Crankshaft System Design

AIES
Advanced Integrated Engineering Solutions Ltd

Data Sheet

CrankDrive - *Making real life easier*

V2016-02-01

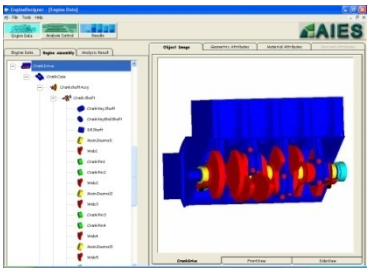
Crank Train System Design

CrankDrive is a Crank Train design environment and is aimed at integrating Geometry, FEA, FD, CFD into a single sub-system environment. This enables the hard work of model preparation, for example meshing and boundary condition definition to be automatically taken care of in this knowledge based system.

CrankDrive is aimed at integrating the best in-class numerical methods to produce outstanding accuracy and performance together with significant savings in time and labour (10 – 100 times faster). The **CrankDrive** 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 crankshaft (system) templates in a matter of seconds, by defining the **CrankDrive** configuration they require. The object assembly tree and sub-system template is generated with all structural and tribological objects and BC's. **CrankDrive** templates currently available (built) are gasoline and diesel, with a number of components including viscous and viscoelastic dampers, single or dual mass flywheels and Balancer shaft systems. Other crank trains can be easily configured so contact us to find out more.



CrankDrive object for a V8 gasoline DOHC system

The **CrankDrive** objects within the sub-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.

Data input

CrankDrive is composed of three assembly trees used to navigate the system environment. Firstly the **Data** Object Tree is used for defining the geometry and material (physics) of the crank train 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 CAE event tree in **CrankDrive** is built-in, 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

Currently available for the **CrankDrive** CAE Event Tree is Engine Loading and Tribology Friction and Lubrication.

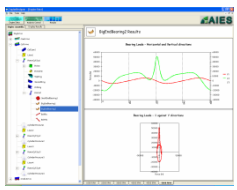
- Fuel Injection
- Combustion
- Cycle Simulation
- **Load Analysis (available now**)
- Heat transfer and cooling
- Thermal Stressing
- **Tribology, Friction and Lubrication (available now)**
- Dynamics & NVH (available very soon)
- Durability (available very soon)

CrankDrive includes, crankshaft design, Main bearing design, crankshaft seal friction, balancer shaft design, balancer shaft bearing design and sub-system friction.

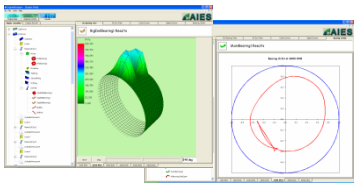
Data output

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.



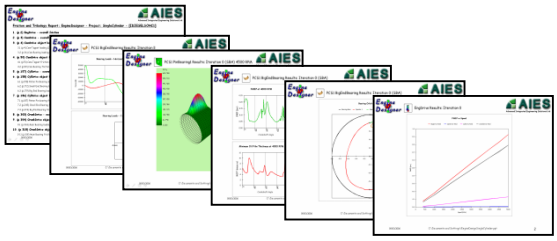
Loading Results



Tribology Results

Engine crank train design report

The report is automatically generated in MS PowerPoint format.



For further information contact
Advanced Integrated Engineering Solutions Ltd
37 The Ridgeway
Market Harborough,
Leicestershire
United Kingdom
LE16 7HG
T: +44 (0) 1858 414854
F: +44 (0) 1858 414885
Email: info@aiesl.co.uk
Website: www.aiesl.co.uk