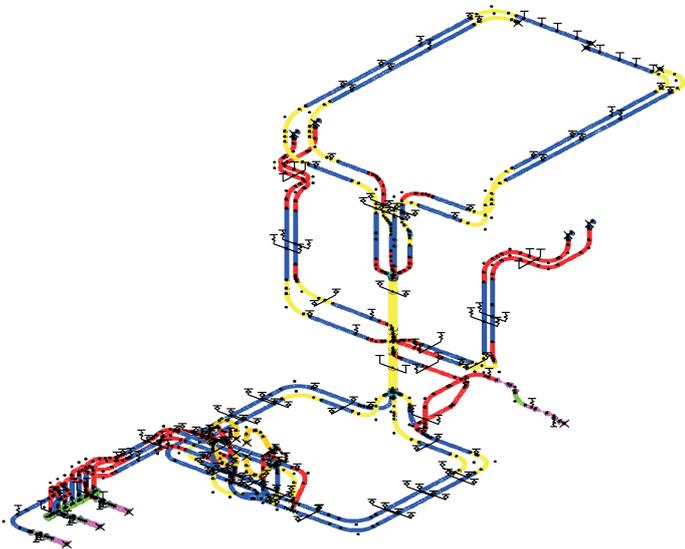


Asnæs Power Station Unit 5



Pipe Stress Analysis of Existing Steam Pipe



At the Danish power station Asnæsværket (Energi E2) the unit 5 reheater steam piping was partly revamped in 2002 due to fatigue cracks in the nozzles at the spherical junctions. The old material was replaced by X10CrMoVNb9-1 (P91).

To avoid future repetitions of this kind of damage it was decided to investigate the condition of the whole piping system regarding actual spring forces and displacements. The forces and the travels of the hangers (cold/warm) were registered.

In August 2003 BWE got the order to perform a stress analysis of the existing piping system. The piping system was thoroughly modelled in ROHR2 focusing on the application of correct wall thickness and insulation thickness according to detail drawings.

The calculation revealed that the prior design load of the hangers in general was too low. Furthermore, it was discovered that the existing hangers did not travel according to the calculations. It turned out that this was caused by increased friction in the constant force hangers as they were old and worn.

To correct this, as well as to lower the stress level in the system, a new hanger system was conceived in collaboration between Energi E2 and BWE. Consequently a number of hangers were added or replaced.

The hangers were ordered from LISEGA according to the newly calculated reaction forces. BWE subsequently carried out the installation of the new hangers in October 2003.

After the installation of the new hangers the thermal displacements of the hangers were measured and showed good conformity with the calculated values.

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Burmeister & Wain Energy A/S has specialized in the development and design of advanced steam boiler plants for utility and biomass fired power stations.

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BWE is part of the Italian STF S.p.A. Group.

Asnæsværket Power Station is owned and operated by ENERGI E2 A/S (www.e2.dk).

Steam data for Asnæsværket Unit 5 :

HP:	1980 t/h	190 bar	540°C
IP:	1769 t/h	47 bar	540°C

Capacity: 700 MWe
Maximum reheater pipe:
Mat: X10CrMoVNb91 – Do 924.4 x 47.2 mm
Boiler supplied by BWE in 1981

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