AUTOMATED ULTRASONIC TESTING OF DEEP HOLE DRILLING **IN INPUT SHAFTS**





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LEADING UT TECHNOLOGY

I-Deal Technologies GmbH & Co. KG in cooperation with Fraunhofer IZFP have developed a novel ultrasonic testing technology and equipment for quantitative non-destructive evaluation of deep hole drillings in input shafts.

This fully-automated inspection machine, with its patented real-time evaluation procedure, is intended for in-line measuring the position of deep holes, automatic sorting out parts with unacceptable deviation from the tolerance zone, and reporting the measurement results to the data base of the production line.



Representation of measured deep hole positions related to the allowed tolerance field

The basic principle of this inspection technology is this: fast and precise ultrasonic measurement of the echo-signals from deep hole drilling, and the mathematical processing for calculating the controlled production parameters with direct feedback to the drilling machine.



Calibration of the ultrasonic transducers for optimal insonification

The core innovation of this measurement procedure is based on a unique ultrasonic image processing technique, which allows a threedimensional capturing the hole positions and in-line applying the flexible type-dependent evaluation criteria for production tolerances.



Ultrasonic image reconstruction and evaluation principle

ABOUT US

I-Deal Technologies is an international provider of innovative system developments and professional engineering services in the field of nondestructive ultrasonic testing. In the field of ultrasonic testing, I-Deal Technologies GmbH has over five years of experience developing procedures and automated systems for non-destructive evaluation of lightweight components, casting and forging products. I-Deal Technologies is active in state-promoted research and development projects, as well as bilateral projects with industry customers in the aerospace and automotive industries.

PRODUCT

Our inspection machine is designed for in-line production, controlling the deep hole drillings in input shafts. The inspection mechanics can be modified for further rotationally symmetrical components. All mechanical components of the testing facility are laid out for a 24-hour production cycle.



Input shaft fastened in the inspection mechanics

The measurement is performed by means of two ultrasonic transducers while input shaft is rotating.



Rotation mechanics and local immersion chamber

The coupling of ultrasound occurs in local immersion technique, whereby the drilling emulsion can be applied as a coupling liquid. The loading and unloading of the inspection set-up can be performed by automated loader (this is the preferred method) or manually.



Representation of measured deep hole positions related to the tolerance field

A very functional and well-developed inspection software provides support to the operator, offering automatic part recognition, easy tracking, and statistical evaluation of the production process on several drilling stations throughout manufacturing.



Monitoring while production on several drilling machines

BENCHMARKING

- Technically mature inspection technique (stable and robust measurement procedure)
- » Measurement cycle time: < 20 sec. including part handling
- » Measurement inaccuracy: < 100 µm
- » Direct feed-back into the manufacturing operation
- » Staff saving due to fully automated inspection and evaluation procedure
- » Numerous reference in the German automobile industry