

ABSTRACT

This dissertation presents the problem of hydraulic and thermodynamic balancing in a hybrid boiler station with heating and supply circuits of varied and time-varying heat demand, a presentation of the existing available hydraulic distributors and an innovative development of a serial thermo-hydraulic distributor with a mathematical model. Additionally, a comparative analysis of the test results in real and model conditions was carried out. Analysis of mean differences and evaluation of moderation were applied.

The research was conducted in two stages: in laboratory conditions at Koszalin University of Technology, Faculty of Civil Engineering, Environment and Geodesy at 2 Śniadeckich Street and in real life carried out at the Services & Bistro Hotel in Koszalin at 5A Dworcowa Street.

Hybrid thermal systems with several heating circuits are mostly characterized by the demand for a heating medium with very diversified parameters, which also change in an extremely irregular manner. The parameters influencing the power of each receiver are the temperature and flow of the heating water.

Currently, there are numerous types of hydraulic distributors available on the market. However, in hybrid systems with heating and supply circuits connected serially, they may turn out to be ineffective.

It has been noticed that fully automated thermal systems may paradoxically contribute to the deterioration of the efficiency of these systems, and thus increase operating costs. It was the unpredictable nature of these changes that initiated the idea of balancing with a serial hydraulic distributor and the need to develop a solution.

Keywords: hybrid boiler station, thermo-hydraulic distributor, balancing heating circuits, mathematical model, temperature logic, heating water temperature, water stream flow