Thesis Title	Heat Transfer Enhancement to a Cooling Water Pipe by Radiation Dominated Combustion in Porous Medium
Thesis Credits	12
Candidate	Mr. Kitipong Jaojaruek
Supervisor	Assoc. Prof. Dr. Sumreng Jugjai
Degree of Study	Master of Engineering
Department	Mechanical Engineering
Academic Year	2001

Abstract

This thesis proposes a one dimensional mathematical model of heat transfer enhancement to cooling water pipe by radiation of dominated LPG combustion in a porous medium. The influence of parameters that have effects on heat transfer coefficient at the surface of a cooling water tube (Nu_m) is studied. The implicit finite difference method is used to solve mathematical model. The results show that the heat transfer performance in term of Nu_m are higher than the system without the porous medium by a factor of 3.5-6. The Nu_m depends on combustion characteristic in the porous medium. The high feeding rate of gas mixture will promote heat transfer coefficient owing to a high combustion temperature and the shift flame closer to the water pipe. The optical thickness of the porous medium τ has a moderate effect on increasing the heat transfer coefficient when τ is more than 10. Decreasing the equivalence ratio ϕ at a constant heat supply yields an increasing in Nu_m due to a high convective heat transfer and flame closer to the water pipe. A thermal efficiency of heat transfer to the pipe calculated from the model and from the experiment differs by 3 – 5 percent.