

## **Effect of cold inflow on chimney height of natural draft cooling towers**

### **Abstract**

Temperature and pressure drop data obtained from an air-cooled heat exchanger model with cross-sectional flow areas of 0.56 m<sup>2</sup>, 1.00 m<sup>2</sup> and 2.25 m<sup>2</sup> operating under natural convection are presented that indicate significant cold inflow, resulting in the reduction of effective chimney height. Cold inflows encountered in actual applications where the Froude number is typically 0.2, may not be as severe as described in this paper, which was of the order of  $10^{-6}$  to  $10^{-4}$ . Additional tests on smaller scale models appeared to favor the explanation that the occurrence of cold inflow in the air-cooled heat exchanger model was primarily due to the relative ease in either drawing cold air from inlet or from outlet, and to a lesser extent the Froude number of the chimney or the critical velocity estimated by Jörg and Scorer's (1967) formula. A CFD study will bring much understanding of the phenomenon for the different situations.