CAF Central Analytical Facilities
STELLENBOSCH UNIVERSITY

UNIVERSITEIT STELLENBOSCH UNIVERSITY

CT Scanner Facility

MicroCT analysis applications series

Tech note 6

Failure analysis & checking for cracks

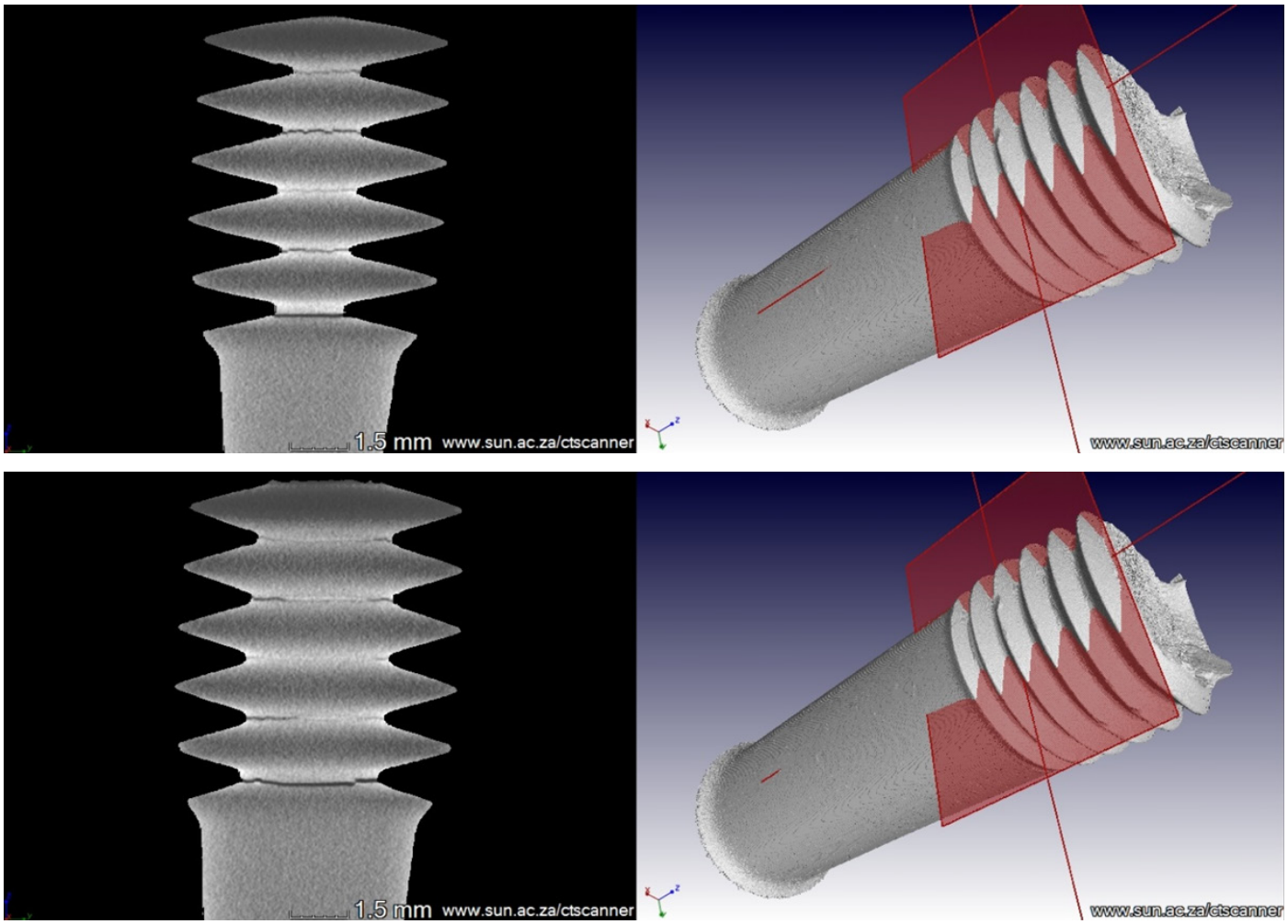
By Dr Anton du Plessis

Introduction

MicroCT can be used as a start point for failure analysis investigations. This is especially useful as the method is entirely non-destructive. The microCT can then identify the location of cracks or other issues and identify where to cut the sample open for further analysis. In this example a quick inspection is demonstrated.

Results

A scan and basic data processing to view this type of cracking and identify the depth of a crack and its orientation, is a good starting point for failure analysis investigations. It is also useful to keep such data for records for legal purposes.



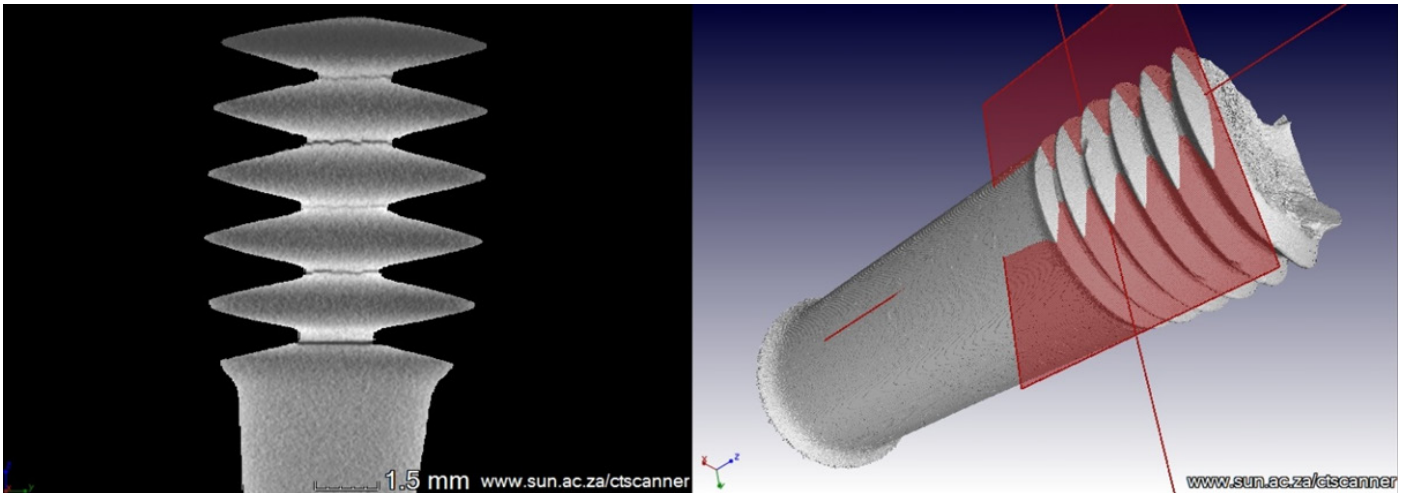


Figure 1: *microCT views of a cracked bolt from a car's engine.*

Limitations?

Limitations on maximum X-ray penetration – typically samples should be smaller than 150 mm for light metals and 50 mm for steels and similar. This is a grey area depending on part complexity and total material to be penetrated. Total material penetration limits for plastics, wood: 200 mm, titanium alloys and lighter metals: 40 mm; steel: 10 mm.

Basically a poor scan will also show problems but not as beautiful as above.

How to go about it

Send your samples or bring it in. For a routine scan and basic analysis as above, we now (2017) charge R3050 per sample incl VAT. For >10 samples, 7% discount.

This includes images and a video of every sample and STL file where possible. Reduced rates for student research projects at South African universities. International rates US$ 300 per sample.

Full data can also be provided at additional cost with free viewer software. We use Volume Graphics VGStudioMax 3.0, and myVGL viewer. For full processed data add R1500 per sample.

SAMPLE SHIPPING AND FORMAL QUOTES

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For more info on image analysis check our youtube channel (click here)

YouTube