SONOMATIC

CASE STUDY

CIVA MODELLING OF TURBINE INSPECTION

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1. INTRODUCTION

Steam turbine equipment requires periodic inspection; usually this involves removal of the blades which can be costly and time consuming. Sonomatic were approached to determine whether inspection could be completed without removing the blades using advanced ultrasonic techniques.

2. PROCESS

Turbine blades are a complex geometry; inspection needs to cover the root, steeple sections and axial locking groove. A model of a turbine blade was created using the Civa software.

Flaws were introduced into the model to demonstrate inspection coverage. Simulations were then completed to determine the responses that would be obtained using linear and matrix phased array probes.

The results were able to demonstrate that in-situ phased array inspection would be able to achieve up to 95% volumetric coverage of the turbine root, and approximately 90% coverage of the steeple sections and axial locking groove.

3. OUTCOME & BENEFITS

The analysis determined that phased array inspection would achieve coverage over the majority of the root, steeple sections and axial locking groove. The benefits of completing Civa analysis of a problem of this nature with Sonomatic are:

- Assurance of inspection methods without having to construct expensive samples.
- Accurate representation of the specific geometry under consideration.
- A variety of inspection techniques and flaw combinations can be investigated rapidly.
- Cost effective development of high integrity inspections.