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Methods of Ultrasonic Inspection in the Automobile Industry – Spot Weld

Ultrasonic Application Solutions

Application

New construction types and joining methods for modern car manufacturing require new or adapted inspection techniques and equipment to address safety concerns.

For the modern construction of car bodies different joining methods are applied. Among these, spot welds, laser seam welds, MAG welds and adhesive joints are going to be presented in this series.

Figure 1: Spot weld inspection with the SpotChecker

Solution

For these types of joints the European Solutions Center develops special ultrasonic techniques. This includes the design of special probes, systems and software. This presentation focuses on **spot weld** ultrasonic inspection methods on the car body. Computer aided ultrasonic spot weld inspection, see figure 1, is well developed and field proven and is applied by almost all car manufacturers. For the inspection of spot welds special developed probes with PVDF elements are used.

They have a water column delay line with an exchangeable flexible rubber membrane. This will ensure maximum ultrasound transmission even on typical curved spot welding surfaces.

Figure 2: Spot welding probe

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Results

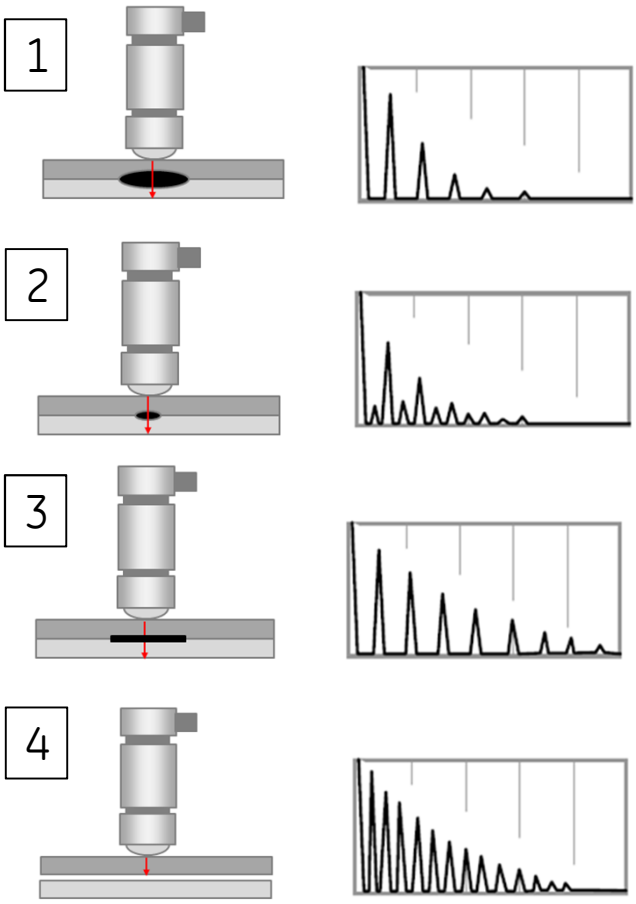

Figure 3: The principle of spot weld inspection

In case of a good spot weld [1] we obtain an echo sequence as shown. Due to the coarse grained weld material and the resulting sound attenuation the echo sequence decays quickly.

If the spot is too small [2], the echo sequence contains intermediate echoes due to the fact that the sound field diameter is larger than the spot diameter.

A stick joint [3] will transmit the sound but the lower sound attenuation (less coarse grained weld) leads to a longer echo sequence.

Finally, if there is no joint at all [4], there's an echo sequence from the first plate only.

General solution information

- Flaw detector: SpotChecker
- Spot welding probes with frequencies up to 20MHz, like G20MN 4,0 (ID 66747)
- In order to determine the nugget diameter, probes with different transducer diameters are used (2,3mm to 8,5mm)

Part numbers

SpotChecker	0036763	G20MN 4,0	0066747

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Your benefits

- Our intelligent dialog probes contain a chip which transmits automatically the probe data to the instrument
- Ensure high quality
- Reduce field failures and potential liability

Contact the GE European Solutions Center for your individual inspection problems:

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