December 1, 2021

How to install the posted update?

Replace your earlier version of MSEW+.exe with the one included in this download. After downloading and unzipping the posted update, you can use File Explorer to copy and paste the executable file. The default directory of MSEW installation where MSEW+.exe is residing:

C:\Program Files (x86)\ADAMA\MSEW+

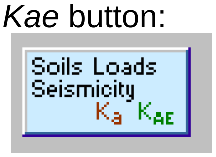
List of Changes in each Update:

Update 2022.01 (2021-12-01): FHWA has released report FHWA-HIN-21-002 providing a framework for using local reinforced backfill. It suggests a modification for sliding resistance factors as a function of amount of fines when this amount is greater than AASHTO's limitation of max 15%. The option of larger amount of fines is now available in MSEW+ (LRFD mode, Simplified AASHTO method) when considering the factors for external stability. To enable access to FHWA-HIN-21-002 from within the program, download this manual at https://geoprograms.com/downloads-adama/ , Miscellaneous Downloads, and paste it in the same directory where MSEW+ is residing, typically in C:\Program Files (x86)\ADAMA\MSEW+\ as FHWA-HIN-21-002.pdf. Note that FHWA-HIN-21-002, MSE-LASR, provides guidelines for extending the Simplified Method; the added option in MSEW+ is just one element in the design process. Use of high amount of fines in design requires consideration of the MSE-LASR manual in its entirety.

Update 2021.20 (2021-10-10): The updates below are *applicable only* to AASHTO 2017-2020 including Stiffness Method. In external stability, static and seismic, the following modifications were made:

1. Ka and Kae are calculated using ω=0 (zero 'batter'). This may have an impact for walls with ω≥10º as the lateral earth pressure coefficients might be greater now. The logic for this change is explained in MSEW in relevant dialogues called by click of buttons. This approach is consistent with 2-part wedge (Coulomb's LE), a viable option in MSEW that is particularly useful when actual broken backslope is considered instead of infinite backslope. However, to be consistent with MSEW(3.0), the user can select to use the actual ω to calculate Ka (note that Kae has always been calculated using ω=0 in M-O equation for infinite backslope).
2. When Coulomb wedge is selected to assess Ka and Kae, these numerically-derived values now are used in external stability. In previous updates, Ka from closed-form solution for infinite slope was used while Kae based on Coulomb wedge was used. For near vertical walls, Ka in previous editions of MSEW+ might be somewhat larger, depending on the broken backslope geometry.

3. **Summary:** Now you have several options to invoke Ka and Kae in *external stability*:
    a. Use the closed-form expression for infinite backslope – you can choose backslope angle β or equivalent backslope angle I for this infinite slope. A button in MSEW explains angle I – it was suggested by FHWA and older AASHTO editions as an equivalent infinite backslope providing a simplified alternative to actual use of broken backslope which requires a numerical process.
    b. Use Coulomb wedge (LE analysis for planar surface of limited extent) to numerically render the values. This approach is useful for broken backslope and/or when it is not feasible for the active wedge in the retained soil to be deep due to stratigraphy (e.g., high seismicity may require deep critical wedge which often is not physically feasible).
    c. Specify your own values of Ka and Kae. This option is particularly useful if the retained soil has high long-term cohesion value (e.g., rock or native cemented soil) thus exerting little lateral pressure. Alternatively, if the retained soil is made up of layers (for which Coulomb option in *a* or *b* is not valid), you may use a more complex LE approach than Coulomb to find the Pa and Pae for Fs=1.0 and then configure the corresponding Ka and Kae suitable for your problem so that external stability could be assessed following AASHTO procedure for MSE walls. Note that (AASHTO suggests the GLE approach which implies LE analysis, preferably rigorous, with general shaped slip surface.
4. You can realize the changes in MSEW+ by selecting Seismicity in input data; you can also specify your desired selection for strictly static problems by going to Soils in input menu and then selecting *external stability* options. The actual Ka and Kae values as well as Coulomb wedges (should this option be selected) can be seen in Results when clicking on *Soil, Loads, Seismicity, Ka, Kae* button:

    Several notes, activated by clicking on relevant buttons, were added for clarity (in Input Data menu, in Seismicity or in Soils then selecting the External Stability options), explaining the approach used.
5. MSEW+ has the option to specify seismic coefficient Kh that is adjusted for allowable displacement – an empirically-based value as suggested in AASHTO Article 11.6.5.1 or as suggested in Appendix A.11.5.1. Your selected option for Kh now is stated in the report as well as in the window in results, accessed through Soils, Loads, Seismicity, Ka, Kae button.

Update 2021.14 (2021-07-30): When inputting data for bearing capacity in Imperial Units considering a sloping toe, the displayed Ns is erroneous. However, it is correct in SI Units. It does not affect the bearing capacity calculations and results, either in Imperial or SI Units. The displayed Ns in the input data screen have been corrected.

Update 2021.13 (2021-03-30): When placing an *embedded* footing in the reinforced soil zone (i.e., footing located below upper reinforcement layers), the embedment depth was ignored in calculating eccentricity. While this has no effects on eccentricity calculated below the footing, it would typically result in larger eccentricity along layers above the embedded footing. This has been corrected in update 2021.13.

Update 2021.12 (2021-02-14): A calculator to assess the facing stiffness factor, Φ_{fs}, factor has been added – see Stiffness Method, Internal Stability LR Factors.

Update 2021.11 (2021-02-01): When calculating the factored connection capacity for extensible reinforcement in Simplified AASHTO (2017-2020), MSEW+ used a reduction factor for durability, RFd, which is likely higher than the specified value. Consequently, the computed long-term CDR for the connection was smaller than should be. The connection values were corrected in Analysis and Design Modes.

Update 2021.10 (2021-01-24): The Coherent Gravity Analysis (CGA) was modified to include two options. Option A is the same as currently implemented [i.e., vertical force component of resultant lateral earth pressure on the reinforced mass, F_T sin(δ), is ignored in calculating R and, subsequently, σ_v, while it is considered in calculating eccentricity, e]. Option B considers rigorously all force components. In addition, Kr(Z) distribution (K_o at Z=0 varies linearly to Ka at Z=6 m) in Option B starts at the soil surface whereas in Option A it starts at the elevation of the top of the wall. Therefore, for horizontal crest Kr distribution is the same. The updated program includes detailed explanation and tips.

Update 2020.21 (2020-12-20): In Strength results of the Coherent Gravity Method, a column was added to the displayed table showing the eccentricity associated with the calculations of T_{max} at each reinforcement level. This eccentricity considers the factored loads within the reinforced zone.

Update 2020.2 (2020-11-25): When surcharge load is specified, CDR in Strength (AASHTO 2017-2020 Simplified) was inaccurate; this bug has been fixed. A simple, uniform format of all tables was implemented. Printout of some data was corrected/modified.