

The effect of radar trace number on tomographic images of cylindrical objects obtained using GPR

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SUMMARY

Ground penetrating radar (GPR) method is a non-destructive method that has been used in geological, archaeological, military and engineering researches for many years. GPR can be used to investigate structures at different depths, from several centimetres to a few hundred meters. In recent studies, it has also been used to image the internal structures of objects with shallow depths, such as tree trunks and historical building columns. With GPR, discontinuities, cavities and cracks in these structures can be detected. While investigating the internal structures of cylindrical objects, measurements are taken around the objects with GPR at certain angle intervals along a circular line. And by using the radar traces taken from these different angles in the backprojection method, tomographic images showing the interior of cylindrical objects are created. Vector network analyzer (VNA) and Vivaldi antenna pair are used to take radar measurements. The measurement system is fixed at one point and the object to be investigated is placed on a table that can be rotated with certain angle intervals around its own axis. Thus, measurements are taken at desired angle ranges. In this study, the effect of radar traces collected with different measurement intervals on tomographic images is compared and examined.

Keywords: GPR, backprojection, cylindrical objects
