

Air and material separation method for industrial CT scanners

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One of the main factors affecting the measurement result is definition of the threshold value between the air and the material. The ISO50% automated algorithm, commonly used in tomographs for engineering applications, comply with the principle of adjusting the threshold value on the greyscale at an equal distance between maximum value for the air and material. Actually, such solution does not have physical grounds. Some of the material can be classified as air and some of the air can be classified as material, which affects the edge detection [1]. An incorrect determination of the surface may significantly increase the measurement uncertainty [2,3]. The paper presents a new method of air and material separation for X-ray tomography for engineering applications. It consists of executing additional calibration measurements and determining correction factor for air-material threshold values on the greyscale of the volumetric file [4]. The advantage of the method is to include on a calibration process factors influencing the accuracy of reconstruction. These are: magnification setting, X-ray scattering at the edges, the instability of the radiation beam during the measurements, detector noises, the impact of external factors, etc. Usability and effectiveness of a new method of air and material separation has been experimentally verified on few different tomographs for industrial application. The proposed method performs better than existing well-known, automated algorithm ISO50% when measuring the volume as well as linear dimensions of workpieces made of different materials.

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