MWX+ / MWM+ / MWK+ / MWP+

Masonry programs

The MW+ applications are general software programs for the verification of walls and piers made of artificial masonry with rectangular cross-sections. For the verification, the following standards are available depending on your licence:

- DIN 1053-1:1996-11 (global safety concept) or
- DIN 1053-100:2007-09 (partial safety concept)
- EN 1996-1-1 and EN 1996-3 in combination with the National Annexes for
  - Germany
  - Austria
  - United Kingdom
  - Czech Republic
  - Netherlands
  - Belgium
- Seismic verifications as per DIN 4149 and/or EN 1998-1 (determination of the permissible earthquake zone)

For the verification, either the simplified or the more accurate calculation method can be used. When applying the simplified calculation method, the software checks compliance with the limits of application. If these limits cannot be met, the more accurate calculation method is available as an alternative.

All effects of actions are entered with their characteristic values and can additionally be configured by assigning them to alternative or concurrency groups.

The load cases and load case combinations are automatically generated from the selected effects of actions and the necessary verifications are performed. For each individual verification, the software checks every load case combination that is theoretically possible to decide whether it could become decisive for this verification.

Comprehensive adjustment options allow you to control in detail the calculation and the output of the structural system, the loads and the results.

Additional features are as follows:

- Detailed material definition
  - Material according to the selected design standard
  - Material database for masonry officially approved by the German Institute for Construction Technology DIBT for the design in accordance with DIN EN 1996 and ÖNORM EN 1996
  - Manufacturer's database for masonry bricks of Wienerberger Ziegelindustrie GmbH Austria in accordance with ÖNORM B 1996
  - User-defined material
- Load transfer and/or transfer of the structural system to the FRILO foundation applications
- The entire structural system and the loads can be entered via the interactive GUI
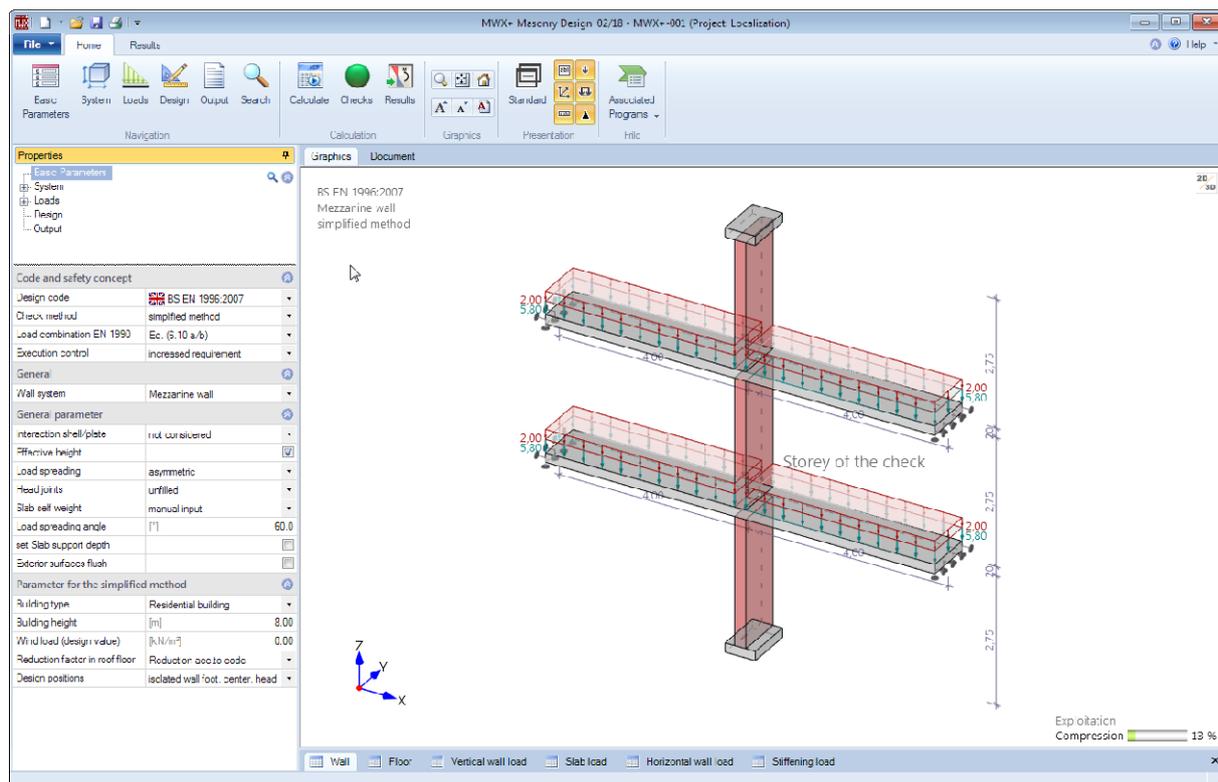
MWX+/MWM+/MWK+

The MWX+ application is suitable for the verification of individual walls. The transition of the global structural system is achieved via corresponding border conditions determined by the connected components (bending stiffness of walls underneath and above the considered wall, supporting conditions of floor slabs on the opposite side of the wall). In addition to individual walls, you can perform calculations of structural systems that consist of basement walls, intermediate storey walls and top storey walls.

Moreover, MWX+ allows you to analyse bracing diaphragms loaded by diaphragm-related shear.

MWM+ is a calculation software for structural stability verifications of multi-storey walls. The calculation also includes stability verifications of basement walls and the determination of the lateral earth pressure in standard cases if earth pressure applies.

The MWK+ application is suitable for structural safety analyses of basement walls loaded by lateral earth pressure. A main feature of the software is the comprehensive calculation of lateral earth pressure acting on the basement wall. You can select among the structural systems of an individual wall and a basement wall with a storey on top. In this case, it is always assumed that the wall to be verified is covered on its total top surface by a solid floor and supports it.

You can define storey floors as being supported either on the left, on the right or on both sides. In addition, cantilevered floor slabs (for balconies) are definable. In this case, it is always assumed that the wall to be verified is covered on its total top surface by a solid floor slab and supports it. Alternatively, you can define a ring beam for bracing purposes.

The masonry wall to be verified can be loaded by vertical effects of actions resulting from

- vertical wall loads from storeys above
- concentrated loads applying at a freely definable height
- floor loads
- line loads on floors

as well as to horizontal effects of actions resulting from

- wall loads perpendicular to the wall plane
- lateral earth pressure perpendicular to the wall plane (MWM+/MWK+)
- bracing loads parallel to the wall plane (MWX+)

MWP+

The MWP+ application is suitable for the verification of masonry piers, i.e. bar-shaped components with a rectangular cross section that are mainly loaded by compression under systematic uniaxial and biaxial bending.

You can apply the simplified calculation method in the analysis of piers under a systematic centric loading. If other loading conditions apply, the analysis must be based on the more accurate calculation method. If applicable, a biaxial eccentricity is taken into consideration for the analysis.

You can select whether the masonry pier should be a

- cantilever column
- hinged column
- restrained column

in the calculation. The supporting conditions are specified separately for the two main axes in this calculation.

The masonry pier to be verified can be loaded by

- centric or eccentric vertical concentrated loads at its top

and/or

- uniformly distributed horizontal loads,
- concentrated horizontal loads or
- horizontal trapezoidal loads.
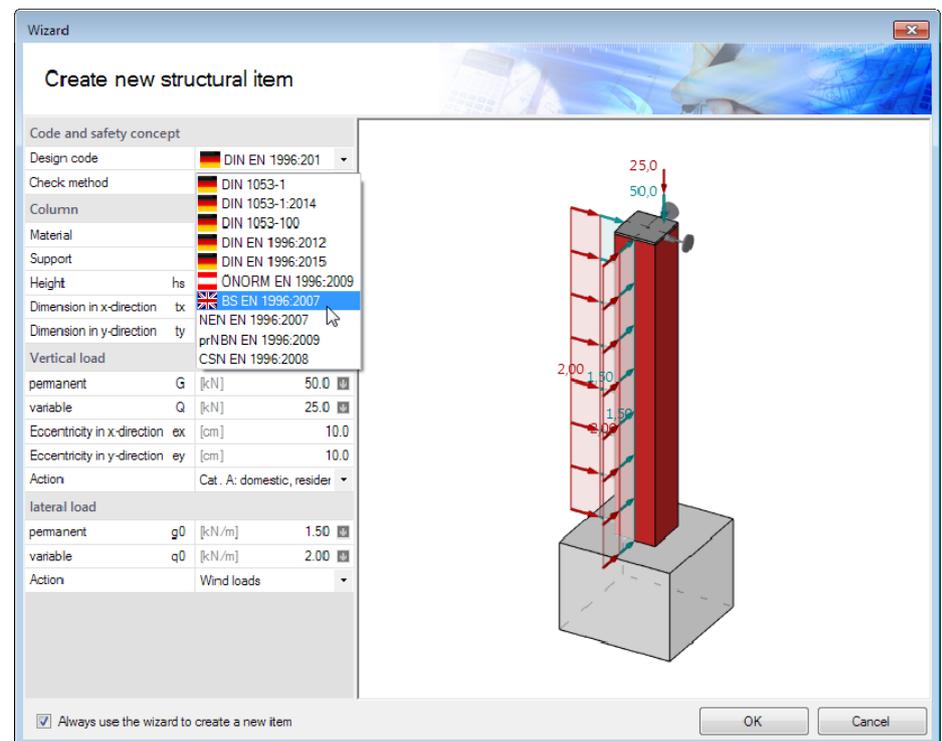
The **wizard** is launched automatically when you start the application program. You can enter quickly the most important key figures of the system. These values can be edited subsequently in the definition area or on the interactive graphic screen.