

1.9.27. BEAM HARDENING CORRECTION OF MULTI-MATERIAL OBJECTS

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Abstract. In this paper we present a method for reducing beam hardening artifacts in Computed Tomography (CT) images. Due to the polychromatic characteristics of common X-ray tubes attenuation does not increase linearly with penetrated material thickness. This leads to dark streaks, blurring and so called cupping artifacts. Additionally, form errors hinder dimensional evaluation. In CT images of objects made of several materials with significant different attenuation characteristics these effects are even more distinct. The method described in this paper allows the correction of beam hardening artifacts in multi-material objects. Knowledge of the impinging X-ray spectrum or the materials absorption characteristics is not necessary. The method works iterative and without any reference measurements. Specimens of several material combinations were tested with CT and beam hardening corrected with the proposed algorithm.

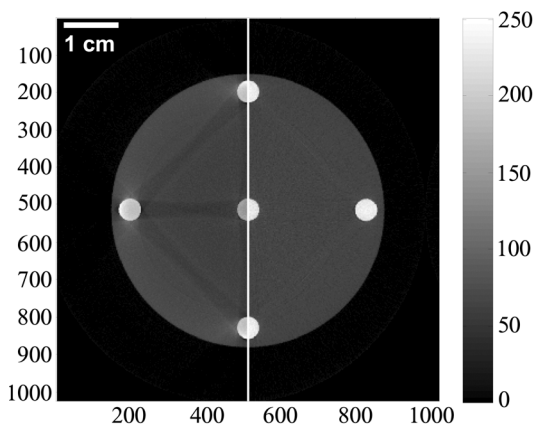


Fig. 1. Result of the proposed beam hardening correction method.

The figure shows an aluminum cylinder with inserted steel pins. It is composed of uncorrected CT image data to the left and the corrected CT image data to the right. Cupping and dark streaks are removed completely

Keywords: CT, NDT, X-ray, artifacts, beam hardening.