

Release notes

D-Geo Pipeline 18.2.2.20951

11-06-2018

New feature

MDR-1130 In the *Factors* window for HDD and Micro Tunneling, a new input called "*Ratio H/Do boundary shallow/deep*" is available and used to determine the boundary between shallow and deep pipe. This boundary is used for the calculation of the modulus of subgrade reaction and the ultimate horizontal bearing capacity.

Fixed bugs

MDR-1125 In version 18.2.1 (only), the boundary between shallow and deep situation was automatically determined using the value of the passive soil stress: if the maximum passive stress was reached, the pipe was considered as deep. However it seems that this criterion is not always relevant and that a deep pipe can be considered as shallow pipe, which leads to unrealistic high values for the modulus of subgrade reaction. This is now solved by using as criterion: "pipe is deep if $H > 7.5 D_o$ ", where H is the soil cover above the pipe and D_o the outer diameter of the pipe. The value 7.5 can be eventually changed by the user in the *Factors* window (Known Issue).

MDR-1131 As a consequence of the previous issue (MDR-1125), the maximum value of the modulus of subgrade reaction used during the Stress Analysis was too high and led therefore to unrealistic values of the pulling forces. This is now solved by using only the verticals in deep situation for the determination of the maximum values of all verticals (Known Issue).

MDR-1126 In version 18.2.1 (only), for the calculation of the pulling forces, the contingency factors on borehole radius and on modulus of subgrade reaction were not included leading to under-estimated values. This is now solved (Known Issue).

MDR-1109 In version 18.2.1 (only), for *HDD Special Stress Analysis per Vertical*, the modulus of subgrade reaction $k_{v,max}$ used for the stress analysis was including safety factor but should be excluding safety factor.

MDR-1110 In version 18.2.1 (only), for HDD, the load factor on traffic load was applied twice on the calculated traffic load.

Limitation

MDR-1128 The ultimate vertical bearing capacity in undrained situation is not displayed anymore in the *Report* (but only in the dumpfile *.drd); only the ultimate vertical bearing capacity in drained situation is displayed in the *Report*.

User manual

MDR-1124 In paragraphs 4.7.1.1 and 4.7.1.2 describing the *Factors* window for HDD and Micro Tunneling, the new input parameter “*Ratio H/Do boundary shallow/deep*” is described and all the tutorials were updated with the newly calculated results.

Verification report

MDR-1129 The results of the benchmarks (expected and calculated) are updated.

New features

- | | |
|----------------------|---|
| MDR-963 | For HDD, in the <i>Materials</i> window, a soil material from Table 2.b of Eurocode NEN 9997-1:2016 can be automatically added, with low and high values for all the parameters. Low values are used for drilling fluid pressures calculation and for settlement calculation whereas high values are used for the soil mechanical data. Moreover, the Young's modulus (at the top and bottom of the layer) can be either user-defined or automatically calculated by the program using the normalized Young's modulus E100 from Table 2.b of Eurocode NEN 9997-1:2016. When the normalized modulus E100 is used, the results of the calculated Young's modulus at the top and the bottom of each layer are given in the report, in section "Soil Mechanical Parameters", for each vertical. |
| MDR-1011 | For HDD, the content of the <i>Factors</i> window has been changed. The same safety factors are applied for both steel and PE pipes, but the default values are different. |
| MDR-956 &
MDR-965 | In the <i>Engineering Data</i> window, two extra features are available for construction in trench: <ul style="list-style-type: none"> • The constant f_m used for the passive vertical stress calculation can be determined using three different methods: a fixed value of 0.3, a value depending on the filling soil type or depending on the width of the trench. • The soil type (used for the calculation of the vertical modulus of sub-grade reaction downward) can either be user-defined or automatically determined. |

Limitation

- | | |
|-------------|---|
| MGEOLIB-854 | Input files created with versions older than MDrill 5.1 (MDrill is the predecessor of D-Geo Pipeline) are no longer supported. Old files can be opened and converted to a newer format using version 16.1 of the program. |
|-------------|---|

Fixed bugs

MDR-1011	In the <i>Factors</i> window for HDD, the default value of the contingency factor on modulus of subgrade reaction has been changed to 2 (was 1.6) as prescribed in Table B.3 of NEN 3650-1. Moreover, the default value of the contingency factor on bending moment for steel has been changed to 1.4 (was 1.16), which corresponds to the overall factor f_k prescribed in paragraph E.1.3 of NEN 3650-1 (Known Issue).
MDR-792	The axial stress due to temperature variation is now used in Load Combination 4.
MDR-904	For a Strength Analysis per vertical, only the results of the first vertical were displayed in the report. This has been solved.
MDR-958	The calculation of the initial (actual) vertical stress for construction in trench has been corrected: for kv;bottom, the minimum value between kv;1 and kv;2 is used instead of always kv;1.
MDR-962	The contingency factor "Soil Load Qn" has been removed. Only a load factor is applied to the reduced neutral soil load Qn;r, with a default value of 1.5 for both PE and steel, as prescribed in Table B.3 of NEN 3650-1.
MDR-974	For the calculation of the maximum mud pressure, H in formula $R_{p,max} = 0.5H$ now represents the soil cover (above the pipe) instead of the soil depth down to the center of the pipe.
MDR-976	The calculation of the vertical bearing capacity is now performed according to article C.4.4.2 of NEN 3650-1:2012. Both drained and undrained situations are calculated.
MDR-981	For the calculation of the pulling forces (HDD), no safety factors are applied.
MDR-1004	For the calculation of the maximum mud pressure in an undrained layer, the "safety factor cover undrained layer" inputted in the <i>Default</i> window is now used, instead of a fixed value of 0.5.
MDR-1062	The calculation of the deflection (HDD) is corrected by using the formula prescribed in paragraph D.4.2 case 5 of NEN 3650-1:2012.
MDR-1082	For the calculation of parameter Lambda in the HDD Stress Analysis, the vertical modulus of subgrade reaction including safety factors (on E and k_v) is no longer used, but replaced by the vertical modulus of subgrade reaction without safety factor, multiplied by the contingency factor on k_v .

Improvements

MDR-800	In <i>Pipeline Configuration</i> for drilling techniques, the number of decimals for the angles has been increased to 4 (was 2) for a more accurate design.
MDR-939	The name of the parameters in the Boundaries selection window has been improved.
MDR-959 & MDR-982	The calculation of the horizontal bearing capacity for drilling techniques has been improved: a distinction is made between shallow and deep situations.

MDR-958	For the calculation of the the actual vertical stress, a warning message is displayed if the trench width is less than 1.5 D_o or more then 3 D_o , because in those cases the formula used by the program is not valid.
MDR-975 & MDR-972	For the calculation of the passive vertical stress and the vertical modulus of subgrade reaction for drilling techniques, a distinction is made between deep and shallow situations: if the maximum passive stress is reached during the calculation of the passive stress, the pipe is considered as deep.
MDR-986	In the Drilling Fluid Data window, the number of decimals for the annular back flow rates has been increased to 4.
MDR-1019	For Construction in trench, the shallow situation is assumed for the calculation of the passive vertical stress and neutral reduced vertical stress. If a trench is deep, a warning is displayed.
MDR-1030 & MDR-1031	For <i>Special Stress Analysis</i> (HDD), the user-defined parameters are applied without safety factors and the traffic load is defined separately from the soil stress.
MDR-1033	The warning about the allowable minimum radius has been improved by indicating for which bending the criteria are not met.
MDR-1063	In the paragraph " <i>Soil Mechanical Data</i> " in the report, the symbol and name of the stress parameters have been improved.
MDR-1090	When opening the <i>Operation Parameters Plots</i> , not all the lines in a graph were visible, an extended zoom was needed. This has been solved.
MGEOLIB-890	In the report the version that made the calculation is displayed, as well as the program version that created the report.
MGEOLIB-894	In the table for input of PL-Lines per layer, a column was added with the name of the material.

User manual

MDR-769	The formula for the deflection has been corrected (paragraph 23.7).
MDR-910	The formula describing the occurrence of uplift for micro tunneling is improved (paragraph 24.2)
MDR-945 & MDR-1083	All the tutorials were updated with the newly calculated results.
MDR-958	A note has been added in paragraph 21.4 explaining that the formula used for the calculation of the the actual vertical stress is valid only for a trench width between 1.5 D_o and 3 D_o . Outside this interval, a warning message is displayed.
MDR-971	The expression "soil load" has been replaced by "soil stress" in all cases referring to a stress.
MDR-977	In the background section, in paragraph 21.7.1, a note was added explaining the origin of the formula used for the calculation of the horizontal modulus of subgrade reaction for drilling technique.
MDR-978	A reference to article C.4.3.4.1 of NEN 3650-1:2012 has been added to explain the formula used for the calculation of the horizontal modulus of subgrade reaction for construction in trench.

- MDR-980 A reference to Table B.3 of NEN 3650-1:2012 was added to explain the default value of the contingency factor on the vertical modulus of subgrade reaction k_v .
- MDR-1064 The following paragraphs have been updated due to a new layout of the input windows:
- Paragraph 4.2.1 describing the *Materials* window
 - Paragraph 4.4.1 describing the *Boundaries Selection* window
 - Paragraph 4.6.3.3 describing the *Engineering Data* window for Construction in trench
 - Paragraph 4.7.1.1 describing the *Factors* window for HDD
 - Paragraph 4.7.2 describing the *Special Stress Analysis* window
- MDR-1089 All the pictures displaying a D-Geo Pipeline window were updated.

Verification report

- MDR-957 The results of the benchmarks (expected and calculated) are updated.