



# Methods of Ultrasonic Inspection in the Automobile Industry – Laser Seam Weld

## Ultrasonic Application Solutions

### Application

New construction types and joining methods in modern car manufacturing require new or adapted inspection techniques and equipment to address safety concerns. This report focuses on a special solution for **laser seam welds**. In the state-of-the-art production of automobiles, laser welding is increasingly being used, e.g. in the roof channel, where overlapped steel plates are welded. A special requirement is “dry coupling” of the ultrasonic probe, in order not to affect the paintability of the car body.

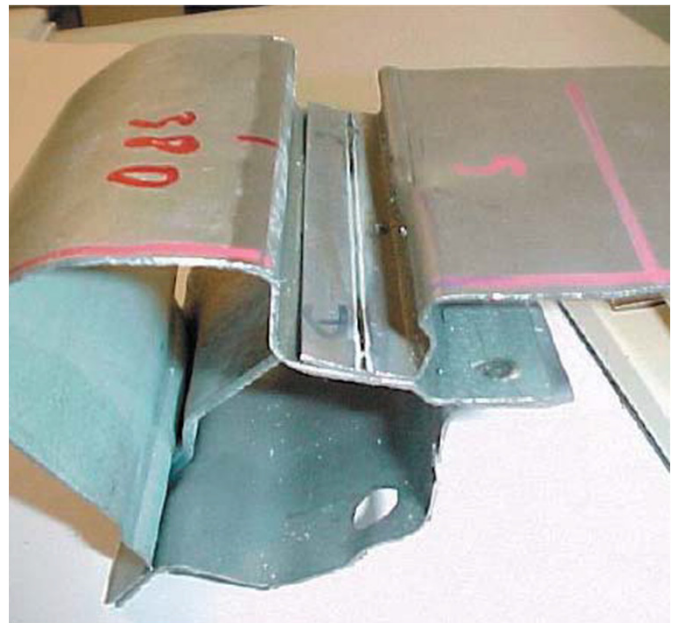


Figure 1: Roof channel with overlapped laser weld

### Solution

The through transmission method proved to be suitable to overcome the problems related to access and the typical surface of laser welds. According to figure 2, the transmitter probe T emits a sound wave, which propagates as a guided wave. If the laser weld L is acceptable, then the receiver probe R receives the sound wave at a high sound pressure amplitude.

A defective weld, for example lack of fusion or incomplete penetration, reduces the signal amplitude.

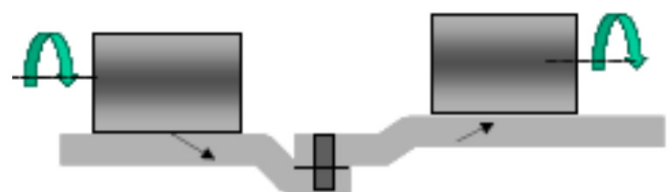


Figure 2: Test arrangement

## Flaw detector USIP 40 & Roller probe system WRL 55-4B2

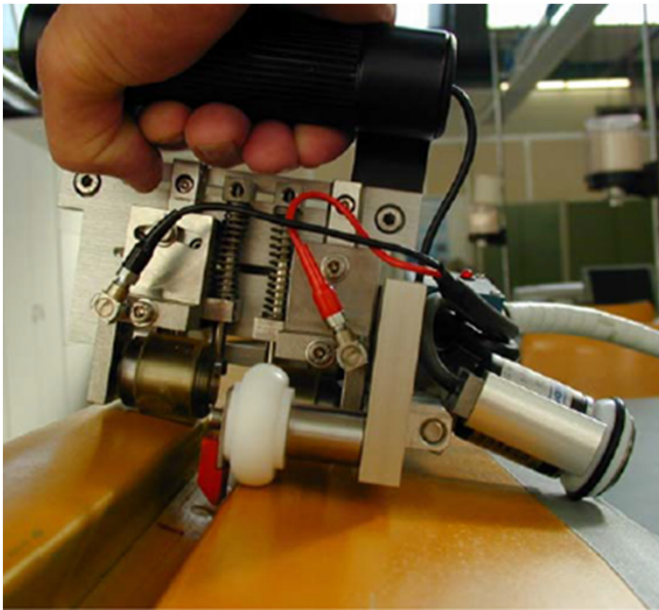


Figure 3: This system allows dry coupling

The inspection can be carried out computer aided. The computer gets the sound amplitude values from the ultrasonic system along with position data from the encoder, and dedicated software allows a procedure including inspection documentation.

### General solution information

- Flaw Detector: USIP 40
- Probe: Roller probe system WRL 55-4B2
- Software: UltraProof

#### Part numbers

USIP 40	0036535	WRL554B2	0068740
UltraProof	0036542		



GE imagination at work

The system is shown on the left. It contains:

- the roller probes,
- a probe holder with springs, which enable the geometric adaptation to the changing surface of the object construction,
- a guide system which ensures the correct position of the probes along the whole length of the laser weld seam
- a position encoder.

This type of ultrasonic transmission technique will not be able to detect extremely small defects in the weld, however, practical application tests in several automobile companies indicate that all relevant unacceptable through weld defects can be reproducibly detected

### Your benefits

- All relevant cases of incomplete root penetration can be reliably detected
- Save money by improving your process

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