

6. Navigation System for Pile Construction by Image Processing

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In foundation piling, it is common practice to control the pile positioning accuracy by checking on the position and the verticality of piling equipment. This paper proposes a method of improving the verticality of foundation pile by image processing. Similar conventional techniques show piling equipment images only, but they do not make effective use of image data so as to ensure verticality. In the proposed method, the inclination and vertical movement of piling equipment extracted from image data are converted to digital data. Then, by measuring the inclination and the movement of the piling equipment in real time, the system estimates borehole deviation and presents navigation information. The operator can view image data, and the same data are made available via the Internet to remote locations such as an on-site project office. The proposed method was field-validated in foundation piling operation carried out by the earth auger method or the earth drill method, and it has been confirmed that piling accuracy achievable by the proposed method is good enough for practical application.

Key words: borehole deviation, image processing, real time, inclination measurement, depth measurement