MACSTARS W

FREQUENTLY ASKED QUESTIONS

MACCAFERRI

FAQ Frequently Asked Questions

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FAQ 1 - IS THERE A DESCRIPTION OF THE ERROR MESSAGES?

Yes. The main error classes are shown in the following table:

CODE	DESCRIPTION	CORRECTIONS
1507	The gabions' facing has been input with an angle different from 0	Check the gabion external face inclination
2005	The ground surface boundaries are not continuously connected	Check whether you have input a continuous soil profile (see also FAQ 5)
2006	The required subsurface boundary order is unsatisfied for the boundaries indicated	Check the input soil profile and try to simplify
2502	The number of points to define the water surface exceeds 40	Redefine the problem so fewer points are used
4005	The distributed loads are overlapped	Redefine the abscissas of the surcharge loads to avoid overlappings
4502	The number of soil types exceeds 20	Redefine the problem so fewer soils are used
6506	The longitudinal spacing between tiebacks must be greater than or equal to 1 m (or 3.28 ft if using American units)	Increase the longitudinal spacing
7502	The total number of reinforcements cannot exceed 200	Reduce the number of reinforcements

If you get other message errors contact the Maccaferri Technical Department

FAQ 2 - HOW TO CUSTOMIZE THE REPORT?

The reports of MACSTARS W may be generated in different languages and have been written trying to obtain a generally acceptable standard.
If, for any reason, you want to modify the report (i.e. to modify the disclaimer…), here are the instructions on how to do it.

1. Go to the \LANGUAGE directory of Macstars W
2. Go to the language whose report you want to modify, for example LANGUAGE\ENGLISH
3. Open the file which is used to generate the report. In our case the file to open are LANGUAGE\ENGLISH\REPORT.DOC
4. Make the modification you want (translations, editing, etc) but ***pay attention not to touch any text string between # nor to modify the editing!***

```
Sliding Safety Factor .....................     : ##
Max overturning moment ................ [#M#]    : ##
Class of the moment ........ : ##
Overturning Safety Factor...................     : ##
Max foundation pressure................ [#P#]    : ##
Class of pressure .......... : ##
Bearing Safety Factor......................      : ##
                            Block : ##
                            ## - ## - ##
          Ratio: Tensile load/Tensile Strength
     Y [#L#]          Fmax        Fs= ##              Fs=1.
##
                            Block  : ##
                            ## - ## - ##
               Ratio: Tensile load/Tensile Strength
               Y [#L#]                    Fmax
##
   Multiplier      Class
##
-------------------------------------------------------------------------
     Maccaferri assumes no responsabilities for the drawings and calculations it
provides, as they must be intended as general indications to suggest the proper use
                            of its products.
-------------------------------------------------------------------------
```

5. Save and exit
6. Run MACSTARS W and check the results

NOTE:
The same procedure can be adopted also for customising the texts in drawing sketch: in this case you have to do:
    1-2   As before, then
    3.   Open the file ENGLISH.TXT
    4-6   As before

**FAQ 3 - IN A SIMMETRIC BLOCK WITH OVERLAPPING REINFORCEMENTS, DOES MACSTARS W CUT THE UNITS?**

No. In case the reinforcements are overlapped, MACSTARS W makes the calculation by considering the total length of the reinforcements, even though the drawing looks like the reinforcements have been cut (see figure).

In the overlapping zone, the interaction parameters reinforcement-reinforcement (at their interface) and those reinforcement-soil (at the contact with soil) are considered.
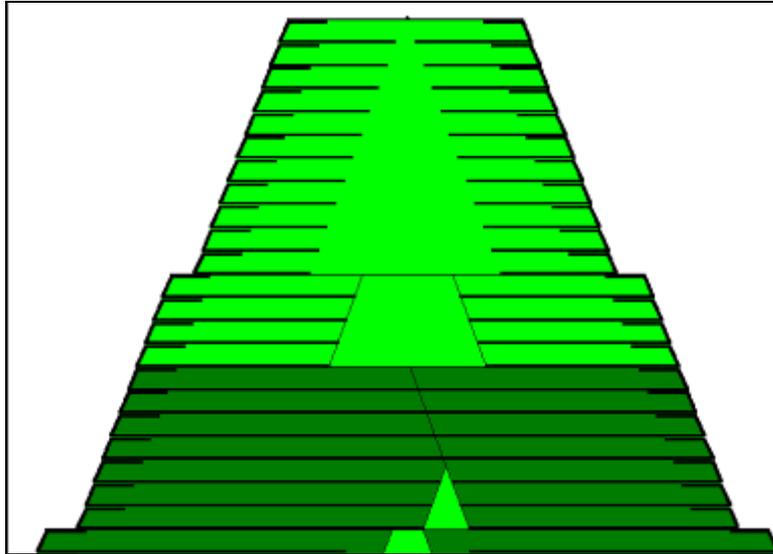
FAQ 4 - FOR A BLOCK LYING OVER A FOUNDATION SOIL, WHICH SOIL IS CONSIDERED BY MACSTARS W FOR THE SOIL-REINFORCEMENT FRICTION?

- *-* For the global stability analysis MACSTARS W takes into account the characteristics of the soil used as structural embankment. This assumption corresponds to the installation of the first reinforcing layer unit over a thin layer of soil similar to the structural embankment's one.

- *-* For the direct sliding analysis MACSTARS W uses the parameters (friction angle and cohesion) input by the user.
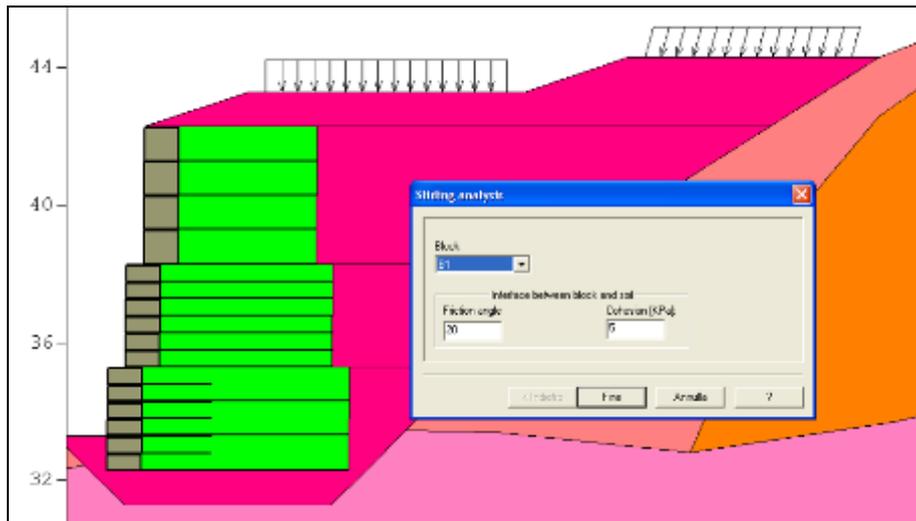
FAQ 5 - WHAT DO I HAVE TO DO TO CORRECTLY INSERT THE SOIL PROFILES?

A - Intersection

The program calculates automatically the intersection points, but notwithstanding the efficiency of the algorithm, some mistakes may occur, due to the inevitable rounding off made by the solver.

For this reason it is better to input geometries with intersection points. Let's consider the geometry of the following picture:

P_1 belongs to the line O_1O_2
P_3 belongs to the line O_2O_3
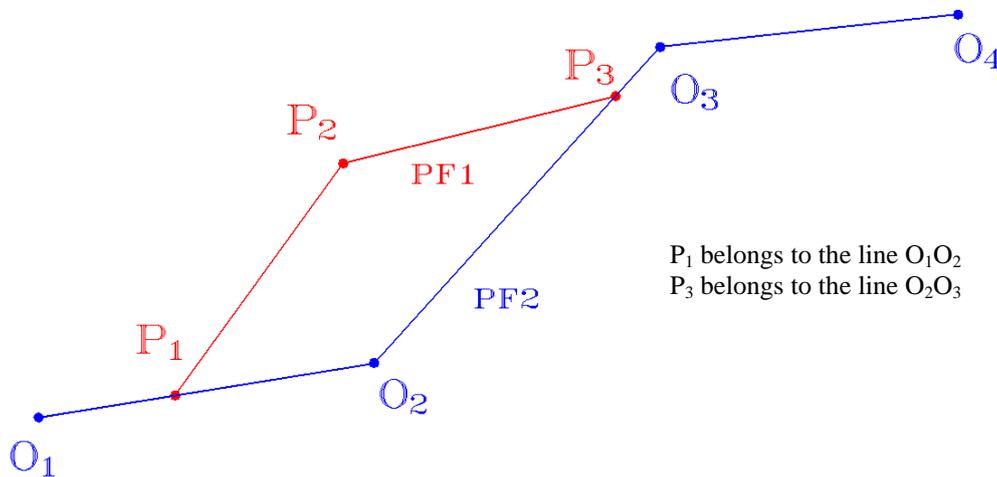
This geometry could be represented through two polygonals PF1: (P1 – P2 – P3) and PF2: (O1 – O2 – O3 – O4)

To avoid possible numerical imprecision, which could, in particular cases, generate some error message, it is better to represent the geometry with the two polygonals PF1: (P1 – P2 – P3) and PF2: (O1 – P1 – O2 – P2 – O3 – O4)

B – Polygonal with vertical stretches

The representation of a perfectly vertical stretch is not admitted. This fact is common to all the softwares relevant to the slope stability analysis and doesn't represent any particular limitation. In fact it is enough to input the co-ordinates with a little numerical difference (not smaller than 0.01 m to avoid convergency problems to the software), to avoid the obstacle without causing mistakes in the results. The figure shows a practical example
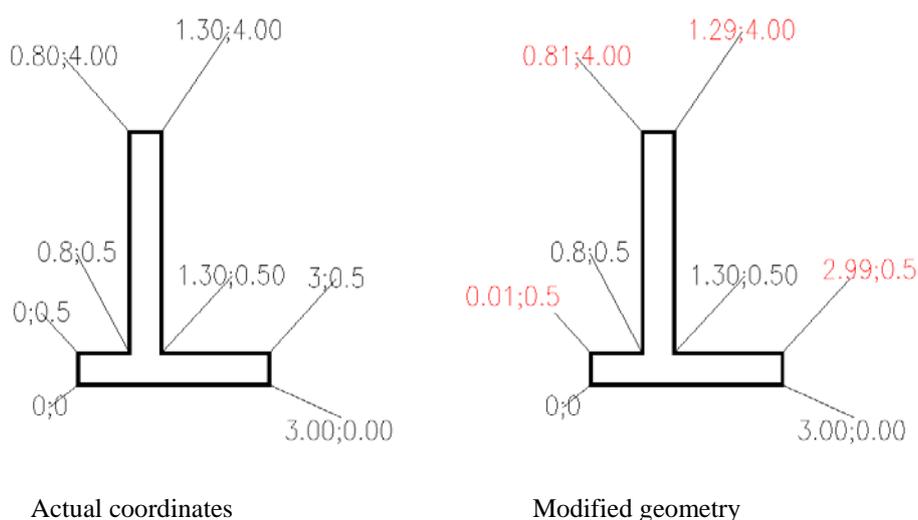
Actual coordinates   Modified geometry

C - Back to back wall

Macstars W copes with the entities "Layers" and "Blocks" with the following logic:

- Where a block lays upon the soil stratification, the structural embankment is kept, that is the part of natural soil, which intersect the block, is deleted;

- Where there is an empty area between block and stratification, this will be filled with the backfill specified in the block's properties.

This layout permits to represent the geometry as it is and to modify the geometry of the section due to the introduction of structures in reinforced soil through the various options of the Block (without acting on the natural stratigraphy).

In case it is necessary to represent a very complex geometry, it is not always possible to go on with this logic. One of such a case of structures is the "Back to back wall" of non-symmetrical type, or geometrically symmetric but with reinforcement characteristics different on each side (see figures):
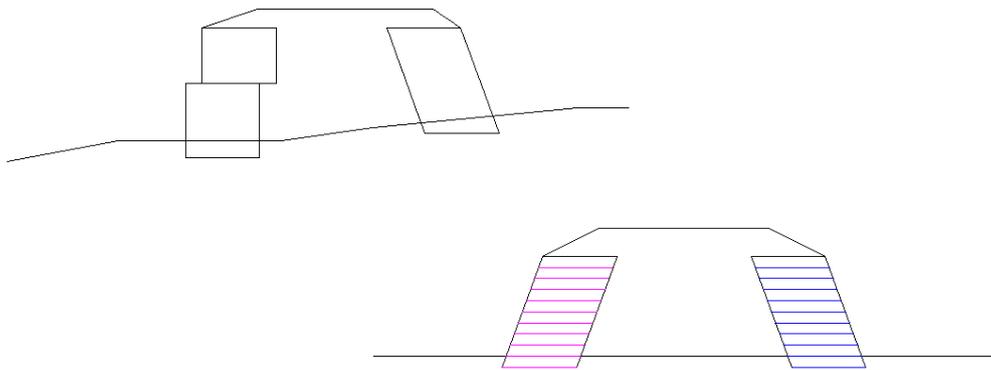
In these cases it is not possible to use the symmetric block, but the structure must be modelled with ordinary blocks, properly orienting them through the option "Hill side".

Remembering that the block input operation on the stratigraphical profile generates a soil (the backfill) up to intercept the natural profile, it is clear the necessity to pre-input a false natural profile, so that the right and also the left blocks could intercept it, thus creating the filling soil.

It is clear that the wedge of fictitious soil, introduced as a limit for the Backfill Soils of the two blocks, must be of the same type of the one defined as 'Backfill' for the blocks. Moreover, for the wedge it is better to use a profile that permits to modify the blocks without too many problems, that is the thinner the better. In this way, during the checks, the possible modification of the blocks' dimension will not require the correction of the whole geometry.
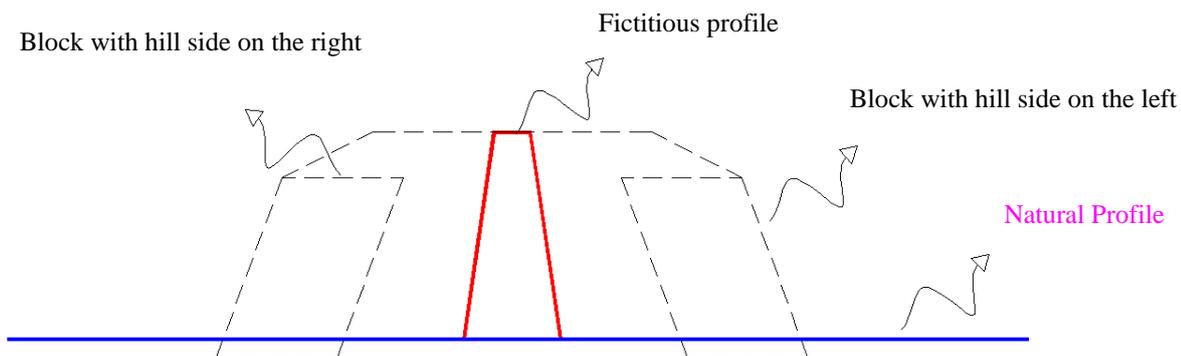
FAQ 6 - HOW TO REHABILITATE AN EXPIRED HARDWARE LOCK?

By picking on ? on the main Menu the user can select the option *About Macstars*
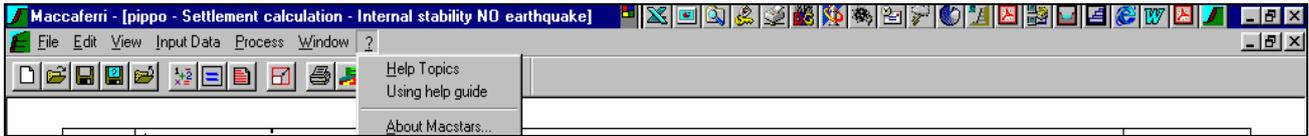
which allows the user to enter the window which provides all the information relevant to the program and the licensee. The dialog window shows the program version, the expiry date of the key, and the name of the registered company.
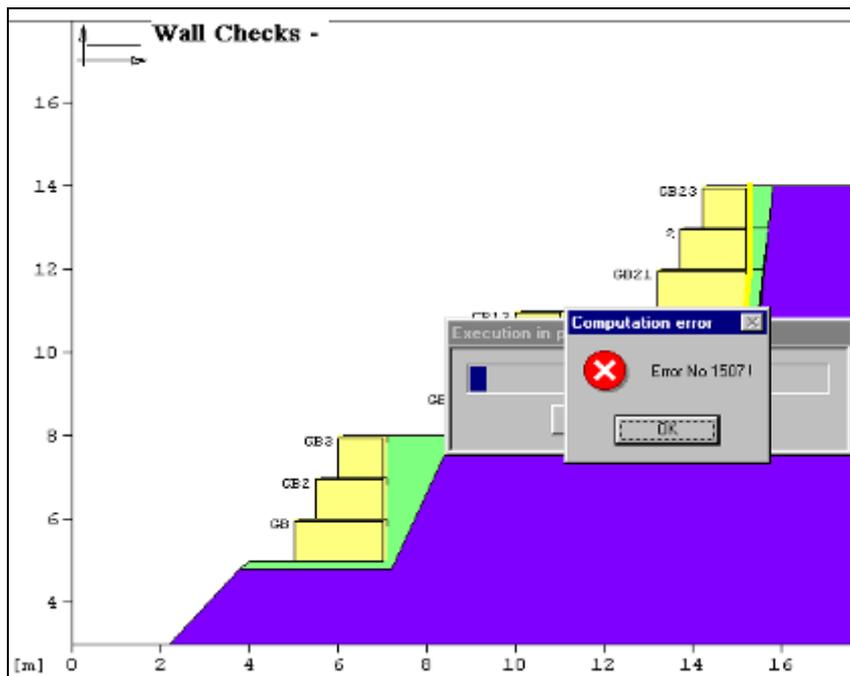

In case the licence is expired please contact OM to get the Rehabilitation code, then double click with the left button of the mouse on the expiring date field and type in the rehabilitation code in the new box
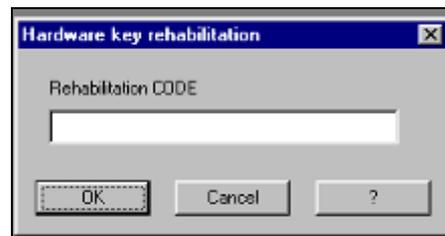
Then click on the OK button and Macstars W will be working

FAQ 7 -I CREATED A GABION STRUCTURE BUT I GET AN ERRORE MESSAGE No 1507. WHAT DOES IT MEAN?

If this is the screen window you get, the problem should be related to the gabions' External face inclination, which must be set to 0 as Macstars W only deals with vertical gabions facing.
By setting the face inclination to 0 and saving, the problem will be solved.

FAQ 8 - WHY DO I GET A DISCONTINUITY ERROR MESSAGE WHEN MODELING A SIMMETRIC STRUCTURE?

The problem may appear is shown at the following figure:
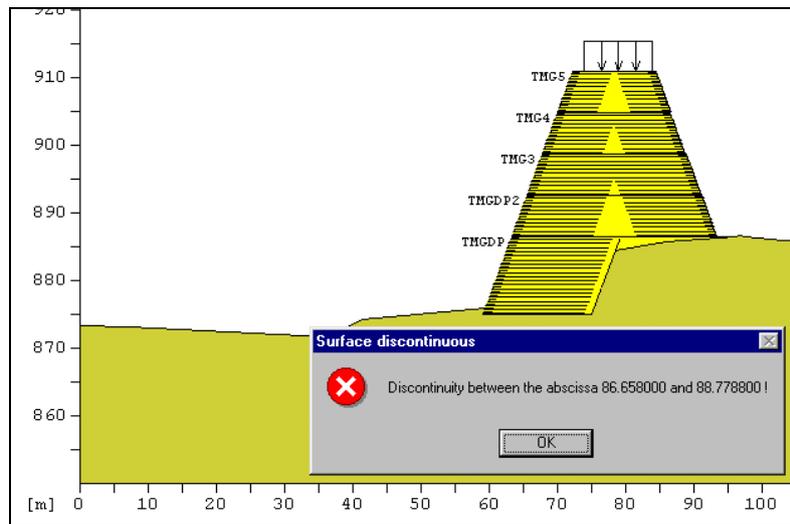
This problem normally occurs when the user inadvertently sets the total length of the symmetric block greater than the top width of the block beneath. You can check it out by creating a DXF file and opening it with Acad: if you zoom in at the intersection between the first and second symmetric block on the outer right side of the embankment, you should find that the superimposed block is hanging by outside.
By **reducing the symmetric block width** you will be able to readjust the geometry accordingly.

FAQ 9: - I WANT TO DELETE A REINFORCEMENT IN A BLOCK: HOW CAN I DO?

Let's suppose that the pattern of reinforcements inside the block is to be modified by deleting the secondary reinforcement Terram ParaGrid 150/15, as we want to use only Terramesh elements in block 1.
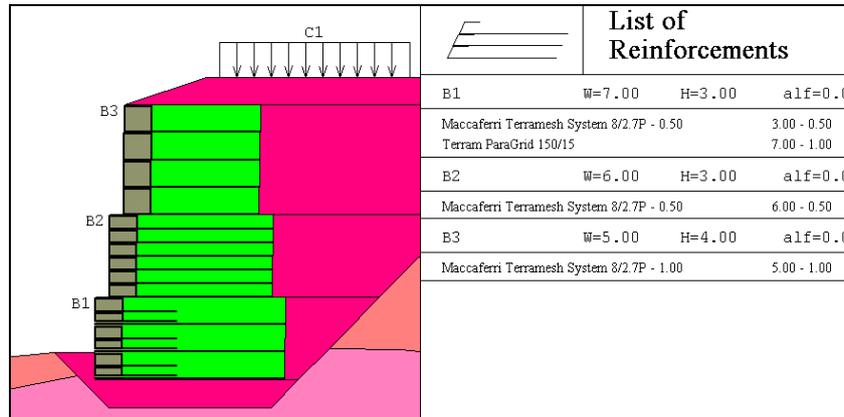
In order to delete the reinforcement the user has to open the B1 block window, **set the reinforcement length to 0**, click on OK and exit the "Block Management" menu
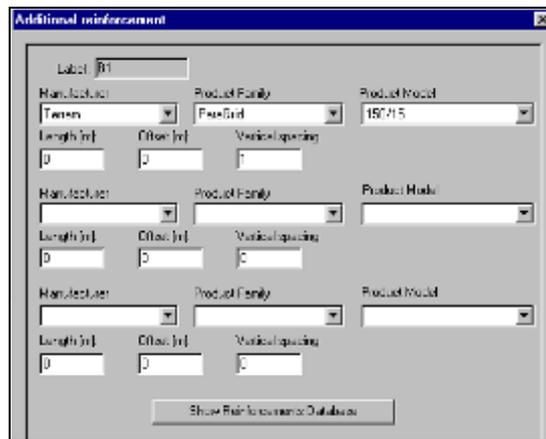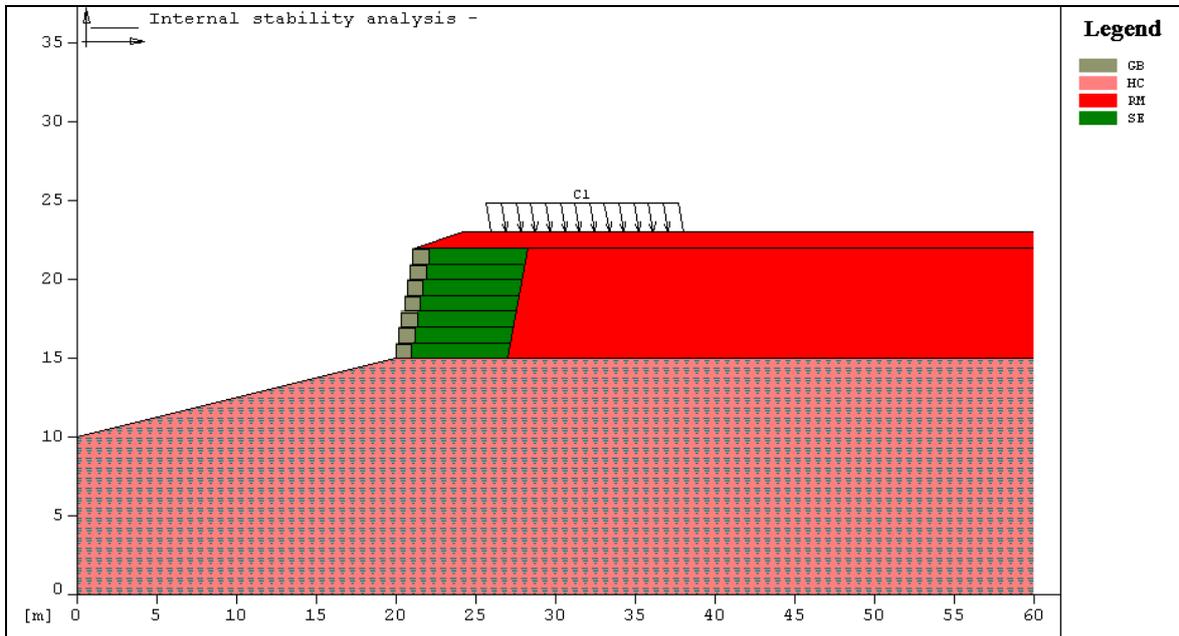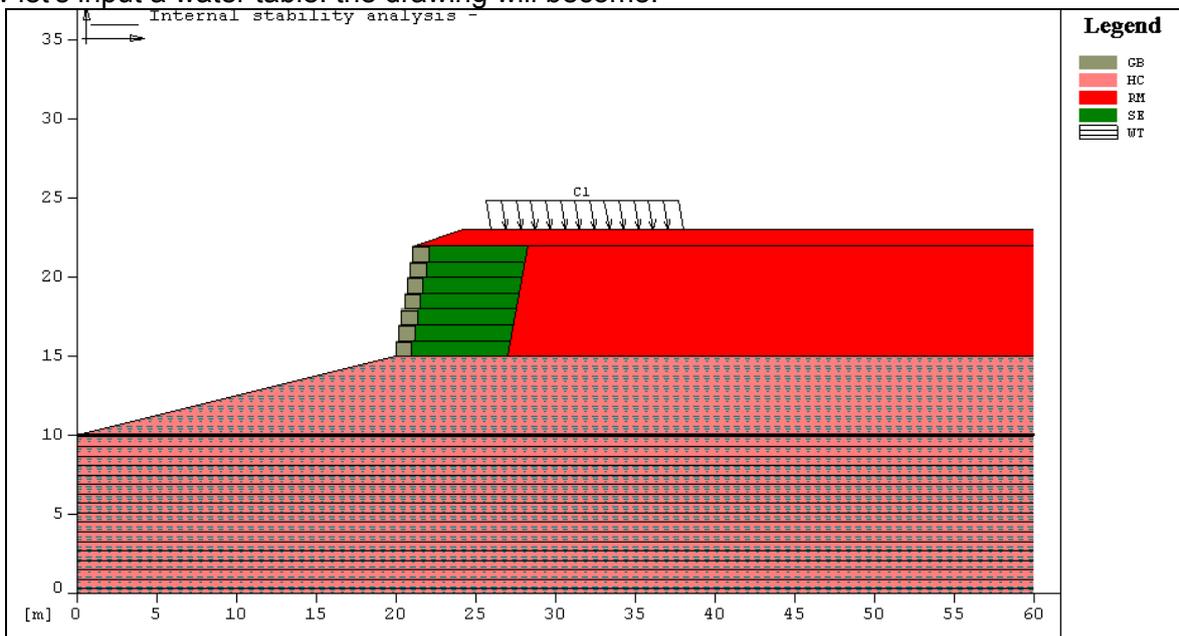

The reinforcement pattern shall be finally updated:
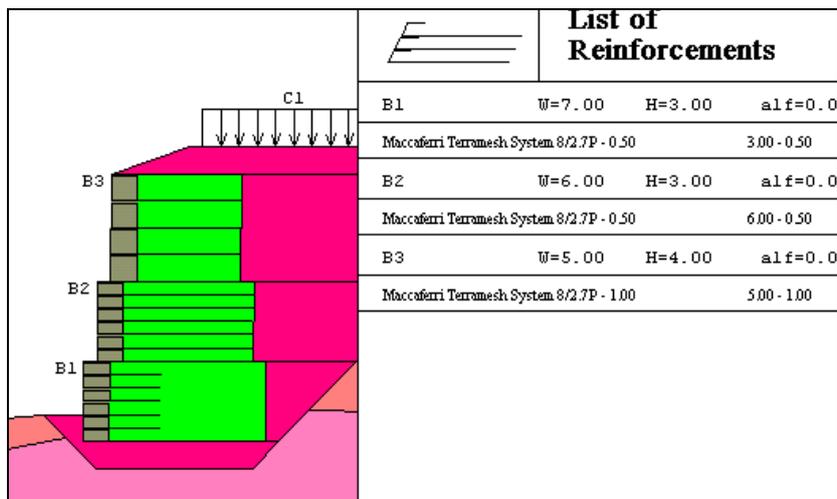
FAQ 10: HOW DOES MACSTARS W TAKES INTO ACCOUNT THE PRESENCE OF A WATER TABLE IF THE SOIL HAS A Ru DIFFERENT FROM 0?

Let's consider the following case, where the existing bottom soil HC is characterised by a certain Ru different from 0: the drawing will be as follows

Now let's input a water table: the drawing will become:

Now the question is: what does Macstars W take into account in the calculations for the HC soil below the water table? How can he cope with both Ru and water table?

The answer is simple: for a soil with Ru, Macstars W does not consider the natural (dry) unit weight, which the user is not allowed to enter, but only the saturated one.

To verify this, open the Soil Properties menu and check the HC soil: you will find the following window, where no natural unit weight is shown, due to the presence of a Ru value.
In this case, in fact, the calculations will be carried out by taking into account the input value for the saturated (totally or not) unit weight.

If, on the contrary, Ru=0, the soil will be characterised also by the natural unit weight:

CONCLUSION
An Ru value takes precedence over water table and piezometric data within the soil layer to which the Ru value applies. The Ru value specified for one stratum does not affect the calculation of pore pressures in other layers.

FAQ 11: WHY THE SEISMIC LOAD IN THE REPORT IS DIFFERENT FROM THE INPUT ONE?

Let's assume to have input an (horizontal) seismic load C_h equal to 0.12
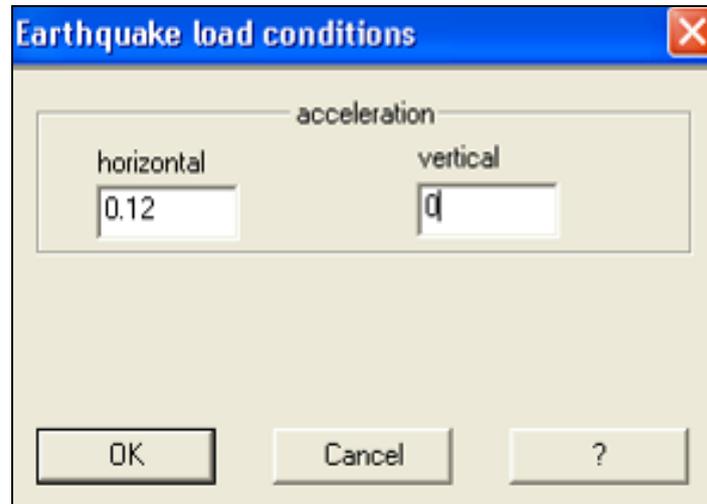
As this value is the ratio (dimensionless)

$$C_h = \text{(horizontal) seismic acceleration / gravitational acceleration}$$

the (horizontal) seismic horizontal acceleration effectively considered in the calculation is:

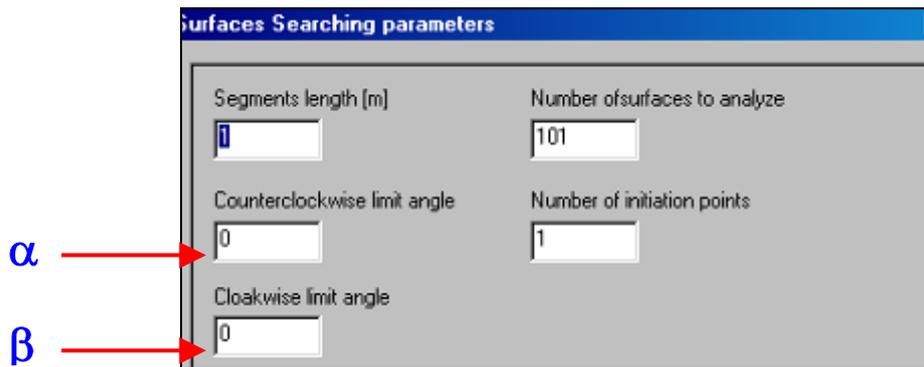$$a_{sh} = C_h \times g = 0.12 \times 9.81 \text{ m/s}^2 = 1.18 \text{ m/s}^2$$

which is the numerical value (in m/s^2 or ft/s^2) written in the report:

CONCLUSIONS
The report shows the effective seismic acceleration in m/s^2 (or ft/s^2), while the user has to input the multiplier of the gravitation acceleration (dimensionless)

FAQ 12: IN THE SURFACE SEARCHING PARAMETERS WINDOW BOX, WHICH IS THE MEANING OF THE LIMIT ANGLES?

- Counter clockwise limit angle **(α)**: value (always positive) of the angle that, minus the slope angle, gives the direction of the upper limit to the generation of the first segment. If both angles are null, a value of 5° is considered.
- Clockwise limit angle **(β)**: value (positive or negative) of the angle that gives the minimum inclination of the first segment of the sliding surface. If both angles are null, a value of -45° is considered.

The counter clockwise angle (α) is the angle which is considered by Macstars as the maximum inclination where to launch trial surface and if this value is set to 0, this means that the trial surface can be parallel to the natural soil profile (as Macstars takes into account the soil slope).

Let's see the figure 1, where a calculation with **both angles set to 0** is shown: as you can see all the trial surface are comprised in a range variable between –45° (β) and 5° (α), where α is given by the soil profile and the upper surface, as stated in the manual.
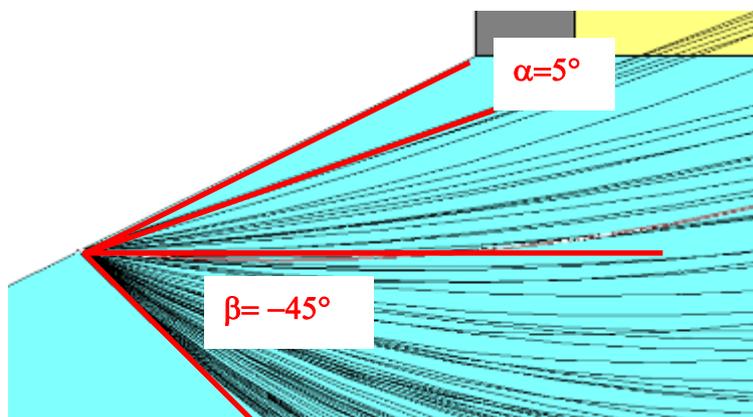

Fig. 1: both angles are set to 0 (default values)

If the setting is changed into α**=5°** and β**=0°**, results are shown in fig. 2, where you can see that, on the contrary of what stated in the manual, the soil slope is not considered and the trial surfaces are contained in a wedge between the horizontal (β=0) and +5° (α), always computed from the horizontal.

The sentence in the manual on the consideration of the soil slope is only applicable when both β and α are set to 0.
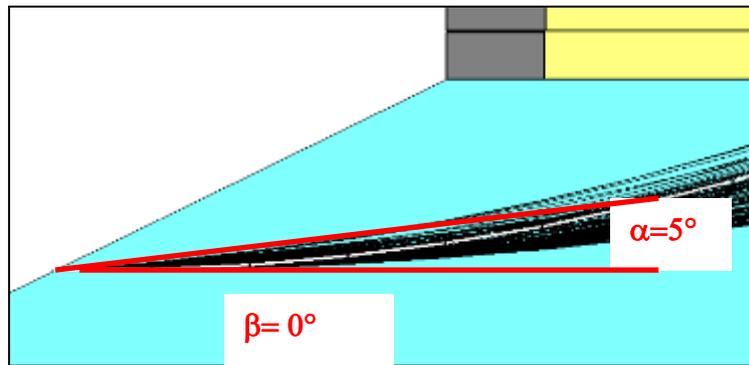
Fig. 2: α=5° and β=0°

Another example (fig. 3) is made with **α=15° and β=0°**, to show that in case of α=0 the software does not consider the soil slope and no surfaces are drawn under the horizontal (as β=0).
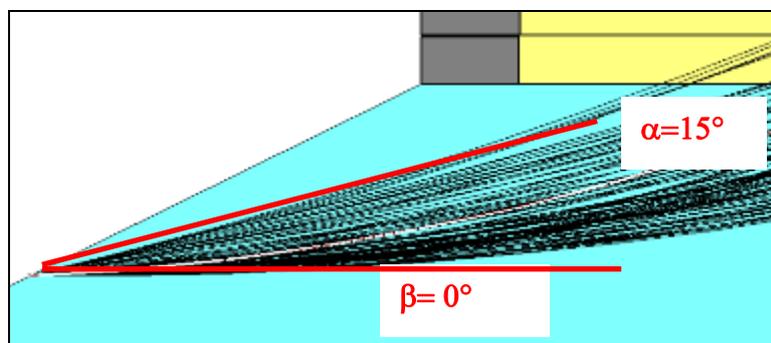

Fig. 3: α=15° and β=0°

Finally the figure 4 shows what happens with **α=15° and β= - 30°** to better clarify this issue.
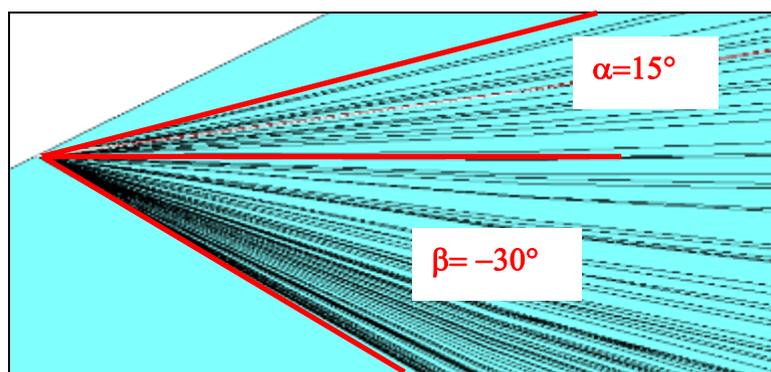
Fig. 4: α=15° and β=30°

The practical utilization of the α, β options is related to the trial surface investigation to a specific area.

FAQ 13: IS IT POSSIBLE TO PLACE A TIEBACK AT ANY POSITION, I.E. ALONG THE EXCAVATED PROFILE?

When the tieback is not placed on the superficial soil profile (i.e. when it is used to consolidate an excavation profile behind a RSS), it is possible to place it at any position by choosing the *Free placing* option and then input its X, Y coordinates.
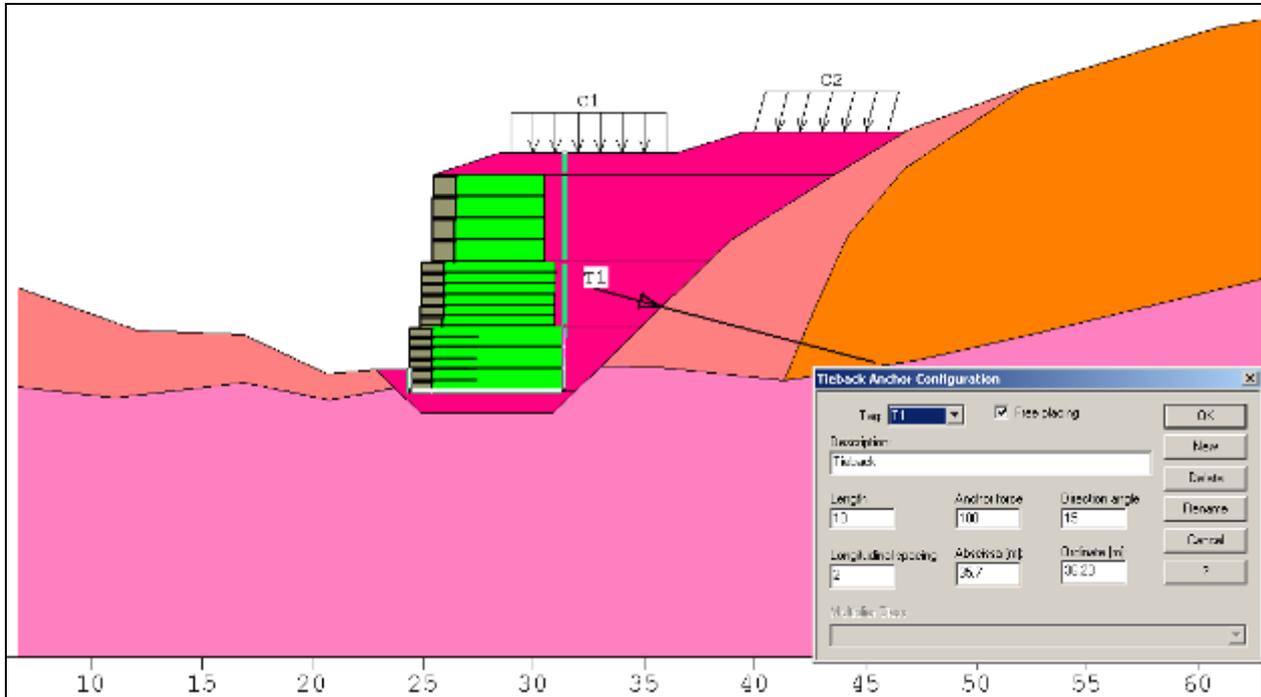
If the Free Placing option is left unmarked, the tiebacks are automatically displaced onto the block profile, keeping the input abscissa
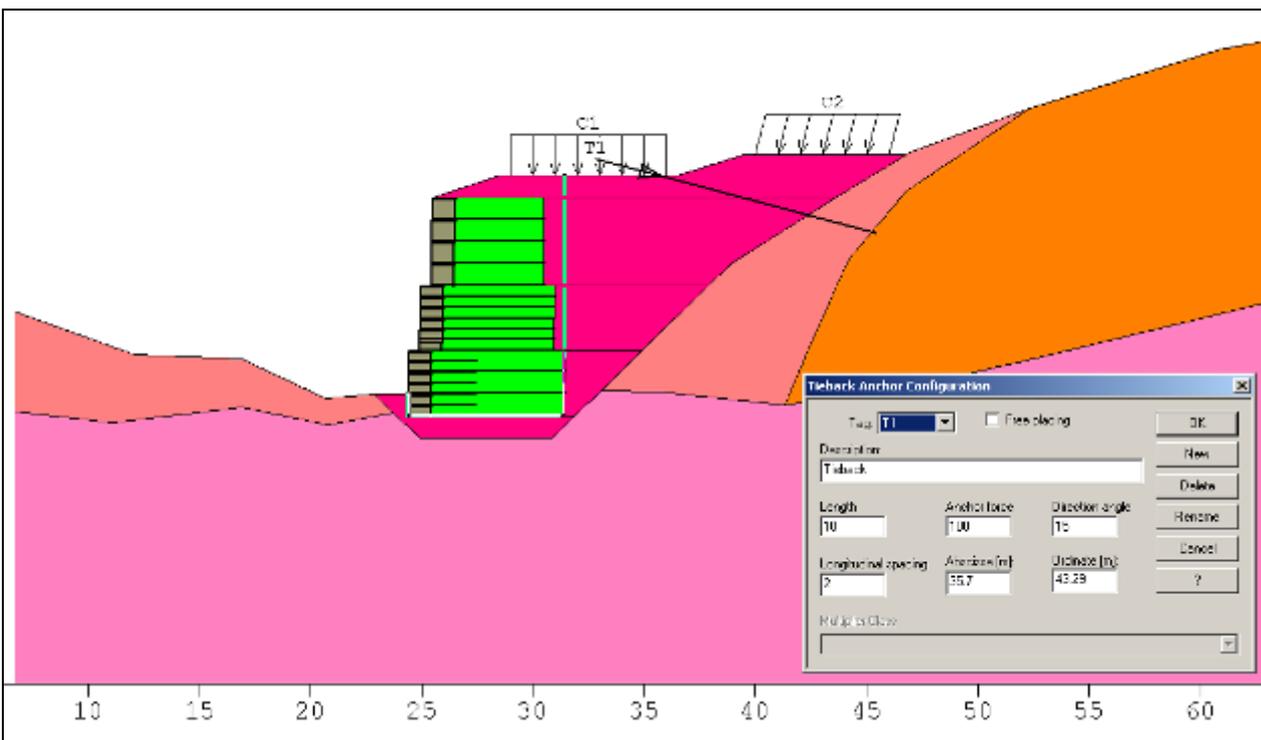
FAQ 14: CAN I MODIFY THE REINFORCEMENT PARAMETERS?

In order to avoid the users to ask OM to modify the reinforcement database for a change of any of the reinforcement properties, Macstars 2.1 allows the qualified users with the Macstars hardware lock (i.e. Subsidiaries) to customise the reinforcement database.

The reinforcement menu is only available when no Macstars documents (.MAC files) are open.
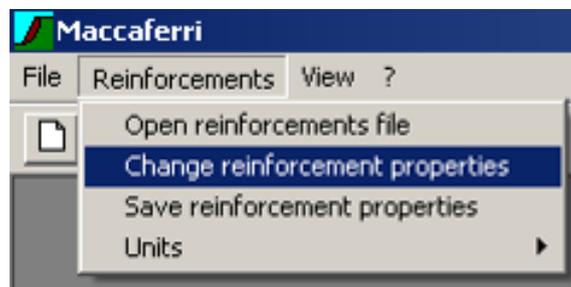

The commands allow the user to modify the reinforcement properties (partial and pullout factors, tensile strength, etc.) and to save the modification under a new file having .RNF extension.
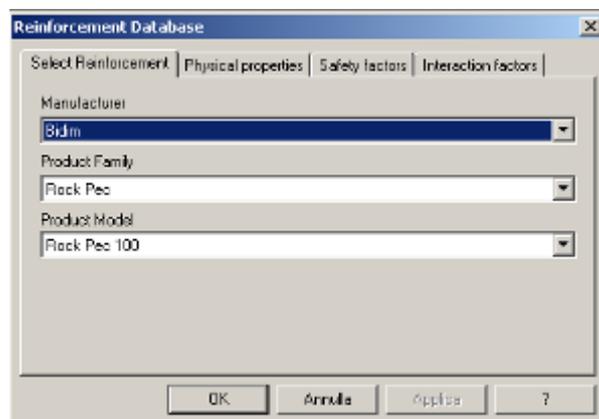
Let's see how to operate:

I STEP: CHANGE THE REINFORCEMENT CHARACTERISTICS

You have to open the existing (default) database by clicking onto the relevant menu:
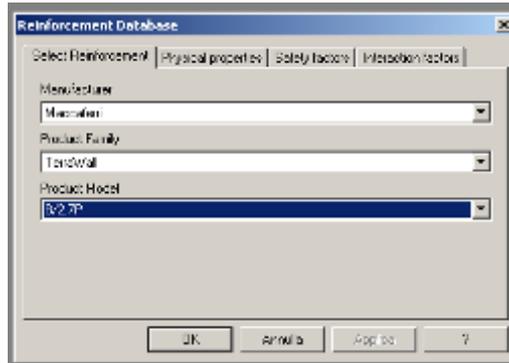

and the following window will appear, allowing you to look at all the properties of each reinforcement.
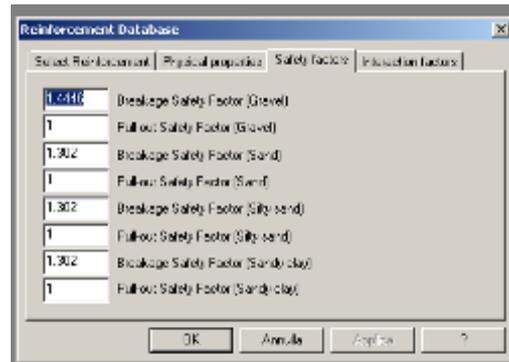

Now, let's say you want to change the pullout safety factor of the Terrawall from the default value 1.0 onto 1.2. You have to:
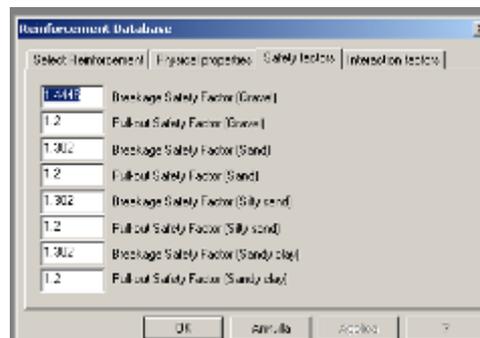
- select the reinforcement:

- select the "Safety Factors" window

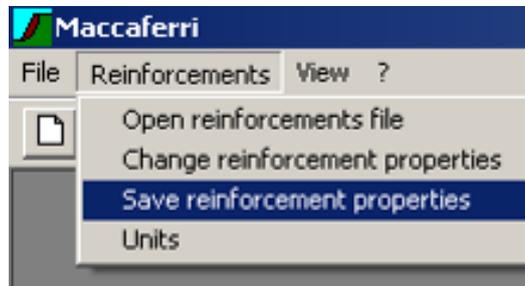- modify the values you want to update:

- click onto "apply" button at the end of the operation and eventually OK: the following empty window will appear:

II STEP: SAVE THE MODIFICATIONS

So far you have changed the values but you **still have to store these data**!!

To do this saving, click onto "Save Reinforcement Properties":

and you will be asked to save the modified database (with the extension: RNF) somewhere in your PC:
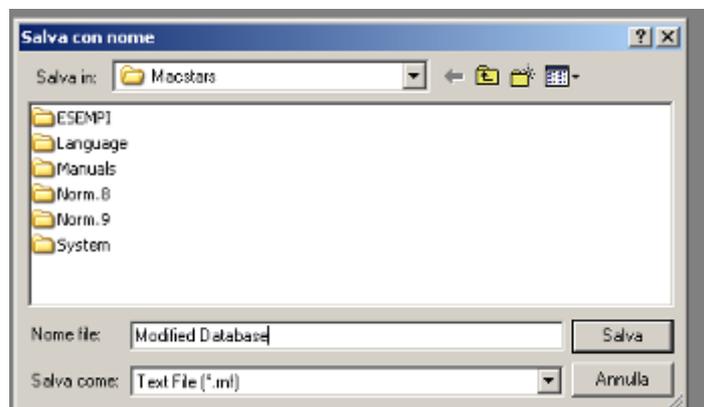
It is strongly suggested to save this file in a folder different from any of Macstars in order not to loose this file in case you uninstall Macstars from your PC.

Now the modifications have been stored: if you now open a Macstars file, you will be warned that the reinforcement properties you are going to use (the ones input in Modified Database.RNF) are different from the ones originally adopted in the .MAC file:
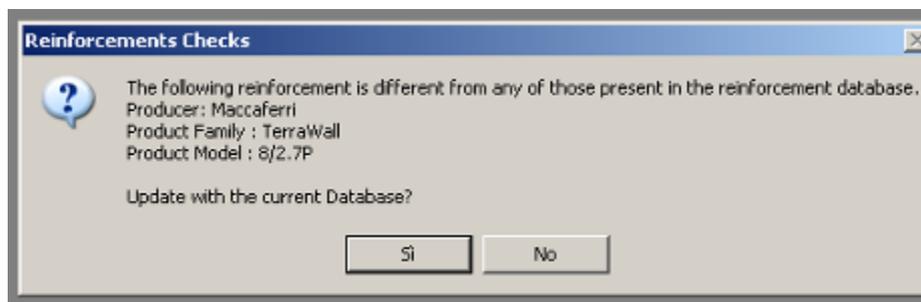
III STEP: OPEN AN EXISTING MODIFIED DATABASE

Click onto the relevant option:
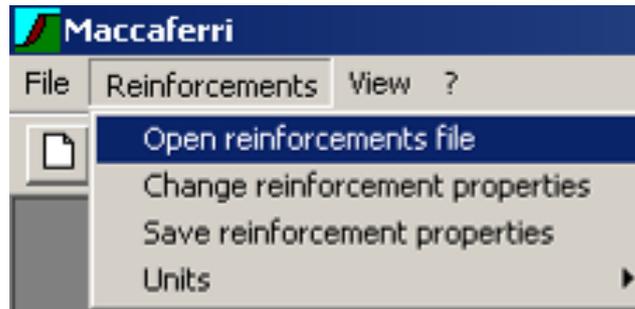
and open(load the .RNF file you are looking for: once the customised database is loaded, the file will be used for all the .mac files loaded or created afterwards.

In order to re-load the original reinforcement database, it is necessary to close Macstars and run it again.

WARNING
This option is only available to the "qualified" Macstars user (that is with hardlock); for clients without dongle this option is not available.

IV STEP: VIEW OF THE CURRENTLY USED REINFORCEMENT DATABASE

You can check at any time which is the database you are working with by looking at the relevant bar on bottom right:
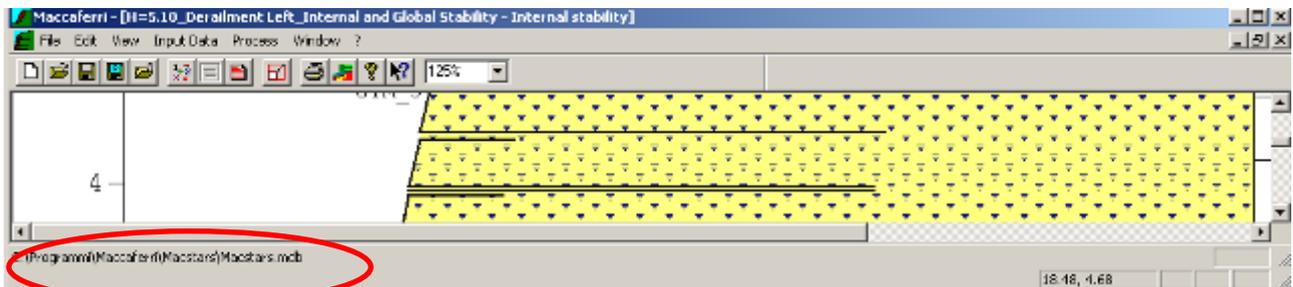
Case A: Macstars is working with the default database (Macstars.mdb)
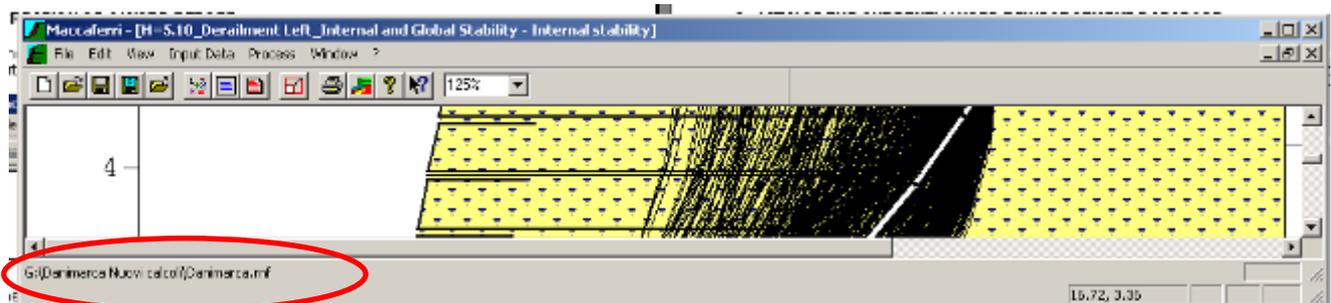
Case B: Macstars is working with a customised DB (Danimarca.rnf) previously loaded

FAQ 15: WHICH ARE THE REINFORCEMENT CHARACTERISTICS CONSIDERED BY MACSTARS?

Macstars requires that foe each reinforcement the the following properties are defined in the relevant database:

PROPERTY	DESCRIPTION	SYMBOL	UNITS
Manufacturer		-	-
Product Family		-	-
Product Model		-	-
Nominal Breaking Load	Nominal Breaking Load (NBL) of a 1 m wide reinforcement unit	T_{br}	kN / m
Linear Stiffness	This is the linear stiffness (J=EA) of the reinforcement, referred to a 1 m wide unit. This parameter is only needed for the Displacement s Method,	J	kN / m
Plastic Sliding Parameter	Ratio between the displacement at breakage and the elastic displacement. Therefore it also identifies a model of behaviour: see Ref. Manual at Ch. 2.4 $\quad$ = 0 Elastic Model $\quad$ (for all geogrids) $\quad$ > 1 Elasto-plastic Model $\quad$ (2 for Terramesh) This parameter is only needed for the Displacement s Method,	PL	–
Elastic Sliding Parameter	This parameter is related to the pull-out behaviour: see Ref. Manual at Ch. 2.4 This parameter is only needed for the Displacement s Method,	k	m^3 / kNm
Minimum Anchorage Length	Minimum length of a reinforcement which is required to evaluate the anchored load behind the sliding surface. Normally this is set to 0.15 m to take into account the actual cuttings	L_a	m
Friction Coefficient Reinforcement-Reinforcement	Parameter used to evaluate the anchored load when one surface of the reinforcement is in contact with another reinforcement.	f_{rr}	–
Pullout Coefficient Reinforcement-Gravel	Pullout coefficient of the reinforcement when the chosen Structural Embankment is a Gravel type soil	μ_{gravel}	–
Pullout Coefficient Reinforcement-Sand	Pullout coefficient of the reinforcement when the chosen Structural Embankment is a Sand type soil	μ_{sand}	–
Pullout Coefficient Reinforcement-Silt	Pullout coefficient of the reinforcement when the chosen Structural Embankment is a Silt type soil	μ_{silt}	–
Pullout Coefficient Reinforcement-Clay	Pullout coefficient of the reinforcement when the chosen Structural Embankment is a Clay type soil	μ_{clay}	–
Partial Material Factor (Gravel)	Reinforcement material factor in Gravel given by creep, damage and chemical/biological degradation	f_{mg}	–
Partial Material Factor (Sand)	Reinforcement material factor in Sand given by creep, damage and chemical/biological degradation	f_{ms}	–
Partial Material Factor (Silt)	Reinforcement material factor in Silt given by creep, damage and chemical/biological degradation	f_{msi}	–
Partial Material Factor (Clay)	Reinforcement material factor in Clay given by creep, damage and chemical/biological degradation	f_{mc}	–
Pullout safety factor	Safety factor used in the pullout calculation. There are 4 values in order to take into account the 4 structural embankment soil types	f_{po-i}	–

FAQ 16: WHY THE TABLE OF CONTENTS IS NOT SHOWN IN THE REPORT?

This problem occurs when the List Separator of your computer is set to , instead of the ; used by Macstars.

This can be easily changed as follows:

1 - Edit the Field to Use the Correct List Separator

2 - Press ALT+F9 to display the field codes. The Table of Contents is represented by a field similar to the following:

> {TOC \h \z \t "Heading 1,1,Heading 3, 3" \n}

In this field, the comma is used as the list separator. This is the default setting in Italy, but many other countries use the comma as the list separator.

3 - Click Start, point to Settings, and then click Control Panel. Double-click Regional Options. On the Numbers tab, you can see which character is currently used as the list separator.

4 - In the field code, replace the commas with the correct list separator. For the earlier example, the field looks similar the following:

> {TOC \h \z \t "Heading 1;1;Heading 3; 3" \n}

5 - Press F9 to update the field.

6 - Press ALT+F9 to switch from the display of field codes to field results.

FAQ 17: WHICH IS THE MULTIPLIER APPLIED TO THE SOIL COHESION (EFFECTIVE OR UNDRAINED)?

When you run the stability checks in accordance to BS 8006 or NFP 94-270, the standards require to apply to the cohesion a multiplier whose value depends upon the cohesion effectively to be considered in the checks (undrained or effective).

As an example in BS 8006 the values of the cohesion multiplier to be used for the ULS analysis for walls and abutments are:

- effective cohesion (c')   1.6
- undrained cohesion (c_u)   1.0

The question is: as the soil properties window box does not allow the user to choose between effective and undrained cohesion, how can Macstars assign the correct value to be applied to cohesion?

Effective or Undrained cohesion?
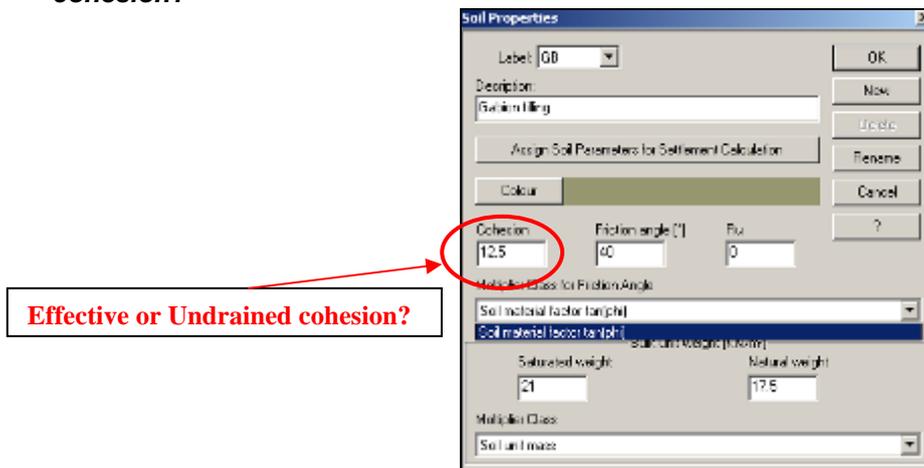
The answer is that Macstars automatically assigns the cohesion multiplier (for c' or for c_u) based upon the following rule:

- If the soil friction angle PHI=0, which means that the soil is working in undrained conditions, Macstars assigns to the cohesion the multiplier relevant to the UNDRAINED conditions.

- If the soil friction angle PHI≠0, which means that the soil is working in drained conditions, Macstars assigns to the cohesion the multiplier relevant to the DRAINED conditions (effective cohesion).