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**Title and content of proposed paper to be delivered to the CEOCORR 2018 Congress**

**Developments in remote magnetic monitoring of carbon steel pipelines to locate and measure abnormal stress.**

This presentation outlines recent developments in a novel remote sensing technique developed to detect localised abnormal pipe wall stress by mapping variations in the earth's magnetic field around pipelines. Corrosion, metallurgical defects and ground movements result in areas of increased localised stress in pressurised pipelines and a direct relationship has been described mathematically relating magnetic field characteristics to the magnitude of stress due to magnetostriction. The method is non invasive and reports localised stress as a percentage of material specified minimum yield strength, its geometric centre, accurate positioning of girth welds and 3 dimensional mapping of the pipeline route including depth of cover all to cm accuracy.

The presentation first explores magnetostriction in ferromagnetic materials and then how measurements of remote magnetic field can be applied to define the location of defects in operational pipelines, quantify the associated abnormal stress, report the position of girth welds and to concurrently report a 3 dimensional map of the pipeline route. The benefits of using this technique and a series of case studies are described to illustrate its use in practice in the field.



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