

Performance improvement by investigation on the influence of injection direction on the spray cooling in natural draft dry cooling tower

In most of thermal power plant, Natural draft cooling towers(NDCT) are mostly used. Heat and mass transfer in NDWCT will be investigated under different operating conditions. Performance of cooling tower will be increase by changing turbulence and velocity conditions. Heat and mass transfers between water and air, as well as drag equations for the two-phase system, will be computed in specific zones such as the cooling fill, spray and rain zones.

Turbulent air flow conditions in the air inlet degrade the cooling performance. This causes a significant limitation of power output

Promoting optimum and laminar air flow conditions of the cooling tower can result in a significant increase in plant power output. By minimizing cooling tower inefficiency due to turbulent flow conditions in the air inlets

At that specific droplet velocity, effects of the following operating parameters on the thermal performance of the NDWCT have been investigated: droplet diameter, inlet water temperature, number of nozzles, water flow rate and velocity.

3D scaled CFD model will be used in ANSYS FLUENT and OPenFOAM.

The most frequently encountered natural draft cooling towers are large structures height reaches up to 220 m.