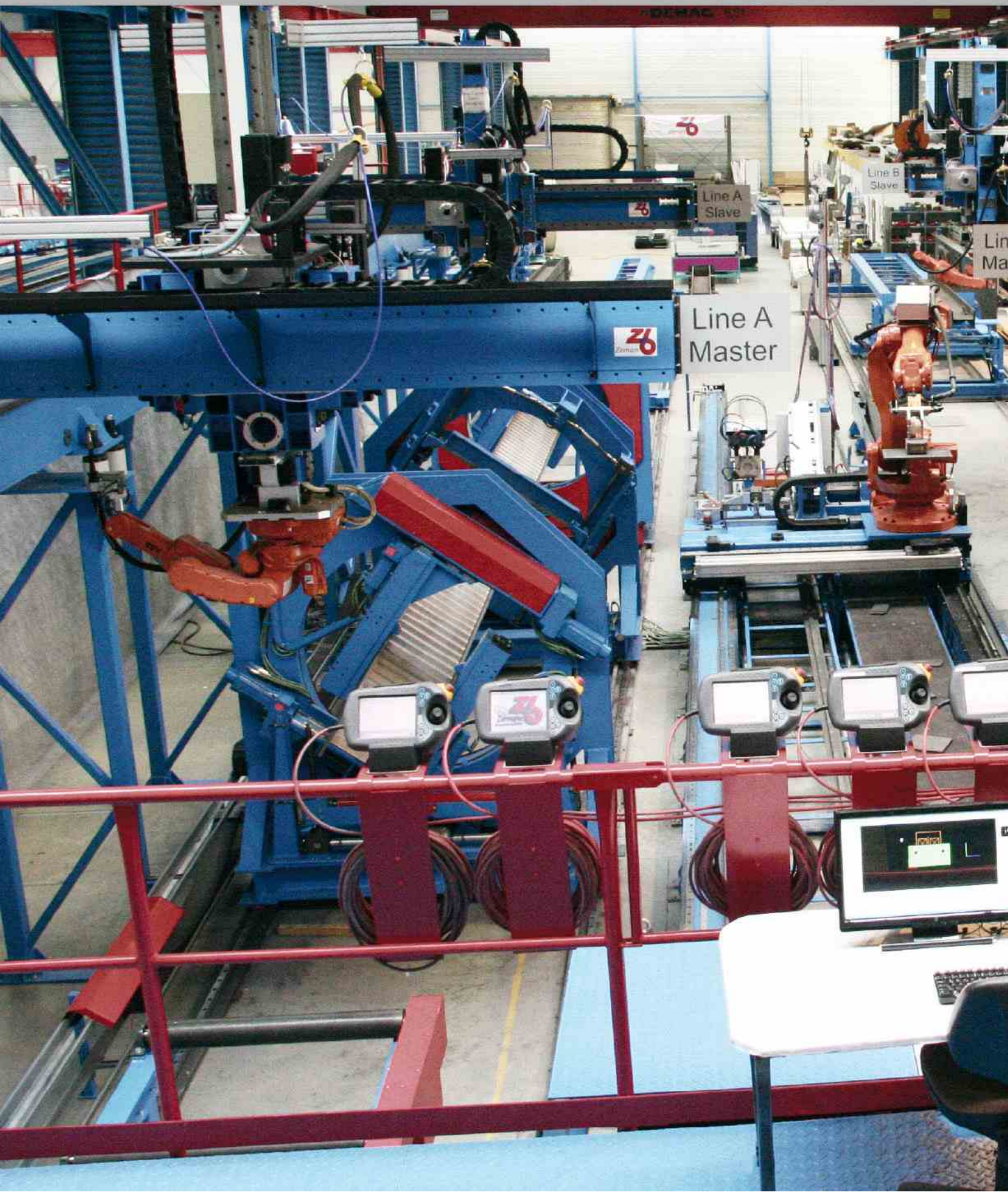
### **Error-free**

The production data are imported directly from any standard CAD system, transferred by ZEMAN's proprietary software solution "pro-FIT", and then executed by the SBA.

### **Flexible**

Huge production diversity, for all common applications, all the way down to lot-for-lot (L4L) production of single-item lots.

# SBA: fit-up and welding of structural-steel elements





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ZEMAN

TOUCH

# SBA from ZEMAN: Steel Beam Assembler

An engineering marvel:  
For fully automated handling, fitting, welding and finishing.

## The principle

Computer-controlled robot arms execute the CAD engineering drawings 1:1. Without errors, and at record speed. The components are delivered on a conveyor system. A laser scanner accurately recognizes which are the right components. Robots pick, fit and weld the components accurately to the member, rapidly and without error.

### Positioning robot

This picks up the required components with precise-fitting accuracy and positions them at their exact fitting location. Time-consuming weldment handling and calibration work are a thing of the past.

### Welding robot

Operates with constantly high welding quality and at constantly high speed. This is ensured by the automatic welding-robot service station.

### Modular design concept

Either one or two lines can be served by one positioning robot, as required by the client and its production needs.

### Conveyor system

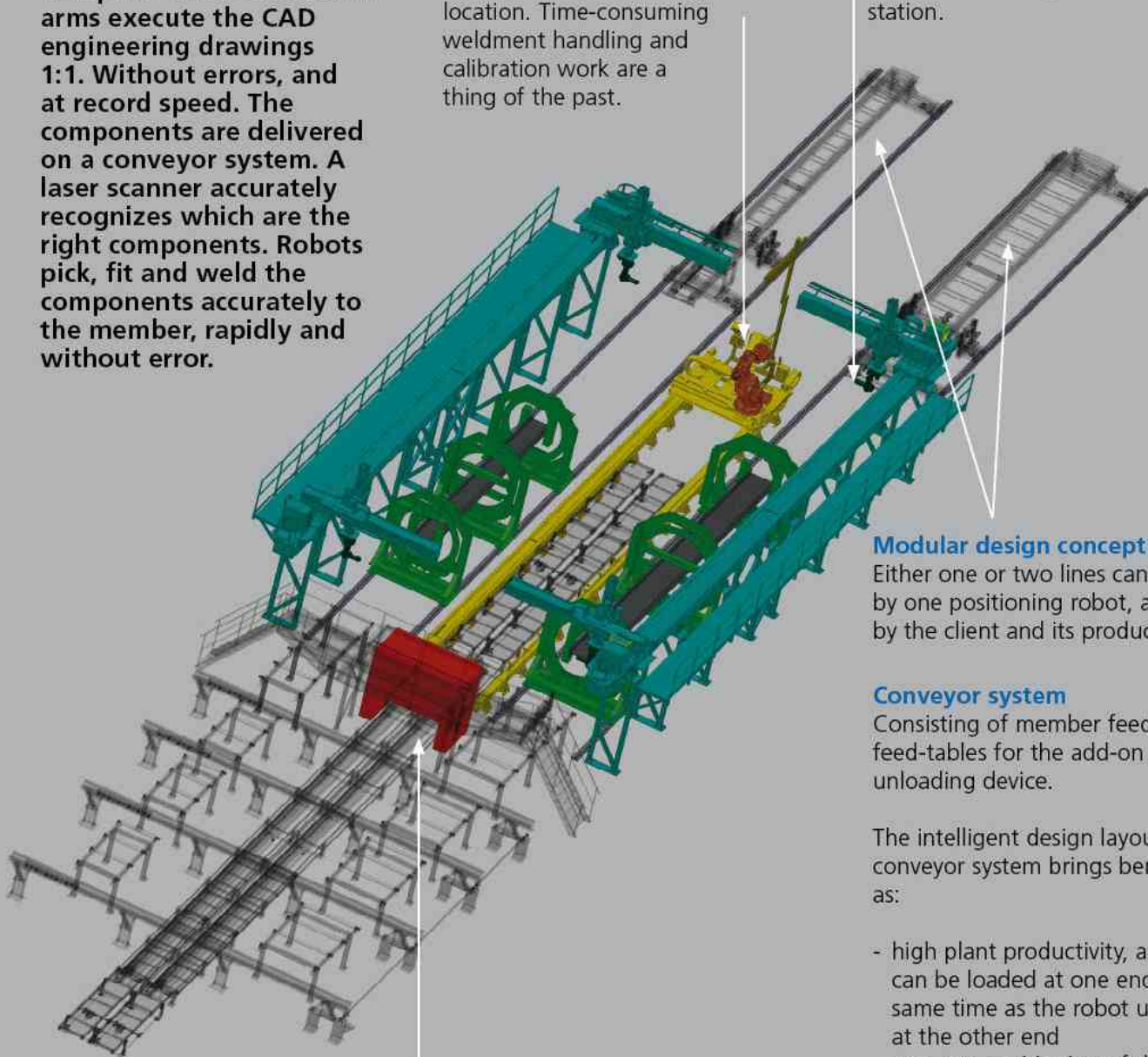
Consisting of member feed-in system, feed-tables for the add-on parts, and unloading device.

The intelligent design layout of the conveyor system brings benefits such as:

- high plant productivity, as the tables can be loaded at one end at the same time as the robot unloads them at the other end
- accurate positioning of the add-on parts at the measured position in the line, enabling them to be passed on to the positioning robot
- collision-free unloading of the finished members – despite the fact that add-on parts have been positioned and welded on all sides

### Laser scanner

Detects the components in any position and compares them with the CAD data. Data transfer to the robots is effected in real-time (i.e. with no testing time).

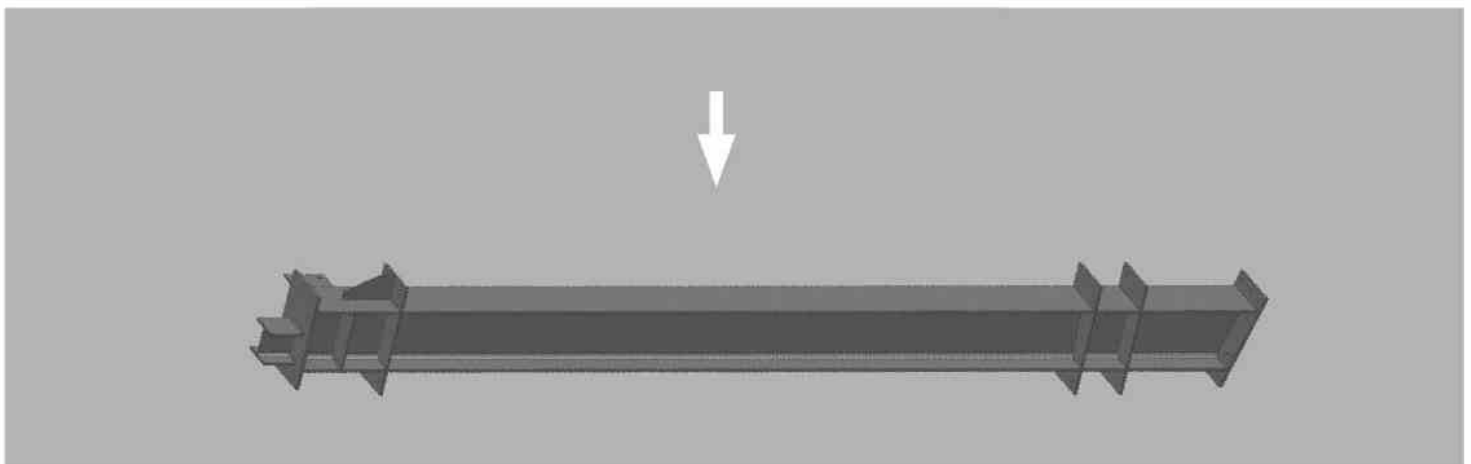
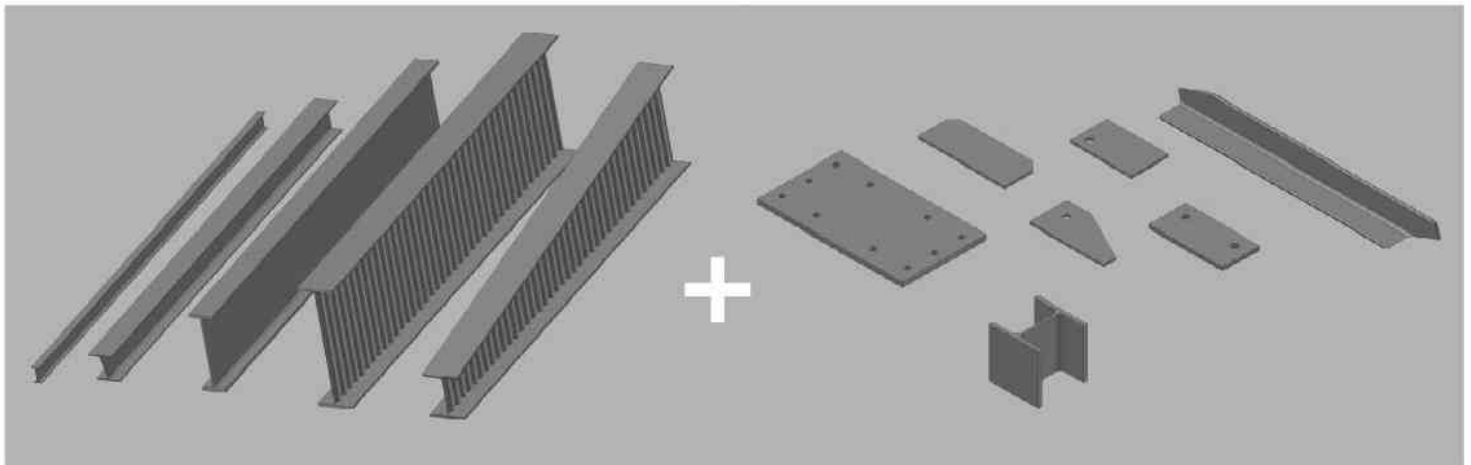


# Potential throughput savings of up to 85 %

Produce in less time and at lower cost: with the SBA from ZEMAN.

Faster than any human worker ever could: the SBA from ZEMAN fabricates steel elements in record time. And in outstanding quality. The robot systems will execute your projects much faster and at far lower cost.

Covers an amazingly wide production range	Zero downtime	No crane handling
<p><b>All common beam formats</b> can be handled. Member heights: <b>8 – 62 in</b> (200 – 1560 mm) Member lengths: <b>10 – 52 feet</b> (3000 – 16,000 mm)</p> <ul style="list-style-type: none"><li>- rolled sections</li><li>- welded plate girders</li><li>- tapered beams</li><li>- special beams (e.g. ZEMAN SIN beams)</li></ul>	<p><b>The robots work on one member at the same time.</b></p> <p>No need for manual measuring and marking out – the machine knows every position.</p>	<p>The member is <b>automatically fed into</b> the ZEMAN SBA, <b>clamped in place, and moved out again</b> once it is finished.</p> <p>One robot accurately positions the add-on parts at the planned fitting location, and the other robots tack-weld and weld on the parts in top quality.</p>



## Low labor costs

Thanks to its high degree of automation, the SBA line needs very little manpower. ZEMAN's many years' experience in structural-steel fabrication is at users' fingertips in the form of a databank.

**Personnel do not need any special structural-steel fabrication know-how.**

## Rapid completion

The SBA from ZEMAN works in record time.

**Savings of up to approximately 85 %** of previous production times are typical. Considerable overall cost reductions are the result.

## Geared for flexibility

ZEMAN's "pro-FIT" software solution broadens the usual scope of a robotic line for standardized mass production to include **one-off L4L fabrication**, even of **single-item lots**.

The SBA from ZEMAN gives you **constant operational readiness**, allowing you to respond quickly and flexibly to the needs of your market.



# Welcome to a new quality level

Computer-controlled fabrication brings perfect results.

The development of the SBA by ZEMAN is underpinned by 45 years' experience in the structural-steel and mechanical engineering sectors. Together with the innovative control software "pro-FIT", this means a quantum leap into a new era of structural-steel fabrication.

## Error-free production

**The production data are imported directly from the CAD program.**

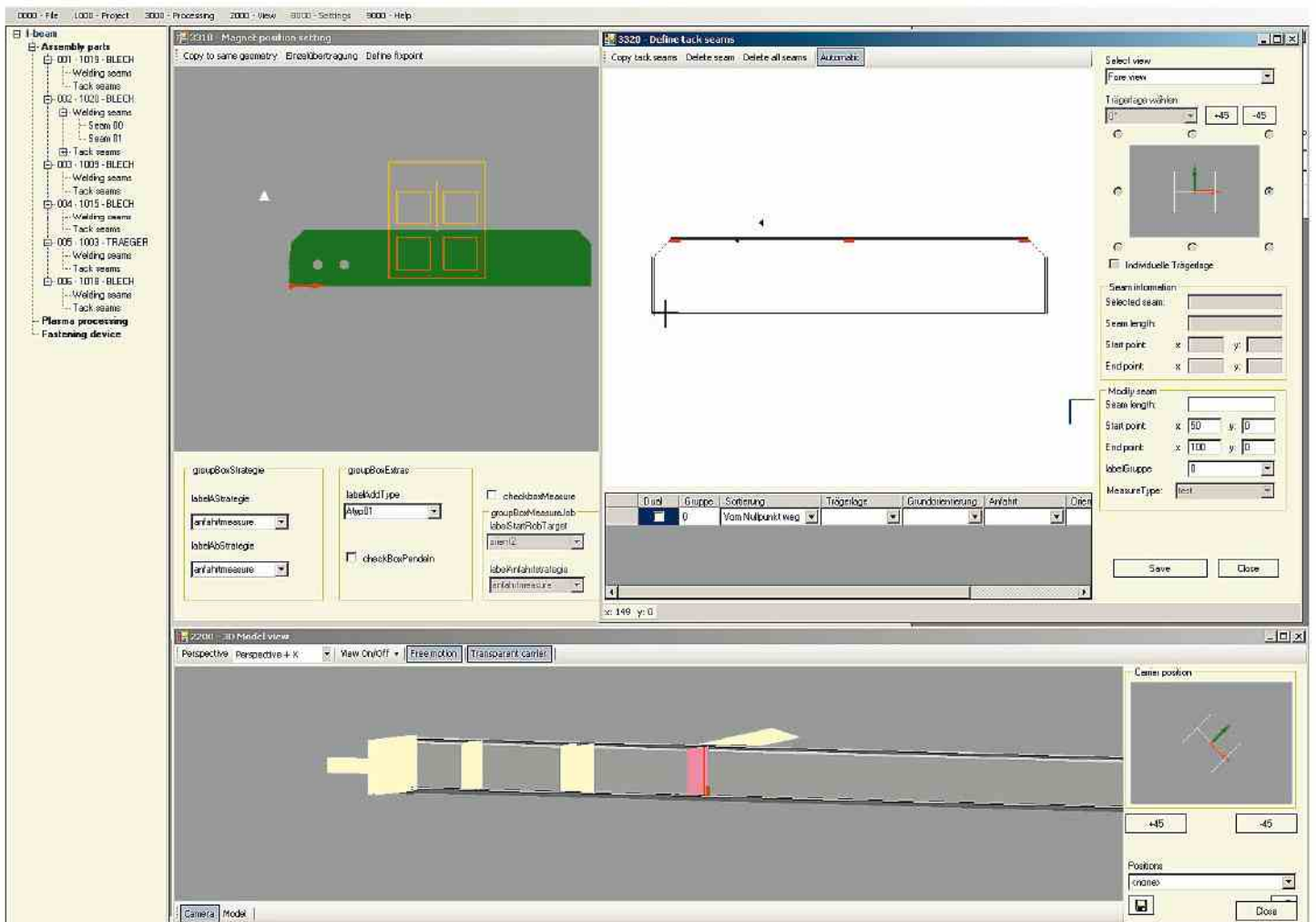
This means that there is no risk of production being disrupted by misinterpretation, by components being accidentally confused, or by any other careless mistakes. Whatever the CAD drawings specify, the ZEMAN control software "pro-FIT" will always implement it 100 %.

## Continuous checking

**The engineering and detailing data and production phases are continually checked.** All the time, in fact, from when the components are fed in until they emerge as the finished product.

## Reproducible perfection

Thanks to the filed parameters, **the fabrication process can be replicated again and again, at the highest level.** This means efficient, cost-effective and time-saving fabrication of both small and large series, with widely differing components.





## Precision in every phase

Now, **dimensionally accurate positioning and correctly oriented fit-up of the add-on parts** is something you can take for granted. Even when components are arranged at angles, and with no need for pre-assembly. The SBA completely eliminates the need for remedial work due to manual assembly errors, and for corrective welding.

## Flawless welding quality

Not even the best-trained specialist can ever weld as precisely as a machine. What is more, the **automatic preheating facility** improves the welding quality and guards against component distortion. On higher-grade structural steels, the **uniform thermal input** ensures that the seam is flawlessly welded.

## Fully automated, down to the last detail

The **plasma-cutting option** allows fully automated weld-preparation of the ends of the components. Any openings needed in the web, or cut-outs on the members, are also fabricated automatically.

- automatic tool change
- torch cleaning
- measuring (calibration) station
- automatic turn-over unit for add-on parts
- facility for adding angle brackets, tappets and frame corners
- "pro-FIT": teachable, remote-maintainable control software
- complex databank for process parameters
- work can resume unhindered after any power outage



# STEEL BEAM ASSEMBLER

## Fit for the future

### Dimensions:

Length:	≈ 203 ft	(62 000 mm)
Width:	≈ 44 ft	(13 500 mm)
Height:	≈ 20 ft	(6 000 mm)
Working height center:	≈ 65 in	(1 630 mm)
Conveyor height:	≈ 55 in	(1 380 mm)
Conveying speed:	66 ft/min	(v = 20 m/min)

### Beams: Hot-rolled / welded beams

Beam height:	min. 8 in / max. 62 in	(min. 200 mm / max. 1 560 mm)
Beam length:	min. 10 ft / max. 52 ft	(min. 3 000 mm / max. 16 000 mm)
Flange width:	min. 4 in / max. 20 in	(min. 100 mm / max. 500 mm)
Weight: beam	max. 13 200 lb	(max. 6 000 kg)
Weight: complete element	max. 17 600 lb	(max. 8 000 kg)

### Mounting parts: Metal sheets, angle profiles, I-profiles as tappet

#### Metal sheets:

Max. weight of each mounting part:	440 lb	(200 kg)
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### Robots: Assembling robot (1x)

6 axes articulated arm type robot:	Payload:	518 lb	(235 kg)
	Reach:	100 in	(2 550 mm)
+ one external longitudinal axis	Movement speed:	4.3 ft/sec	(1.5 m/s)
	Traverse path:	57 ft	(17 500 mm)
+ cross lift	Stroke:	70 in	(1 800 mm)
Tool depot with 3 storage areas (expandable to 5) incl. 1 storage area for preheat equipment			
Gripper consisting of:	1 piece	Docking station for tool changer	
	3 pieces	Magnetic gripper	
	1 piece	Plasma cutting torch	

### Robots: Welding robots (4x)

6 axes articulated arm type robot	Payload:	13 lb	(6 kg)
	Reach:	32 in	(810 mm)
+ three external axes	Movement velocity:	4.3 ft/sec	(1.5 m/s)
	Traverse paths:	x-direction	57 ft
y-direction		79 in	(2 000 mm)
z-direction		63 in	(1 600 mm)

### Welding seams:

MAG 135 (Metal active gas) welding method	Single- and multi-layer	Speed	max. 3 ft/min	(max. 1 m/min)
Welding source (4x):	Welding current:	3 – 500 A		
	Working voltage:	14.2 – 39.0 V		
	Weight:	84 lb	(38 kg)	

### Laser measuring system:

Scanning speed:	12 in/s	(300 mm/s)
Scanning width:	2 x 31.5 in	(2 x 800 mm)
Scanning tolerance:	+/- 0.04 in	(+/- 1 mm)

Quality management certified to ISO 9001

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