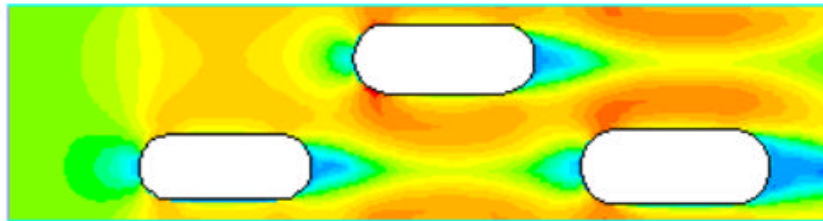


Project Title: BI-OBJECTIVE OPTIMIZATION OF A MOTORCYCLE RADIATOR UTILIZING CFD



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Project Partners:
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Project Abstract:

Optimization of a motorcycle radiator is bi-objective in that the amount of heat transferred is maximized while the pressure drop is minimized. These opposing design goals are achieved by determining the optimal geometric arrangement of the radiator. The optimum configuration is found by coupling a search algorithm with CFD results. Traditional approaches do not consider both objectives, and optimization has rarely been systematically used in the design of heat exchangers. Except in some aerospace applications, little work has been done using this process.

A two-dimensional model of the air-side of a motorcycle radiator is created and meshed using a PC version of GAMBIT, Fluent's new pre-processor. Periodic boundaries are assigned to reduce computational load. The model is then analyzed using the CFD software Fluent/UNS. Turbulent effects are considered. Pressure drop across the tube array and average temperature across the exit plane are exported to the optimizer for examination. Based on these results, the optimizer calculates new values for the design variables and the model is updated. The repetitive process of changing the model geometry and mesh is automated through the use of journal files.