

Stator testing



The air compressor is a major aircraft engine components. It is made of adjustable turbine blades (rotor) and stator.

Principle of operation :

- The rotor sucks and accelerates the air flow, and will be deflected in regard to the engine axis.
- The following stator straightens the flow in the axis and slows it by turning a part of its speed in pressure.
- The following rotor accelerates again the air flow and will be deflected again from the engine axis.
- The following stator will again straighten the flow, slow it, and turn its speed in pressure again.
- Etc.

The increase of the compression rate for a single stage axial compressor of a civil turbojet is from 1,15 to 1,16 in optimal condition use. This is the reason why a complete compressor has many stages.

The stator is made of 2 shells between which are secured several dozens of titanium blades.

The weld of each rotor on the outer shell must be X-rayed to make sure it will not detach and thus get sucked into the engine, which would destroy it immediately.

Solutions implemented by Balteau...

2 technics of inspection of these welds :

CONVENTIONAL RADIOGRAPHY

A panoramic RX tube is positioned exactly at the center of the stator and a film which has been placed around the outer ring is irradiated. All welds are X-rayed all at once.



The advantages of the conventional radiography:

- Only one radiography per component inspected
- Lower investment cost compared to digital radiography

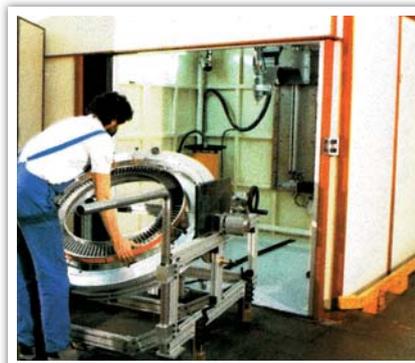
This installation consists of :

A shielded cabinet for radiation protection

A constant potential panoramic 160 kV RX generator

A manipulator axis to move down the RX tube at the centre of the stator

A mobile trolley to position the stator in the shielded cabinet



DIGITAL RADIOSCOPY

A directional RX tube is positioned inside the stator and a flat panel is positioned on the outside. The size of the flat panel allows to see 2 or 3 welds at the same time. The rotation of the stator will allow to display all the welds.



The advantages of digital radiography:

- The image quality is superior
- Opportunities to optimize image quality through digital filters (see balteau's software IPS012)
- Possibility to save all images on a computer network.
- Images can be sent quickly by e-mail to a remote inspector

This installation consists of :

A shielded cabinet for radiation protection

A constant potential directional 225 kV RX generator

A flat panel

A motorised diaphragm

A robot to position the tube and the detector in front of the welds

An acquisition station and images analysis

A rotating table to rotate the stator

