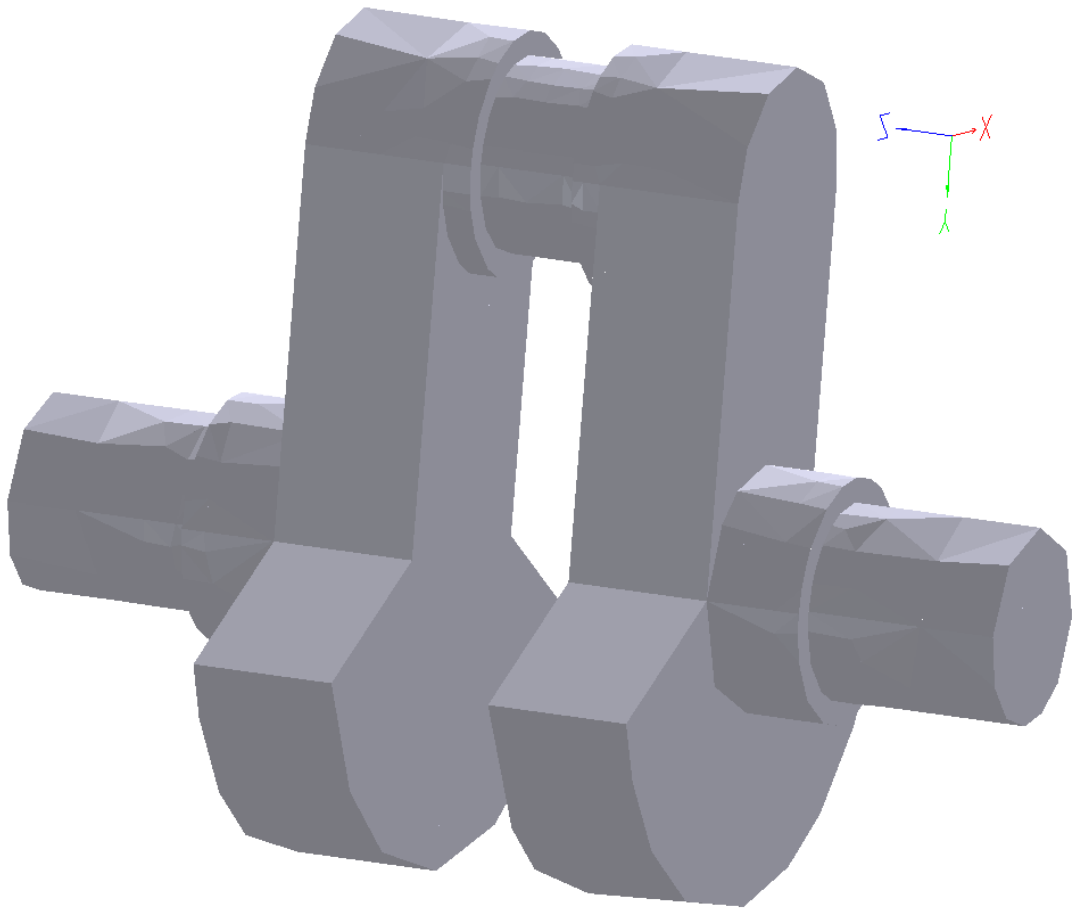


Z88 AURORA® EXAMPLE MANUAL

Example 9: Motorcycle crank shaft

(Tetrahedron No. 16 with 10 nodes)



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9. Example: Motorcycle crank shaft (Tetrahedrons number 16 with 10 nodes)

This example demonstrates the calculation of a motorcycle crank shaft. The total load from the piston is -5000 N.




Input file:


b11_g.cos → CAD input data

The mesh consists of quadratic tetrahedrons and was created with Pro/ENGINEER WF4. Special about this example is the application of boundary conditions because their definition is a little tricky.

One front of the crank shaft will be used to lock the displacement along the z-axis. The ball bearings are placed at the shoulders. They do not lock crankshaft's torque. The side of the shoulders will only be fixed in x- and y direction.

The total load of -5000 N is located on the whole surface of the crank pin.

To create a new project, use , **Create Folder** prompt e.g. *Example9*, confirm with *Enter* and exit the dialog with *OK*. To import the example file *b11_g.cos*, use the  **Import/Export** function of Z88 Aurora. There are many possibilities to import data from other programs. Here you have to use  **Cosmos-File**. The element type is "tetrahedron".

Switch to the preprocessor using the  button. There you can see that a load case already exists. If you choose it, the boundary conditions are displayed and on the right side of the window, the kind of condition is shown (*Figure 1*).

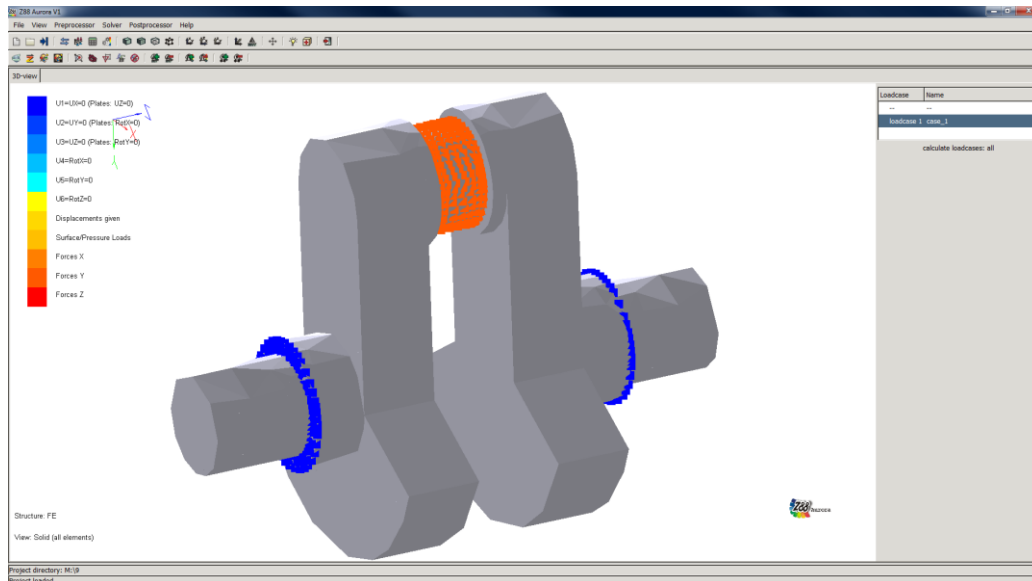






Figure 1: Crank shaft with boundary conditions

To calculate the example, you have to switch to the solver view using the  button. There you can use the iterative *SICCG-Solver* for example (see also the Theory Manual). This example is calculated with *5x5(x5) Gauss points* and *von Mises-stress*. The numbering of the nodes will be bad because of using quadratic tetrahedrons. To avoid this you can use the option “*Node sort*” (Cuthill-McKee-algorithm) in the solver option menu which can be opened by  **Options** . To start the solver use  **RUN** .

When the solver has finished you can look at the results in the postprocessor using  (Figure 2).

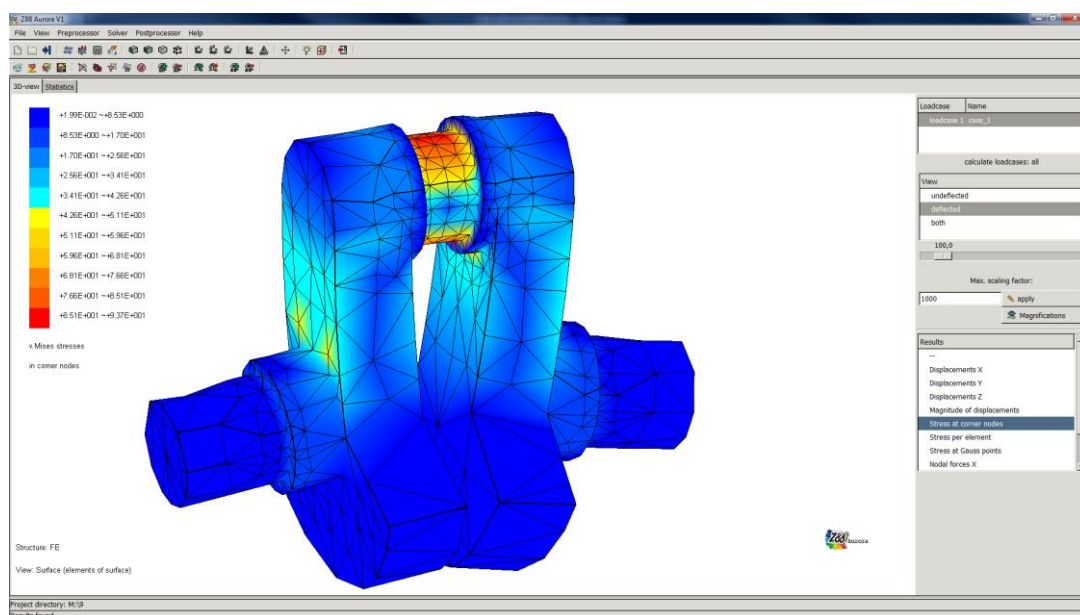


Figure 2: Stress-plot of the deformed structure