

## Heat Transfer Characteristics on Blade Tip with Unsteady Wake

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**Abstract :** Present study investigates the effect of unsteady wakes on heat transfer in blade tip. Heat/mass transfer was measured in blade tip region depending on a variety of strouhal number by naphthalene sublimation technique. Naphthalene sublimation technique measures heat transfer using a heat/mass transfer analogy. Experiments are performed in linear cascade which is composed of five turbine blades and rotating rods. Strouhal number of inlet flow are changed ranging from 0 to 0.22. Reynolds number is 100,000 based on 11.4 m/s of outlet flow and axial chord length. Three different squealer tip geometries such as base squealer tip, vertical rib squealer tip, and camber line squealer tip are used to study how unsteady wakes affect heat transfer on a blade tip. Depending on squealer tip geometry, different flow patterns occur on a blade tip. Also, unsteady wakes cause reduced tip leakage flow and turbulent flow. As a result, as strouhal number increases, heat/mass transfer coefficients decrease due to the reduced leakage flow. As strouhal number increases, heat/ mass transfer coefficients on a blade tip increase in vertical rib squealer tip.

**Keywords :** gas turbine, blade tip, heat transfer, unsteady wakes

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