Bridge Inspection & ACFM®

Bridges are a key feature of any country's infrastructure with many being designed with a minimum life span of 50 years. The "life of a bridge" can be extended past it's intended lifespan using inspection, maintenance and preservation measures. A large portion of bridge structures, particularly older ones and those carrying railway lines, are often constructed from steel I-beams or box section girders which are bolted or welded together. Such steelwork is then generally painted to help prevent corrosion. The presence of paint or rust, together with difficult access, often present challenging scenarios making inspection very difficult or time-consuming for conventional NDT techniques.

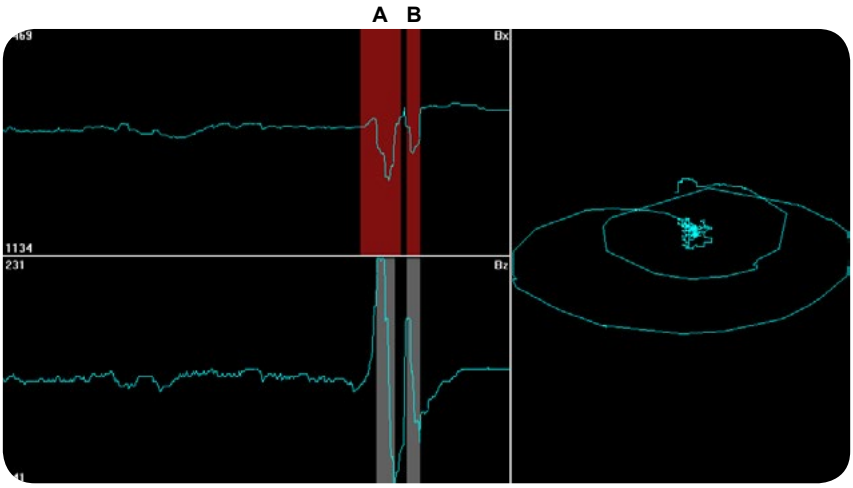
ACFM® is an NDT method developed for the detection and sizing of surface breaking defects and is particularly suited for fatigue cracks in and around welds on painted, coated or corroded surfaces because it does not require removal of the coating.

Using ACFM® as an inspection method can greatly speed up inspection, reduce waste and save time compared to other NDT techniques such as Magnetic Particle inspection. When using ACFM® it is possible to separate the roles of a local probe operator and NDT inspector; allowing use of rope access technicians to deploy probes in areas of difficult access. As a result this can avoid the need for scaffolding or other support structure, which in turn can cause closures of roads or railways under and around the bridge.

In terms of "defect data", ACFM® provides accurate length and depth information on the size of any defect found, allowing repair efforts to be concentrated on the most serious defects, without wasting time on insignificant ones.

AMIGO™ Features

- Rapid scanning using a hand-held probe.
- Reliable crack detection
- Accurate sizing (length and depth).
- Reduced cleaning requirements, no need to clean to bare metal.
- Rugged site unit, IP54 rated.
- Min. 5 hr operation fully-charged battery pack
- Full data storage for back-up, off-line view and audit purposes.



Thames Bridge, built in 1867: ACFM® signals from 2 defects on a bridge weld (left) with MPI indications from the same defects (right). Defect **A** was 20 mm long by 3.9 mm deep; defect **B** was 10 mm long by 3.0mm deep.

TSC have been directly involved in a number of bridge inspections. One of the more unusual projects involved the inspection of welds on an historic bridge, constructed in 1867, spanning the river Thames.

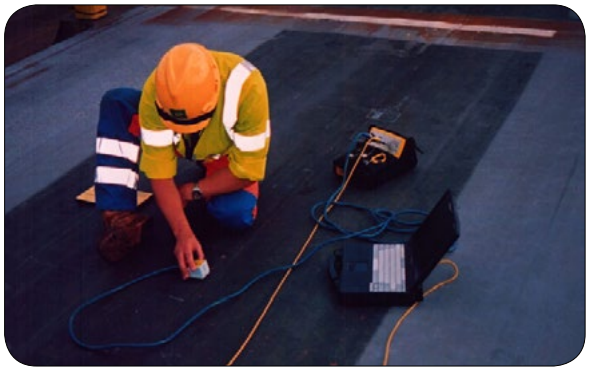
Longitudinal beam web repairs had been carried out on the bridge, involving joining the original cast iron material with steel. Tests carried out on material samples prior to the inspection resulted in a high degree of confidence in ACFM® for use on what is an unusual combination of welded materials, complicated by the presence of a relatively thick primer and paint coating.

Standard pencil probes are available for inspecting fillet welds. For inspecting other areas prone to cracking (such as flat surfaces adjacent to cut-outs, or flat butt welds) an array probe is often beneficial. The main advantage of using an array probe over single coil probes is that a much larger area can be inspected in one pass of the probe. In addition, array probes usually include a position encoder, allowing automatic location recording and faster defect sizing.

QEII Bridge (cable-stayed bridge opened in 1991) ACFM® inspection of lamp post welds.

In summary, the benefits of using ACFM® are:

- No need to remove paint or non-conductive coatings.
- Major time savings compared to conventional methods.
- Detection and sizing from the same inspection.
- Easily deployed by rope access technicians, if required.
- Complete records of all inspections for audit or review.



Humber Bridge (opened in 1981) - Deck plate inspection with AMIGO™ kit.

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