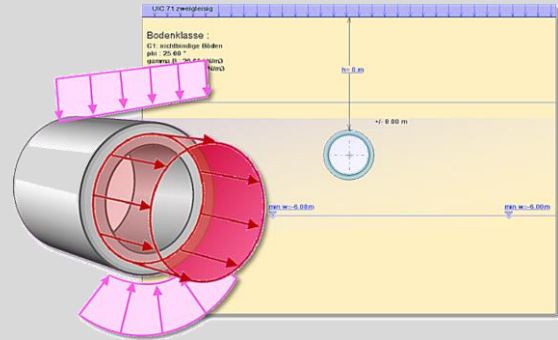


RTjpipe

11.10.302 Jacking pipes

Jacking pipes according to ATV-A 161 and DWA-A 161

- Clear graphical input with optimal control of all changes
- Consideration of soft soils, rock and the transition between both soil types
- Reliable processing of different pipe systems, pipe types as well as different load and arrangement cases
- For pipes made of concrete, reinforced concrete, fibre and asbestos cement, stoneware, steel, cast iron & UPGF
- Design according to DIN 1045-1, EN 1992-1 and corresponding national annexes for DE, AT, SK/CZ & UK
- Comprehensive output of results with free configuration of lists and graphics

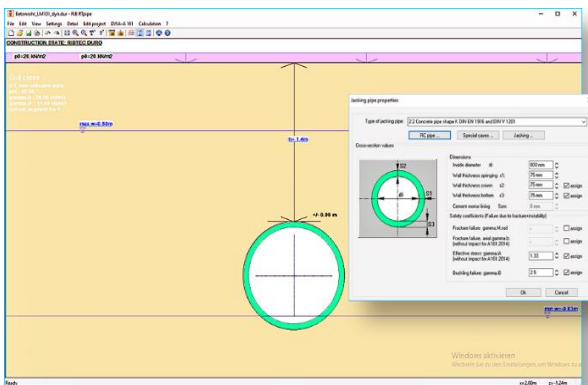


RTjpipe has a work environment oriented to objects and graphics for the design of circular pipes, which can be rigid or flexible and are installed by jacking. This analysis takes into account the current regulations for various pipe materials. The results are displayed clearly and comprehensibly.



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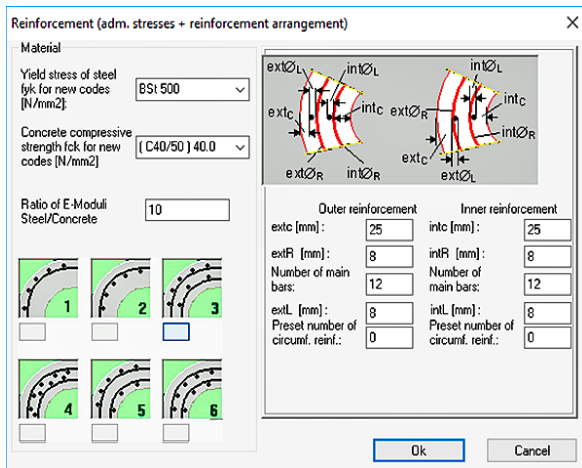


RTjpipe Features

The Windows® programme has an object- and graphic-oriented working environment and can be used for the calculation of circular pipes laid in the jacking method according to working sheet ATV- A 161 resp. DWA-A 161. The jacking pipes are treated as circular, rigid resp. flexible pipes. Possible materials are plain concrete, reinforced concrete, fibre and asbestos cement, stoneware, steel, cast iron and und UP-GF. The proofs consider the requirements according to the guideline ATV 161A as well as the new DWA-A 161. Furthermore, the application supports the following calculation options:

- analysis for soil and rock material with different angles of the support, if required under consideration of the transition between soil and rock material during the jacking of the pipe
- consideration of soil parameters with respect to the bulk density resp. soil consistency
- proof for lower limiting values of wall thickness/ratio of arc radius with respect to the type of pipe cross section
- consideration of traffic loads according to ATV A161 or DWA-A 161 for regular vehicles, railway traffic and design air planes
- calculation of the bulk loads depending on concrete cover and pipe diameter
- consideration of soil stresses from dead load resulting from permanent and non-permanent effects
- design for minimum stress resultants for all pipe materials resp. evaluation of minimum of required reinforcement for rc-pipes
- design of the reinforced concrete pipes optionally according to DIN 1045, DIN 1045-1, EN 1992-1 and according to national annexes for DE, AT, SK/CZ & UK optionally for normal or high-performance concrete
- single- or double-layer formation of the reinforcement

Product Information

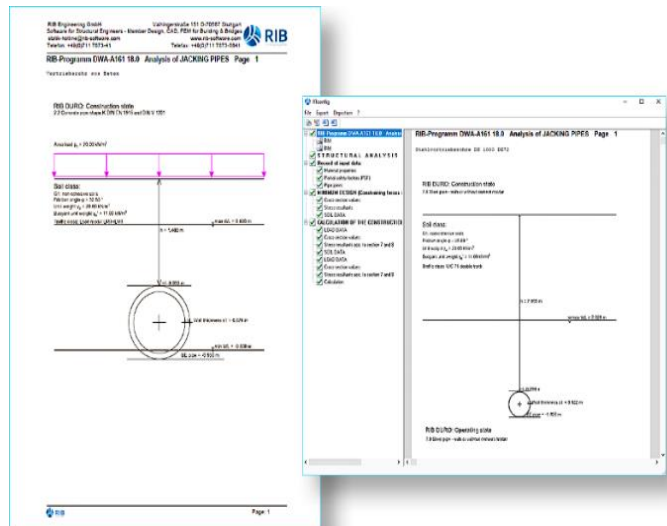


- fatigue analysis for calculated stresses in cracked state with $2 \cdot 10^6$ load cycles according to ATV A161 for live loads of vehicles and design loads of air planes as well as 10^8 load cycles for railway loads. Alternatively, user defined load cycles can be defined including crash factors and horizontal earth pressure due to permanent effects.
- consideration of DIN EN 1916, DIN V 1201 and 1202 also for plain concrete pipes including fatigue design and evaluation of load carrying capacity
- classification of reinforced concrete pipes according to the required European standards with calculation of the equivalent apex pressure force and the required load class LC
- proof of allowable strains for UP-GF pipes according to DWA-A 161
- proof of transverse stability according to ATV-DWVK-A127 for flexible pipes
- proof of allowable displacements for flexible pipes according to DWA-A 161
- buckling analysis in longitudinal direction for steel pipes during the construction stage according to DWA-A161
- design analysis in in longitudinal direction with consideration of the interconnection of pipes with up to 3 compression rings for each pipe sector
- consideration of straight and curved axis of pipeline including the analysis of the permissible axial stress dependant on the modulus of elasticity of the pipe material, the cross section of the pipe, the properties of the compression rings and the trace geometry
- rough calculation of the steel weight of circular and longitudinal reinforcement per meter
- clearly arranged and comprehensive short and detailed report of results

The design of the jacking pipes is performed for different stresses in the construction and the service state as well as for a minimum design for the collection of possible constraint. The maximum values of the three design stages are essential for the following analyses. The stress analyses with jacking pipes are both performed in longitudinal direction and transverse to the pipe axis. If required, the fatigue analysis is performed as well. The result document contains placing hints, soil parameters, stress resultants and stress analyses in the three design states transverse to the pipe axis; the pressure stresses in longitudinal direction as well as a diagram of the permissible jacking forces depending on the gapping joint and the permissible normal pressure stress.

Comprehensive documentation

In RTjpipe, the safety coefficients against failure due to breakage and instability are differentiated and the verification is carried out in two safety classes. The load distribution around the pipe circumference depends on the support design, the backfilling and the deformation behaviour of the pipes. Admissible support reaction angles vary from 30 to 180 degrees. Cases I to III of the ATV/DWA are available. For pipes made of polyester and plastic, the strains are verified, for other types of pipes the stresses and additionally also the strains are verified.



The result document contains installation information, soil parameters, internal forces and stress analyses in the 3 design states transverse to the pipe axis; the compressive stresses in longitudinal direction, as well as a diagram of the permissible pre-pressing forces as a function of the gapping joint and the admissible longitudinal compressive stress. Before printing, the result list can be configured. In an overview dialog, all desired results including graphics can be compiled, printed or exported to MS-Word.