Traceability of optical length measurements on sand surfaces - DTU Orbit (09/11/2017)

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This work concerns traceable measurements on moulds used in automatic casting lines made of green sand, which has a very low strength against the force of a contact probe. A metrological set-up was made based on the use of calibrated workpieces following ISO 15530-3 to determine the uncertainty of optical measurements on a sand surface. A new customised sand sample was developed using a hard binder to withstand the contact force of a touch probe, while keeping optical cooperativeness similar to that of green sand. The length of the sample was calibrated using a dial gauge set-up. An optical 3D scanner with fringe pattern projection was used to measure the length of a green sand sample (soft sample) with traceability transfer through the hard sample. Results confirm that the uncertainty of the optical scanner on the substituted hard sample is similar to that of the soft sample, so the hard sample can successfully represent the soft sample in the ISO 15530-3 procedure. The expanded uncertainty (k=2) of length measurements on sand was estimated to 10 µm.

General information

State: Published
Organisations: Department of Mechanical Engineering, Manufacturing Engineering, Technical University of Denmark
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Number of pages: 2
Publication date: 2016

Host publication information

Title of host publication: Proceedings of euspen's 16th International Conference & Exhibition
Main Research Area: Technical/natural sciences
Conference: euspen's 16th International Conference & Exhibition, Nottingham, United Kingdom, 30/05/2016 - 30/05/2016
Metrology, Traceability, Optical 3D scanning, Sand
Source: PublicationPreSubmission
Source-ID: 123535769
Publication: Research - peer-review › Article in proceedings – Annual report year: 2016