

1.1.6. MAGNETIC METHODS OF STEEL PIPES TESTING IN THE PROCESS OF THEIR PRODUCTION AND EXPLOITATION

Sherbinin V.E., Yekaterinburg, Russia

Effectiveness of magnetic methods usage for testing steel pipes and other round products is connected with capability of their circular magnetization which closes out generation of other scattering fields with the exception of those caused by nonuniformity of a pipe. When this happens, magnetization can be caused by a current flowing in a rod inside the pipe and also by a current flowing in the pipe itself. In the first case defects located at inner and outer pipe walls are detected. In the latter, inner pipe walls defects can also be detected if they are deep enough.

For large scale pipes these flaw detectors were replaced by flaw detectors with Π -shaped electromagnets (pole magnetization). Recently, matrix transducers are used in flaw detectors making it possible to expand testing zone beyond joints, enlarge the space between transducers and a surface of a pipe and to increase precision of testing at the same time.

A specific place is held by magnetic methods in solving problems of testing pipes laid underground (gas and oil pipelines). In this case inner pipe shell-flaw detectors are used. For magnetization they are using electromagnets or constant magnets which poles are equipped with brushes for the purpose of decrease of magnetic resistance between magnets and pipe walls.

In 1999 a shell-flaw detector with transversal magnetization was developed. It allowed to detect special danger defects – stress corrosion damages with a length of 40 mm or more and 20% of a pipe wall thickness deep.

More than 100,000 km of pipelines undergone testing by flaw detection systems in JSC “Gasprom”. Tens of thousands stress-corrosion cracks and other defects were detected. The achieved results make it possible to conduct multi-factor analysis of pipelines condition and estimate their residual resource.