COCOSYS analysis of EREC Bubble Condenser test SLB-G02

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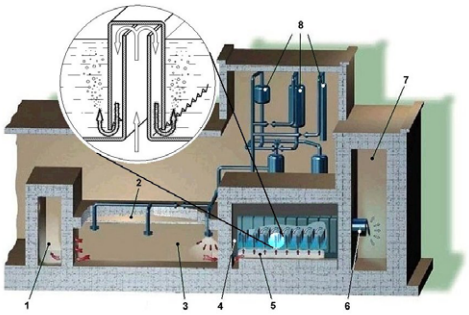
> Objectives

- Completion of spectrum of accidents investigated experimentally by performing tests with loads representative for a Steam Line Break in NPPs with WWER-440/213
- Investigation of the occurrence of condensation oscillations, i.e. possibility of dangerous loadings to the Bubble Condenser construction
- Validation of the DRASYS model in COCOSYS and of models for specific components in the WWER-440/213 containment.

> EREC test facility BC V-213

The test facility has been designed in scale 1:100 (relative to Paks NPP) for investigating thermal-hydraulic processes under conditions expected during design basis accidents.



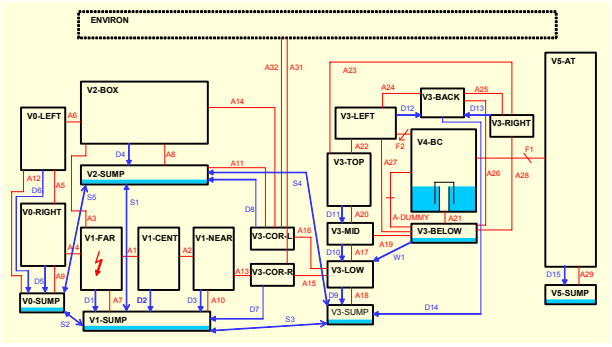
General view of EREC test facility BC V-213

It consists of following main systems and components:

- System of high pressure vessels and break simulator
- System of hermetic compartments simulating the principal groups of containment compartments including a fragment of a real Bubble Condenser tray with 18 full size gap-cap units
- One check valve leading from the BC gasroom to the air trap and the relief valve leading from the BC gasroom to the BC gasshaft.

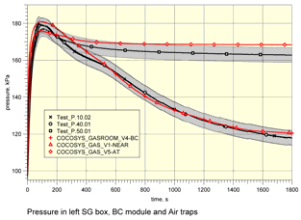
> COCOSYS post-test calculations of SLB-G02

For the calculations a 23 node model was developed.

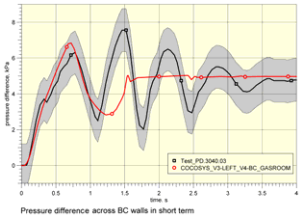


BC V-213 model with 23 nodes

The influence of initial and boundary conditions was investigated. A sensitivity study with regard to heat conduction processes was performed. The heat conductivity coefficients of the concrete structures and wooden insulation as well as the carry-over of wet air through the water layer were identified to be of special importance for the correct process simulation. After adjustments in the data set and in the DRASYS model of COCOSYS finally a good coincidence of calculation with experimental results was reached.



Pressure in left SG box, BC module and Air traps

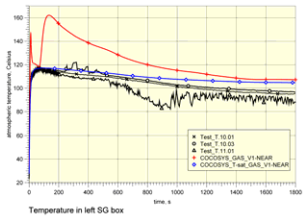


Pressure difference across BC walls in short term

Parameters of main interest:

- maximum pressure and temperature in the hermetic compartment system,
- pressure difference across the BC and
- pool water heat up.

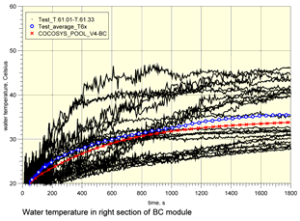
In all calculations superheated condition in the break node was calculated, whereas the measured temperature is close to saturation.



Temperature in left SG box

The pool water heat up speaks about the efficiency of the Bubble Condenser during any accident.

Comparing measured and calculated heat up allows to judge about the correctness of the process simulation.



Water temperature in right section of BC module

> Conclusions

- During all steam line break tests no condensation oscillations were observed.

- By means of the SLB-G02 test the DRASYS model of COCOSYS was validated. The results of the post-test calculations are in good coincidence with the measured parameters. For a correct simulation special features of the W-213 containment components identified in the tests are to be considered.

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