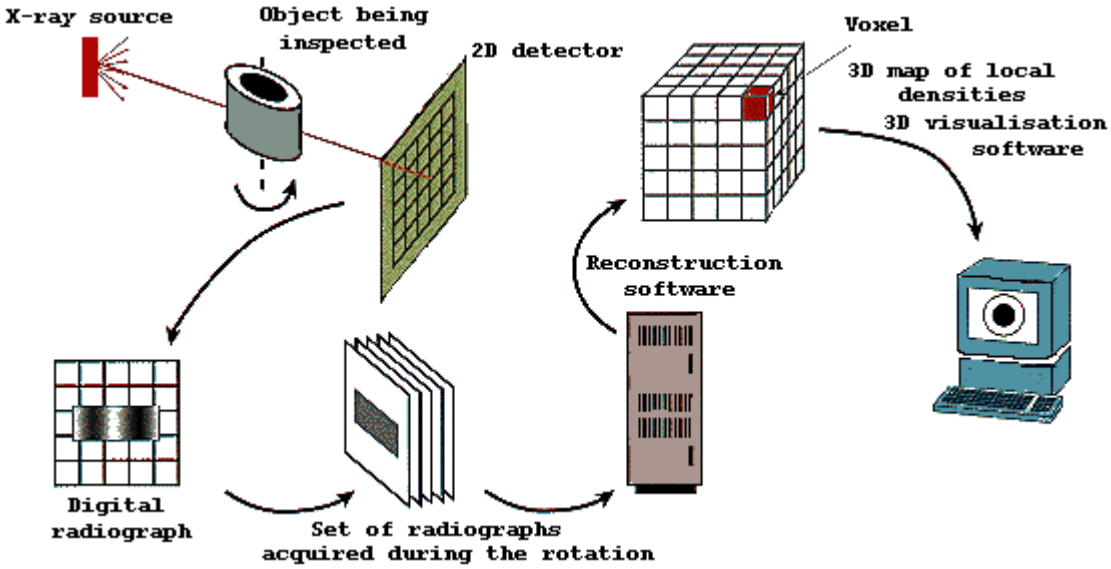
MICRO-RADIOGRAPHY ~ MICRO-TOMOGRAPHY
Advanced materials / specimens-analysis

3D VISUALISATIONS

Challenge

There is a permanent demand for non-destructive materials analysis. In medicine, tomography is an established X-ray technique in which structures lying in a single plane are visualized sharply, without blurring by structures lying in different planes.



Solution

In a joint project, this technique is developed for industrial applications: analysis of extremely fine structure - hence the name "microtomography". The principle is that X-rays travel through the object, are detected and recorded digitally. The object is rotated so that it is irradiated in various positions. This yields a set of X-ray projections. Mathematical treatment then permits a reconstruction of an image of the projections.

Advantages

X-ray microtomography can find a wide range of applications because many materials can be examined - including metals, plastics and ceramics - by using a suitable spectral energy. Small defects such as hairline cracks can be detected and accurately located in moldings, welds, turbine blades and objects made of fibre-reinforced plastics. In principle, structures as small as 100 microns can be visualized in large objects, down to 10 microns for smaller objects. Special software permits diagnosis of the type of defect.

Cost/benefit

Industrial application of X-ray microtomography is still in the early research stages. NRG is spearheading this development, which includes everything from mathematical modeling via software development to a set-up for field testing. The results obtained so far are excellent and X-ray microtomography is anticipated to become a valuable new non-destructive testing tool for inspections, detection of failure causes and lifetime extension.

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