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Modeling boundary conditions for thermal simulation of internal combustion engines entails convection heat transfer from the combustion flow path, crank case and head top oil combined with conduction heat transfer from sliding contact and friction between the piston assemblies, liners, valves, guides and intermittent contact of the seats. The time scale for an engine thermal analysis is much greater than the time for one engine cycle. Therefore, it is helpful to average the heat transfer characteristics for surfaces which see sliding contact mixed with convection states over one engine cycle and use these averaged values to advance the simulation.

The Cycle Average Tool assists in these analyses by computing and updating cycle averaged boundary conditions from convection and sliding contact heat transfer as the thermal analysis proceeds. It also assists with the complex task of preparing an engine thermal simulation starting from a CAD model, with utilities to apply stationary interface contacts resistances, mesh controls and other convection boundary conditions around the model consistently.

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Industries:

Products:

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[STAR Global Conference 2013](#)^[2]

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