

Title	PPOOLEX Experiments on Dynamic Loading with Pressure Feedback
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**Abstract** This report summarizes the results of the dynamic loading experiments (DYN series) carried out with the scaled down, two compartment PPOOLEX test facility designed and constructed at LUT. Steam was blown into the dry well compartment and from there through the DN200 vertical blowdown pipe to the condensation pool filled with sub-cooled water. The main purpose of the experiments was to study dynamic loads caused by different condensation modes. Particularly, the effect of counterpressure on loads due to pressure oscillations induced by chugging was of interest.

Before the experiments the condensation pool was filled with isothermal water so that the blowdown pipe outlet was submerged by 1.03-1.11 m. The initial temperature of the pool water varied from 11 °C to 63 °C, the steam flow rate from 290 g/s to 1220 g/s and the temperature of incoming steam from 132 °C to 182 °C. Non-condensables were pushed from the dry well into the gas space of the wet well with a short discharge of steam before the recorded period of the experiments. As a result of this procedure, the system pressure was at an elevated level in the beginning of the actual experiments. An increased counterpressure was used in the last experiment of the series.

The diminishing effect of increased system pressure on chugging intensity and on measured loads is evident from the results of the last experiment. The highest pressure pulses both inside the blowdown pipe and in the condensation pool were about half of those measured with a lower system pressure but otherwise with similar test parameters.

The experiments on dynamic loading gave expected results. The loads experienced by pool structures depended strongly on the steam mass flow rate, pool water temperature and system pressure. The DYN experiments indicated that chugging and condensation within the blowdown pipe cause significant dynamic loads in case of strongly sub-cooled pool water. The level of pool water temperature is decisive. High individual pressure pulses (and loads) were missing with increased temperature and the oscillations were continuous in nature and their amplitude was almost constant. With an increased steam mass flow rate the highest loads were found from the condensation pool and not from inside the blowdown pipe.

**Key words** condensation pool, steam/air blowdown, chugging, dynamic loading