

WL 1 +

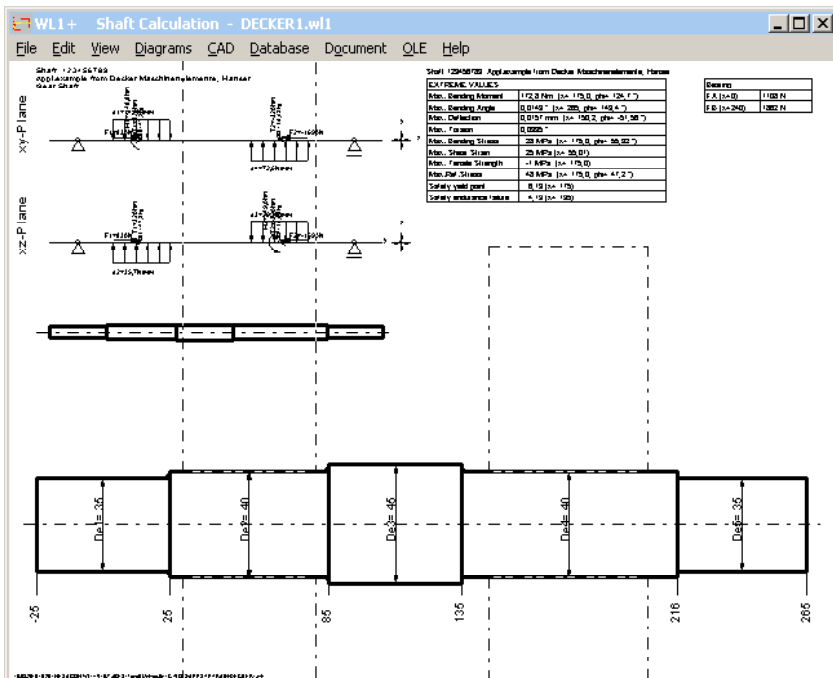


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Software for Shaft Calculation incl. Roller Bearing Calculation

for Windows

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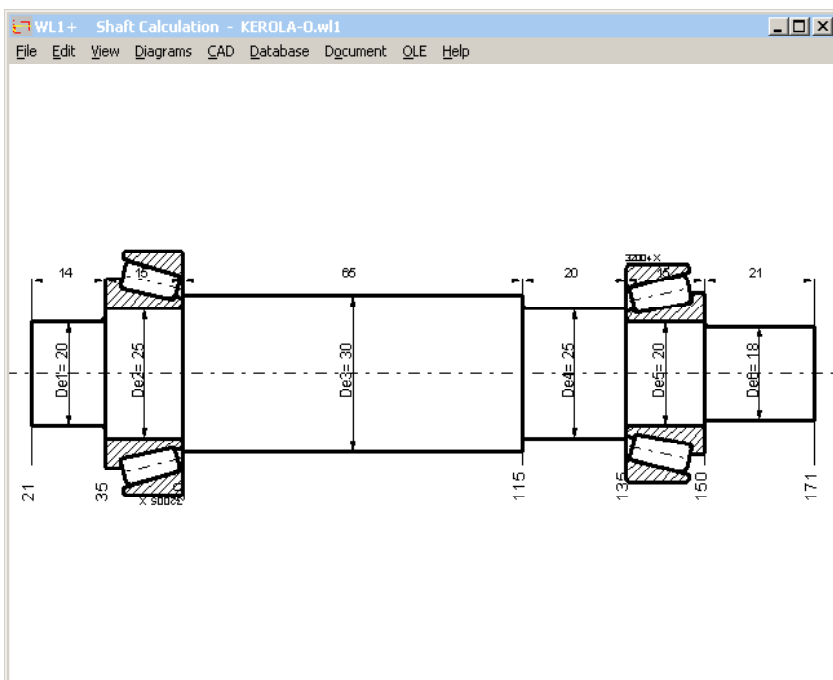
Shaft Calculation

WL1+ calculates load, stresses, bending line, torsion, critical speed, statical and dynamical safety. Load bearing capacity can be calculated according to DIN 743.

WL1+ also calculate endurance safety and life expectancy of roller bearings by means of the integrated roller bearing database.

Shaft and Load

The shaft is built from up to 100 cylindrical or conical sections. Up to 50 individual forces, path loads, bending moments, torques and axial forces can be assigned. WL1+ converts stress from gears into path loads, axial forces, torques and bending moments. The easiest input method is, however, to import the gear forces calculated by our gear program ZAR1+.



Stress Concentration Effect

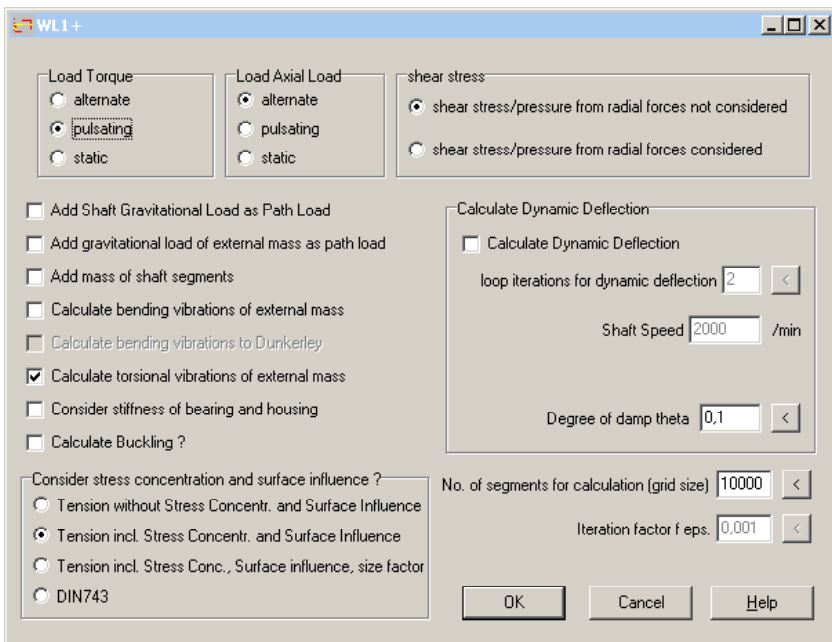
The increased stress at shaft transitions is automatically taken into account when you enter surface values, sensitivity factors and transition radius. Zones with increased stress concentration effect (e.g. from sliding key grooves) can be taken into account by entering beta k, beta kb and beta kt when calculating torsion and bending stress.

Bearings

WL1+ calculates statically determinate bedded shafts with fixed and loose bearings, fixed clamping and radial thrust bearings (each bearing absorbs axial forces in only one direction). In addition, statically indeterminate supported shafts with 3, 4 or 5 bearings can also be calculated.

Material Database

WL1+ provides material data according to DIN 743. Further steels and non-ferrous metals are made available by accessing the WST1 material database.



Critical Speed

The resonance speed for bending vibration and torsional vibration are calculated from the shaft's inherent mass and external masses (e.g. rotor body, gear wheels, belt pulley) according to the Kull & Dunkerley method.

Reference Stress

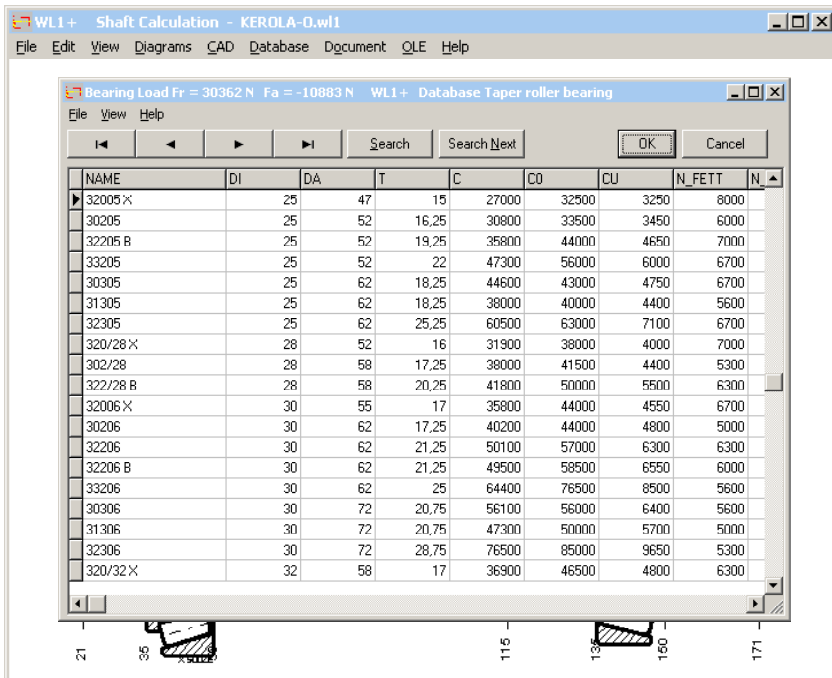
It is possible to calculate reference stress from the bending, tension and shearing stresses according to the maximum stress theory, maximum shear theory or maximum distortion energy theory.

Safety factors

Safety factors (endurance failure and yield) according to DIN 743 can be displayed as diagram.

Rolling Bearing Database

WL1+ includes database files with 600 deep-groove ball bearings, 100 self-aligning ball bearings, 70 needle bushes, 170 needle bearings, 500 cylindrical roller bearings, 300 tapered roller bearings, 360 self-aligning roller bearings, 100 angular contact ball bearings and 180 needle roller cages.



Diagrams

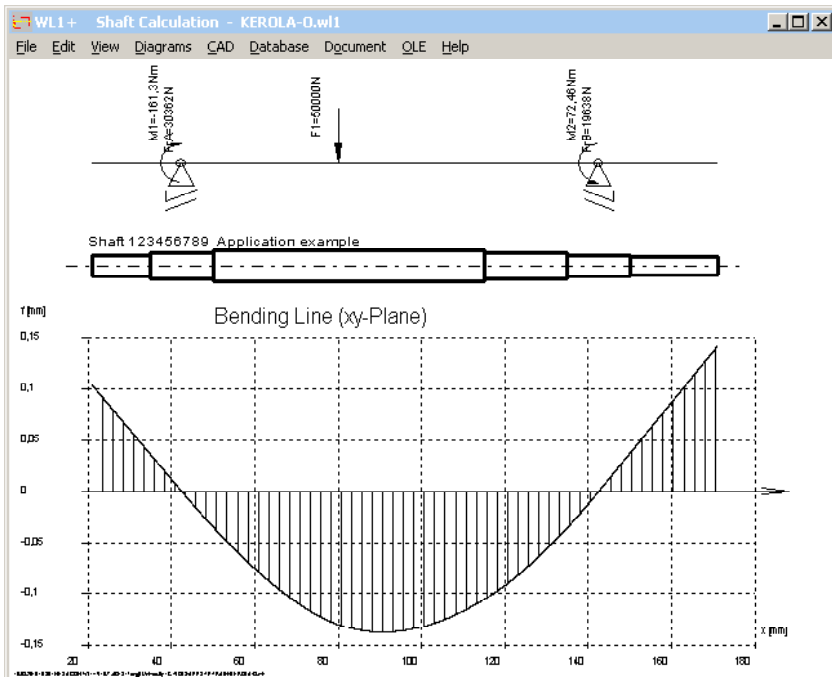
Torque, bending moment, bending angle, deflection line, bending stress, shearing stress and reference stress curves provide important information. You can print the charts, or load into your documentation.

Rolling Bearing Calculation

On the basis of the calculated bearing loads, you can choose the appropriate bearing from database. WL1+ calculates life expectancy according to DIN and ISO.

Printout

The printout shows the extreme values for bending moment, deflection, bending stress, shear stress and reference stress along with shaft weight, mass moment of inertia, centre of gravity, bearing loads, bending angle an the bearing positions, bearing life expectancy, resonance speeds, material values and input data.



CAD Interface

You can export true-scale drawings of shaft with roller bearings to your CAD system vis DXF or IGES file.

HEXAGON Help System

For explanation of the input data you can display help text and pictures. WL1+ provides error messages for input errors and when value limits are exceeded. For each error message you can display more detailed information and suggestions for remedial action.

Hard-and Software requirements

WL1+ is available as 32-bit app or 64-bit app for Windows 7, Windows 8, Windows 10.

Guarantee

HEXAGON gives a 24-month guarantee on full functionality of the software. Customers will be informed regularly about updates and new features.