Engine System Design

AIES
Advanced Integrated Engineering Solutions Ltd

Data Sheet

Engine Designer - *Making real life easier*

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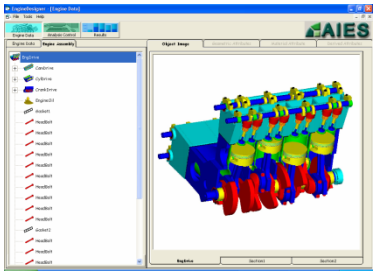
Engine System Design

EngineDesigner is an early stage engine design environment, aimed at integrating the Geometry, FEA, FD, CFD into a single design and analysis environment. This enables the hard work of model preparation, meshing and boundary condition definition to be automatically taken care of within this knowledge based system.

EngineDesigner is aimed at integrating the best in-class numerical methods to produce outstanding accuracy and performance with significant savings in time and labour (10 – 100 times faster). The EngineDesigner environment is object oriented and includes all component connectivity from object to sub-system to system level.

Uniquely user friendly configurations

The user can easily build new engine (system) templates in a matter of seconds, by defining the engine configuration they require. The object assembly tree and system template is generated with all structural and tribological objects, and BC's. Engine templates currently available are inline and Vee in either gasoline or diesel, with either SOHC or DOHC systems. Other engines can be easily configured so contact us to find out more.



EngineDesigner assembly for a V8 gasoline DOHC system

The engine Objects within the system are defined by their geometric and material data. These are used to automatically calculate mass, inertia, stiffness for example. These attributes then instantly populate the mathematical models that reside within the analysis solver of the system. En**gineDesigner** is composed of three assembly trees used to navigate the system environment.

Also within **EngineDesigner** is the overall system environment **EngDrive** and its sub-systems, **CamDrive**, **CylDrive** and **CrankDrive. CamDrive** is the valve train system, **CylDrive** is the power cylinder system and **CrankDrive** the crank and balancer shaft system.

Data input

Firstly the **Data** Object Tree is used for defining the geometry and material (physics) of the engine system.

Secondly there is the **Analysis** Tree, where the CAE event tree (design and analysis methods) is located which defines the type of CAE methods used within the system. This is where mesh, BC's and loads are defined.

The built-in CAE event tree in **EngineDesigner,** but in the near future this will be easily configurable to allow for expansion and tailoring to the users own requirements.

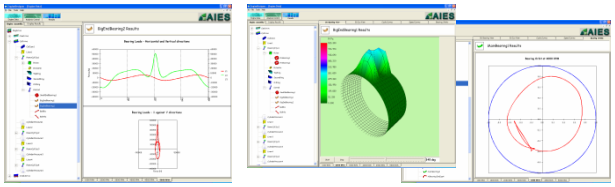
Built in CAE event Tree - design Methods

- Fuel Injection
- Combustion
- Cycle Simulation
- **Load Analysis (available now**)
- Heat transfer and cooling
- Thermal Stressing
- **Tribology, Friction and Lubrication (available now)**
- Dynamics & NVH (available very soon)
- Durability (available very soon)

Data output

Thirdly the **Results** object tree is used to navigate the results available at object, sub-system and system level.

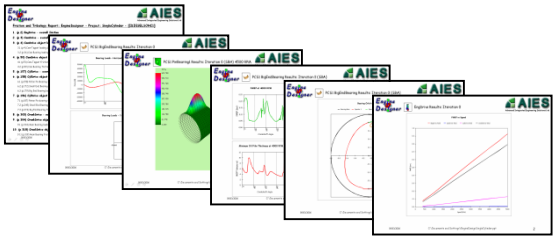
Currently the results available are in 2-D x and y, polar, 3-D isometric and 3-D spatial. The 3-D results are automatically animated over the speed and load case of interest.



Loading Results **Tribology Results**

Engine design report

- MS PowerPoint format



New developments coming soon are Engine sizing, Engine mesh driven by the geometry of the components, MBD and interfaces to other CAE Events. (FEA and CFD and cycle simulation solvers).

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