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OBSTACLE DETECTION SENSOR FOR HDD

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ABSTRACT: This paper will update the status of an obstacle detection sensor being developed by GTI with assistance by the Trenchless Technology Center. The sensor is based on differential impedance tomography techniques for HDD equipment and will be incorporated into the drill head. The original concept was to use a low frequency signal injected into the soil via the drill tip and a pair of bridge sensors, mounted orthogonal to one another along the drill tip, to detect the presence of metallic or non-metallic obstacles in proximity to the HDD head during pre-bore. These obstacles will cause changes to the sensor balance distinguishable from the surrounding soil. The sensor will be simple and compact, provide range and direction data for obstacles ahead of the HDD head, and will address the negative issues associated with such systems as GPR.

An initial proof-of-concept was achieved in Phase 1, but the range and sensitivity of detecting objects ahead of the drill tip were lower than desired. In Phase 2, GTI and TTC are conducting finite element modeling to determine what improvements can be made in the mechanical design and sensing configuration to improve the device. GTI and TTC are also exploring the feasibility of incorporating different sensing configurations and technologies in the same unit to increase reliability. The goal is to have a new prototype fabricated and tested in 2007.