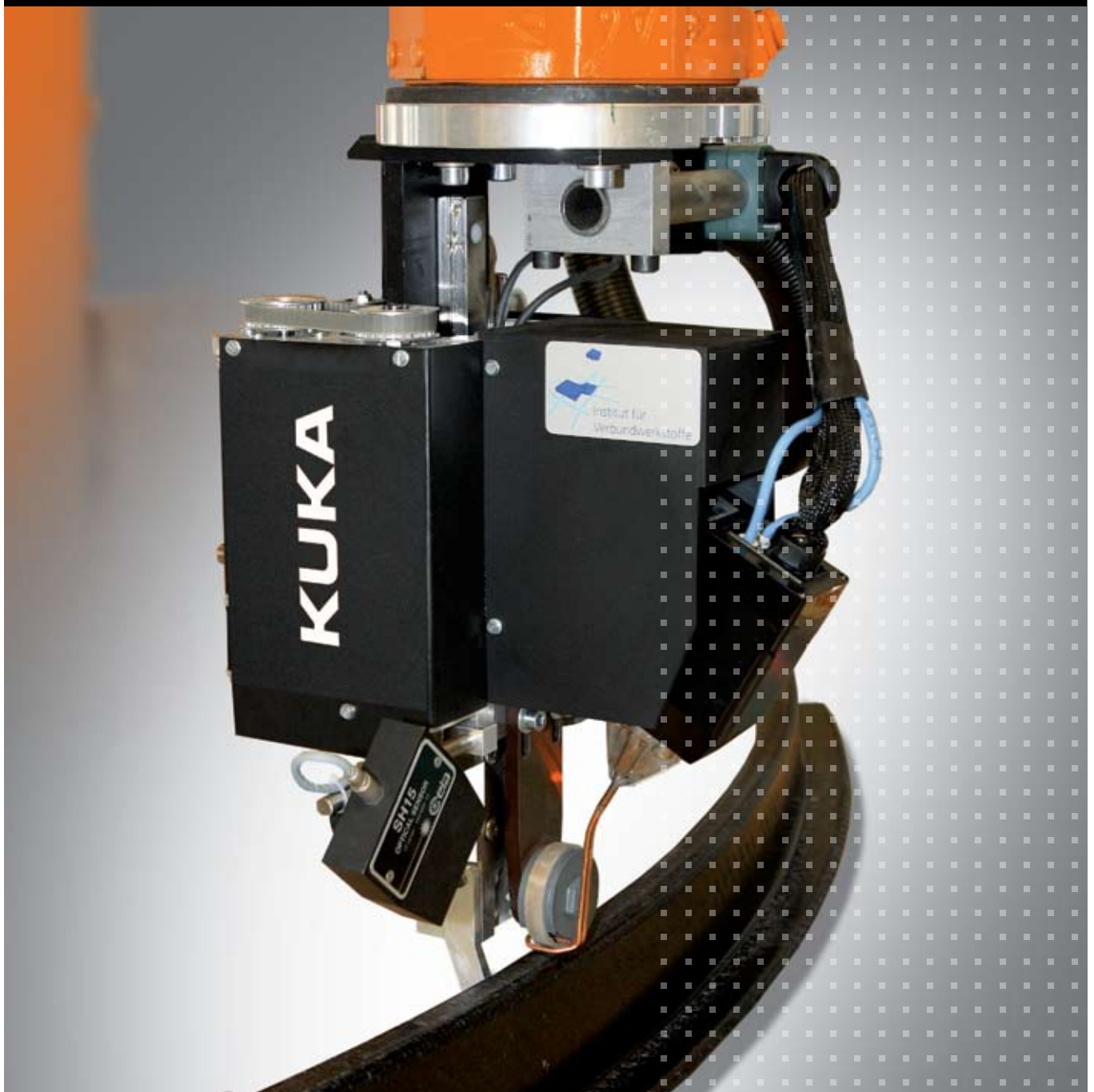


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KUKA Automation Solutions

INDUFLEX JOINT RESEARCH PROJECT



■ SUMMARY

INDUFLEX - ECONOMICAL JOINING OF FIBER COMPOSITE STRUCTURES BY MEANS OF **INDUCTIVE** HEATING USING **FLEXIBLE** HANDLING SYSTEMS.

The objective of this project is the development of a welding process for fast, flexible joining of three-dimensional structures made of fiber-reinforced thermoplastic composites.

In a prototype manufacturing facility, a pioneering induction welding head was combined with a jointed-arm robot as a flexible handling system. During the induction welding process, the seam quality is monitored and regulated by means of an innovative process controller.

This technology allows easy subsequent separation of the joint and renewed joining of the components.

The process is being tested using components for the automotive industry. Furthermore, a methodological study of product life cycles is being drafted to assess costs and quantify cost-effectiveness.

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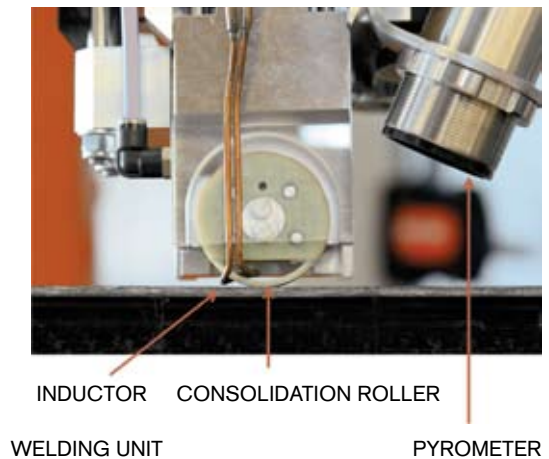


Bundesministerium
für Bildung
und Forschung

SUPERVISED BY



Projektträger
Forschungszentrum
Karlsruhe (PTKA)



INDUCTOR CONSOLIDATION ROLLER
WELDING UNIT PYROMETER

ROBOT INDUCTION WELDING SYSTEM / WELDING UNIT

This research and development project is being supported by funds from the German Federal Ministry of Education and Research as part of its "Research for Tomorrow's Production" initiative, support code 02PB2030, and supervised by the Project Management Agency Forschungszentrum Karlsruhe (PTKA), Department of Production and Manufacturing Technologies (PFT).

■ INDUSTRIAL RESEARCH GROUP "INDUKNOWLEDGE"

The industrial research group "InduKnowledge" is being established as part of the project to inform interested companies about the results of the project and current developments. Discussions will also focus on knowledge transfer with the industry in terms of demonstrator design, semi-finished materials, change management, required quality assurance concepts, etc.



OBJECTIVES

- Highly flexible welding process for fiber-reinforced thermoplastic composites (FRP) by means of inductive heating
- Targeted heating in the joining zone
- Highly suitable for automation
- Separability of joints
- Joining of material combinations

RESULTS

- Flexible welding head for complex manufacturing geometries
- Assessment of life-cycle costs
- Further development of 2D induction welding to freeform welding
- Identification of the significant process parameters
- Development of initial simulation models
- Establishment of a quality assurance system
- Separation and rejoining
- Welding of 2D and 3D seams

ADVANTAGES OF INDUFLEX OVER OTHER WELDING PROCESSES

- Highly suitable for automation and series production
- Ability to join components of different materials (thermoplastics and metals)
- Joining process suitable for FRP
- Separability of joint
- Low energy costs due to highly efficient, targeted heating in the joining zone
- The Induflex process allows the use of inexpensive holding and clamping fixtures
- Short cycle time compared with adhesive bonding, as no curing times required

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INTERESTED? WOULD YOU LIKE TO RECEIVE FURTHER INFORMATION ABOUT THE PROJECT OR THE INDUSTRIAL RESEARCH GROUP? CONTACT ONE OF OUR PARTNERS DIRECTLY:

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