COMPUTED TOMOGRAPHY STATUS

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SUMMARY

Computed tomography (CT) is a relatively new radiographic technique which has become widely used in the medical field, where it is better known as computerized axial tomographic (CAT) scanning. This technique is also being adopted by the industrial radiographic community, although the greater range of densities, variation in sample sizes, plus possible requirement for finer resolution make it difficult to duplicate the excellent results that the medical scanners have achieved.

INTRODUCTION

CT displays a radiographic cross-section of a solid object, as if the object had been sliced, and viewed normal to the slice plane. There is no overlapping of images as there is in conventional projection radiography. It is also more sensitive to small changes in density than conventional radiography--typical medical systems claim 0.5% sensitivity, compared to 1% to 2% sensitivity for projection radiography. The best spatial resolution claimed by the medical scanners is in the 0.5 mm range.

CT data is taken by scanning a beam of X-ray photons through a well defined planar section of object, and detecting the transmitted beam with an electronic detector, as depicted in Fig. 1. There are various conventional scan geometries which have been "named". The simplest is the "first generation", where a single detector is used and the beam is translated through the object in the scan plane, taking 10 to 1000 data points depending on resolution required. Each data point represents a line integral of density through the part. These data points together constitute one "projection". The object is then rotated about an axis perpendicular to the scan plane and another projection is taken. Again depending on required resolution, tens to hundreds of projections are taken, covering at least 180

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