

Slide No. 158
Row 19 with two
missing blades



Amount of Loss

CHF 205,000

Short Description

A steam turbine built in the sixties with an output of 27.5 MW, a working temperature of 500° C and twenty rows of blades had 192,500 working hours when after 25 years the last inspection was carried out. 22,531 working hours later, row 19 lost two blades. With the help of the manufacturing company the blades were replaced. After repairs the turbine was no longer able to achieve the same high output as previously, and vibrations were observed at certain loads. After a further 14 months a technician suddenly observed unusual vibrations. The turbine was immediately stopped. 43 of 104 blades in row 20 had been damaged on the front side of the blades.

Comments

After more than 27 years of constant use the turbine was at the end of its life time. The condition of the blades was aged and weakened. The blades were not a one-piece design and were therefore more sensitive to shocks. The loss of the two blades in row 19 damaged the weakened blades of row 20 more severely than the inspectors of the turbine had thought probable.

Conclusions and Loss Prevention

Although it was an old turbine losing blades, the same also happens with newer ones, although less frequently. After the first incident the adjacent blades should have been inspected more carefully, especially considering the type and age of the turbine.

Slide No. 159
The two blades after
breaking off



Slide No. 160
The two blades damaged
the following blades in row 20

