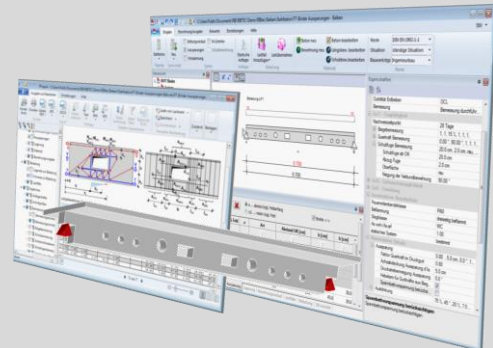


BALKEN

- 11.11.557 BALKEN RCbeam
- 11.11.558 BALKEN Details for Reinforced and Prestressed Concrete
- 11.11.559 BALKEN SLS, FLS & Refurbishment
- 11.11.560 BALKEN Prestressing
- 11.11.561 BALKEN Steel beam
- 11.11.562 BALKEN Timber beam
- 11.11.563 BALKEN Elastic Foundation

Analysis and design of continuous beams: Steel-, Reinforced / Prestressed Concrete and Timber

- Design according to DIN and EN with NAs for DE, AT, SK/CZ & UK
- Clear, configurable working environment
- Material change between reinforced concrete, prestressed concrete, structural steel and timber
- Efficient and fast input for simple systems
- Load transfer from and to other positions
- Different language settings for input and output
- Output as short list, long list and detail list with integrated graphics and diagrams
- Verification overview with all information



BALKEN can be used to calculate and dimension continuous beams in structural engineering made of reinforced and prestressed concrete, structural steel and timber. The program has a configurable graphic-interactive working environment for the input and output. With BALKEN, straight continuous beams including single span beams as well as cantilever beams with or without elastic bedding can be calculated. A prestressing bed or subsequent prestressing can be defined via an extra option. Additional options allow the design of openings and notches, the performance of serviceability and fatigue proofs or proofs for existing structures.



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BALKEN – Basic Module continuous beam

BALKEN is a Windows® program for the calculation and design of continuous beams from

- Concrete
- Structural steel
- Timber

with graphic-interactive working environment for input and output. With BALKEN, straight continuous beams including single span beams as well as cantilever beams with or without elastic bedding can be calculated. BALKEN is a multi-purpose structural analysis program and provides the following benefits:

- Modern interface with ribbon bar, quick access bar, tree view and property grid as well as 2D- and 3D views
- Graphics with sensitive elements and dimension chains as well as direct display of modifications
- Possible change of material: reinforced concrete – prestressed concrete – structural steel – timber
- Analyses according to DIN and EN with national annexes for DE, AT, SK/CZ and UK
- Efficient input via quick input, from a template or user-defined data records possible
- Consideration of elastic bearings and joints

- Fire protection certificates for reinforced concrete and timber beams
- Load forwarding and transfer from other positions
- Combination formation for nonlinear calculations
- Clear program control, configuration and independent language settings DE, UK and CZ for input and output
- Modern table-oriented result list with integrated graphics or diagrams that can be repeated at any time
- Result output with configuration and filter options
- Clear result output as short list, long list and detail list
- Custom template technique

Loading

- Centric or eccentric load input
- Individual loads and moments
- Line loads and line moments
- Line loads constant, as trapezoidal or triangular loads
- Temperature loads and support reduction
- Copying loads field by field or at a distance with automatic generation of load cases
- Automatic generation of load positions within a load case

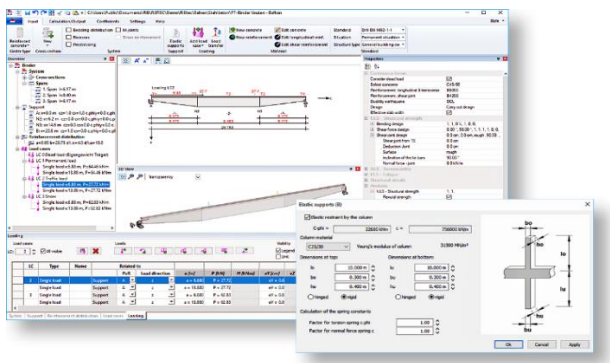
With BALKEN you are using a structural analysis program, which has proven itself in many cases both in the day to day business and in solving complex problems

Product Information

Option - Continuous RC beam

The uniaxial reinforced concrete design is possible according to DIN 1045-1, EN 1992-1 and the corresponding national annexes for DE, AT, SK/CZ and UK. The following tasks can be solved with BALKEN:

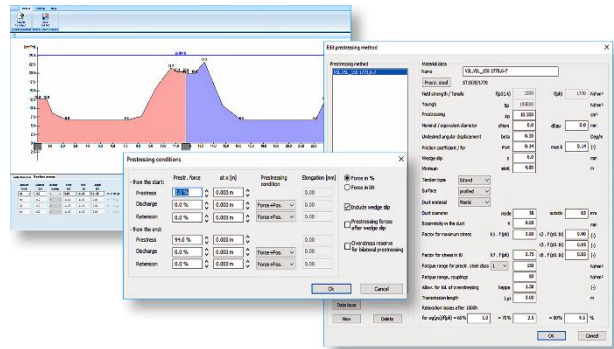
- Homogeneous rectangular, T-beam, slab, standard I-beam cross-sections with variable web and flange thicknesses as well as upstand beam cross-sections
- Typified cross-section gradients
- Arbitrarily variable cross-section gradient including cross-section offsets
- Simply symmetric – in special cases also asymmetric – cross-section shapes are possible
- Structural systems with an unlimited number of spans and automatic
- Consideration of the effective slab widths for the stress resultant calculation
- Display of requires reinforcement
- Optional use of normal-strength concretes (up to C50/60), high-strength concretes (C55/67 up to C100/115), ultra-high strength concrete (UHC140)
- Reinforcing steel reinforcement (up to B550), high-strength reinforcing steel reinforcement (SAS670) or glass fibre reinforcement (ComBAR®)
- Rigid or elastic support with automatic calculation of the spring coefficients
- Reliable generation of design combinations with load case attributes
- Automatic generation of load cases by copying span by span or with a certain distance
- Single loads, line loads, trapezoidal and triangular loads, temperature loads and support settlement
- Loads can be applied centric or eccentric
- Automatic generation of load positions in a load case



- Linear stress resultant calculation with automatic generation of all design combinations
- Linear stress resultant calculation with moment redistribution under consideration of the distribution boundaries
- Moment round-off and automatic consideration of the minimum restraint and loads close to a support
- Nonlinear determination of internal forces for elastic bedded beams with failure of bedding
- Complete reinforced concrete design in the ULS
- Minimum and ductility reinforcement
- Bending bearing capacity due to N-M-interaction
- Consideration of reinforcement rules
- Shear bearing capacity due to V-T-VT interaction
- Flange connecting reinforcement
- Composite joint
- Tabular fire protection

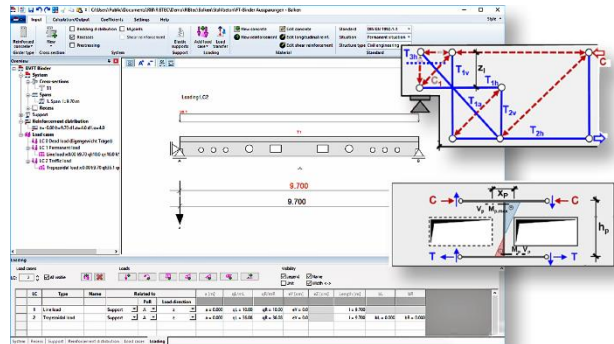
Option - Prestressing

- Single-level prestressing – pretensioned or post-tensioned
- Database with all current prestressing methods
- Prestressing with up to 4 prestressing conditions per side including wedge slip
- Prestressed concrete design under consideration of creep, shrinkage and relaxation ($t = 7, 28, 36500$ d)
- Tensile splitting reinforcement for pretensioning



Option - Detail design

- Design of geometrical discontinuity areas for small and large openings (recesses) according to DAfStb Heft 399/599 and DAfStb Heft 459
- Post design for openings closely spaced $< 0,8$ h
- Design of geometrical discontinuity areas for offset supports (notches)



Option – Additional design for SLS, FLS and refurbishment

- Complete reinforced concrete design in the SLS, FLS and refurbishment
- Minimum reinforcement for the crack width of thin and thick structural members
- Minimum reinforcement due to discharge of the hydration heat for slabs
- Limitation of the crack width
- Limitation of concrete and steel stresses II
- Limitation of the deformations in the uncracked state
- Limitation of the effective deformations in the cracked state for $l_{eff}/250$ and $l_{eff}/500$
- Deformations optionally for quasi-permanent, frequent or rare combination of actions
- Analysis against fatigue of the longitudinal reinforcement stage 2
- Verification against fatigue of concrete pressure stage 2

- Check against fatigue of the tension struts (transverse or stirrup reinforcement)
- Verification against fatigue of the struts
- Verification against fatigue of the composite joint
- Determination of fatigue strength by specifying the number of load cycles
- Consideration of the dynamic factor in building construction
- Load-bearing capacity analyses for existing buildings with utilisation rates for a given longitudinal and shear reinforcement taking into account possible corrosion damage

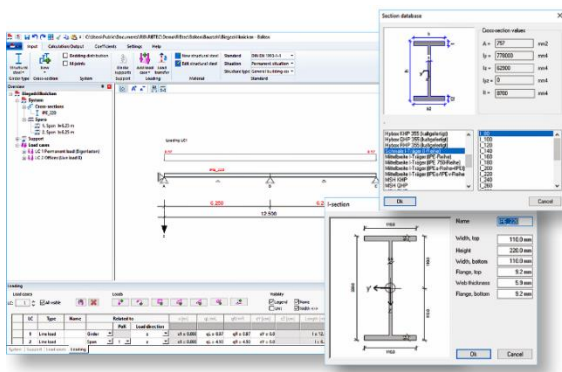
Option Reinforcement for concrete beam

- Display of tensile- and shear-force coverage
- Display of selected reinforcement
- Proposition of a draft for reinforcement

Option - Steel girder

The biaxial structural steel design is possible according to DIN 18800, EN 1993-1 and the corresponding national annexes for DE, AT, SK/CZ and UK. The following tasks can be solved with BALKEN:

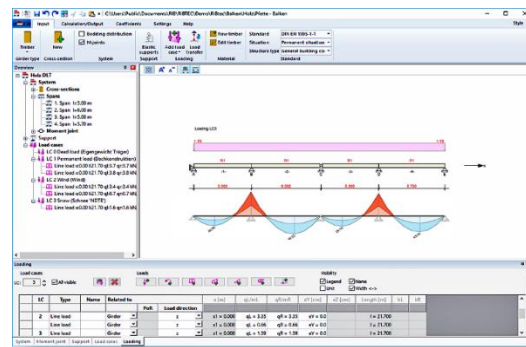
- I-, T-, U-, O- and rectangular sections from the section database as well as symmetrical welded sections
- Constant cross-section gradient per span
- Cross-section classification
- Elastic stress calculation EE due to NM-V-T interaction
- Automatically plastic verifications EP for all typified profiles if utilization of the elastic stress verifications is exceeded
- Lateral torsional buckling for I- and U-sections
- Deformations alternatively for quasi-permanent, frequent and rare combination of actions



Option - Timber girder

The biaxial timber design is possible according to EN 1995-1 and the corresponding national annexes for DE, AT, SK/CZ and UK. The following tasks can be solved with BALKEN:

- Rectangular sections out of softwood, hardwood and glued-laminated timber
- Constant cross-section gradient per span
- Stress and lateral torsional buckling analysis including torsion
- Calculation of the support pressure
- Hot design, respectively, fire protection
- Proof for vibration of timber slabs
- Limitation of the deformations for initial (w_{inst}) and final deformations (w_{fins})



Option - Elastically bedded beam

- Elastic bedding according to the subgrade reaction method with or without tensile failure
- Calculation with failure of bedding: automatic combination formation in the temporary (BS-T/GEO-2) and permanent situation (BS-P/GEO-2/ULS) as well as automatic combination formation for the deformations (SLS) and subsequent nonlinear calculations for the design of structural members with characteristic nonlinear internal forces
- Consideration of a lowering, longitudinal and a torsional bedding
- Arbitrary bedding segments
- Conversion of constrained modulus into subgrade reaction coefficients
- Calculation of the base pressure forces

Configurable Result Output

The result list including graphics can be configured and output for a specific office. In this way, only what is relevant and necessary is displayed. The output control is multi-level. The output of input values, internal forces, deformations etc. can be controlled comprehensively. Short, long and detailed outputs are available for individual specifications. The entire document can be previously checked with a preview function. The list output with the contained graphics can be configured by activating the corresponding markers in the table of contents. It is possible to use filters for tables in order to reduce the content and leave only the most important information. The configuration is available even after the data has been saved and can be used as a template.

The list layout can be adapted in the format and design of the headers and footers and saved as a company or user template. Project information can also be integrated via field functions. With the export to MS Word/Excel, PDF, XPS and VCmaster the documents can be further digitally processed.

