MobiDecoPRO

The Professional Dive Planner for mobile phones

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Disclaimer

L'autore di MobiDecoPRO non garantisce che il programma sia senza errori.
Inoltre non garantisce che l'implementazione degli algoritmi di calcolo siano privi di errori.
Questo software e' dedicato a subacquei tecnici e rebreather esperti per valutare i profili m-value gradient basati sui calcoli di Erik Baker e sul modello decompressivo Buhlmann ZHL16-B.

ATTENZIONE
L'utilizzo e l'applicazione dei piani di immersione generati da questo programma non garantiscono l'incolumità, ed è possibile incorrere in malattia da decompressione, gravi lesioni o anche la morte.
L'immersione è in generale insita di rischi, e le immersioni con decompressione usando miscele di gas e rebreather aggiungono rischi significativamente maggiori. Il software non e' inteso per utenti non addestrati.
Questo programma e i piani decompressivi che produce sono strumenti solo per subacquei esperti in immersioni con decompressione usando miscele e rebreather. Se non siete stati correttamente addestrati in immersioni tecniche o rebreather con decompressione da una agenzia didattica internazionalmente riconosciuta e/o non avete confidenza nella pianificazione e immersione con miscele, NON USATE QUESTO SOFTWARE O I PIANI DI IMMERSIONE DA ESSO CREATI.

Per cortesia: IMMERGETEVI IN SICUREZZA!

Con l'installazione e l'uso di una qualsiasi delle versioni di MobiDecoPRO, si accettano implicitamente le clausole contrattuali, ed in particolare che l'utilizzo dei risultati generati da MobiDecoPRO è a totale rischio dell'utilizzatore, e che l'autore di MobiDecoPRO, Erik Baker o il Dr. Buhlmann non potranno in alcun caso essere considerati responsabili degli eventuali danni o incidenti che potrebbero verificarsi dall'utilizzo del programma e dei suoi dati.

The author of MobiDecoPRO does not guarantee that the program is free of errors.
Furthermore, does not warrant that the implementations of algorithms are correct and free from errors.
This software is dedicated to experienced mixed gas rebreather divers to evaluate m-value gradient profiles based on Erik Baker's m-value gradient calculations and the Buhlmann ZHL16-B decompression model.

WARNING
Even if you follow dive schedules generated by this software, there is no guarantee that you will not suffer decompression sickness, serious injury or possibly death.
Diving is in general full of risks, and decompression diving using mixed gases and rebreathers adds significantly more risks.
This software is not intended for uneducated users. This software and the decompression schedules it produces are tools for experienced mixed-gas rebreather decompression divers only. If you have not been properly trained in mixed-gas rebreather decompression diving by an internationally recognized technical certification agency and/or don't have a deep knowledge of decompression planning and mixed-gas diving, DO NOT USE THIS SOFTWARE OR THE DIVE SCHEDULES CREATED BY IT.

Please DIVE CAREFULLY!

By installing and using any version of MobiDecoPRO you agree that you use all results generated with MobiDecoPRO on your own risk, and that the author of MobiDecoPRO, Erik Baker or Dr. Buhlmann can not, under any circumstances, be made liable for your use of the program and any kind of injuries that any person might get as a result.
The english version of this disclaimer is a faithful translation of the original italian disclaimer and is given at your convenience. Please be aware that the only valid disclaimer is the italian one.

1 Summary

MobiDecoPRO is a professional dive planner specifically designed for mobile phones or portable devices. It uses the Erik Baker's m-value gradient calculations and the Buhlmann ZHL16-B decompression model to compute the decompression info of multilevel profile dives.

1.1 Who can use it?

MobiDecoPRO helps the planning of complex and multilevel profile dives, with different kind of mixes. It's dedicated to all those professional, technical and recreational scuba divers who plan and verify their dives, gaining an higher safety level.

1.2 When do I use MobiDecoPRO?

MobiDecoPRO brings to the mobile phone the functionalities of traditional Dive Planning software that runs on a laptop or desktop. Just consider all situations in which you'd like to make a last minute change of plan, maybe already on the boat. No more 5 minutes waiting for Windows to boot up: your deco software is ready to be run on a hand-held device that is "instant on"!.
You can use it before diving, to quickly plan your dive. It is very easy to learn and use: the creation of several alternative profiles, a good practice that sets an higher safety level, is very simple and quick.
MobiDecoPRO can be used after the dive, to fill your logbook pages with data you cannot have from your dive computer (eg. the RNF), to compare your real dive and the corresponding square dive, to verify your breath consumption vs. the standard consumption.

1.3 What does it do?

MobiDecoPRO lets you enter several different kind of mixes and various segments (i.e. constant depth portions of dive). When finished a simple press of a button will show your ideal deco profile, with all the stops needed, their duration and depth, and the Oxygen toxicity.

1.4 What algorithm implements?

MobiDecoPRO uses the Buhlmann Tissue Model ZHL16-B, and Erik Baker's gradient model.
In few words, it considers

- gas accumulation and release speed of 16 modeled tissues
- the maximum difference between ambient pressure and accumulated gas pressure on each tissues at the beginning of ascent (low gradient factor)
- the maximum difference between ambient pressure and accumulated gas pressure on each tissues at the end of dive (high gradient factor)

For more info about the algorithm, we suggest reading the following documents, available on the internet:

- **Gradient Factors for Dummies By Kevin Watts**
  - (http://www.rebreatherworld.com/general-and-new-to-rebreather-articles/5037-gradient-factors-for-dummies.html)
- **A summary of Professor A A Buhlmann's ZH-L16 Algorithm**
  - (www.vvw.be/duiken/zhl16.doc)

1.5 How does it work?

MobiDecoPRO has been designed for Java mobile phones or devices. Once copied the file on your device (via GPRS, BlueTooth, infrared or sync-cable), you just need to start the applications. A simple and intuitive menu will guide you through all the functionalities. A contextual help is always available.

1.6 Notes on figures

Please, be noticed that the figures in this manual are taken from the PC emulator. The real aspect of the program depends on the phone you are using. Some menu options may be associated to the right button of your phone, while on the figures are associated to the left one. Also the aspect of the screens may differ. Please take your time to get acquainted with your phone rendering of the software.

2 Installation

The installation of the software can be done in several different way, depending on the mobile phone or device
The software is bundled in a single file with **jar** extension, which can be downloaded from the web address received after the purchase. The download of the DEMO version can be done directly from the web address shown in http://mobidive.freehostia.com.
You can download the file directly from the phone or device web browser. As an alternative you can download the file to your personal computer. In this latter case it is up to you to transfer the file in your device, using the connection software and/or a BlueTooth/ Infrared/cable connection: please refer to the user manual of your device to do this step.
If you prefer, you can request to receive the file as an e-mail attachment. If you do this way, you have to transfer the file on the device, as in the case of downloading to the computer.

The simplest and most effective way is the direct download from the device: in this way the installation is automatically performed by the device management software. Please, be aware that the download from the mobile phone requires an internet connection, and that there could be extra connection costs billed by your carrier. Please refer to your contract o carrier to know the amount of the extra costs.

To donwload the application from the device just open the browser of your device and enter the web address sent you after the purchase.

Once installed, the application will prompt for the language preferred. The language can always be changed using the Settings form (par. 3.2).
After the language choice, the application will show the disclaimer, which should be carefully read and approved. At last the main menu will be shown(par. 3.1).

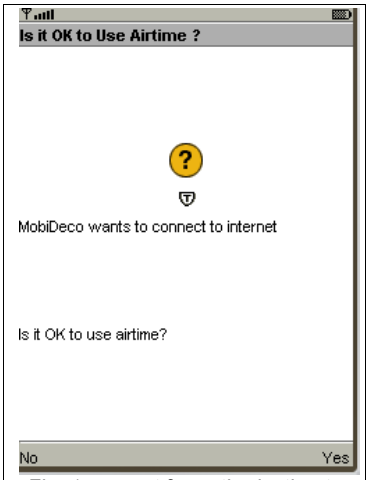


Fig. 1: prompt for authorization to connect

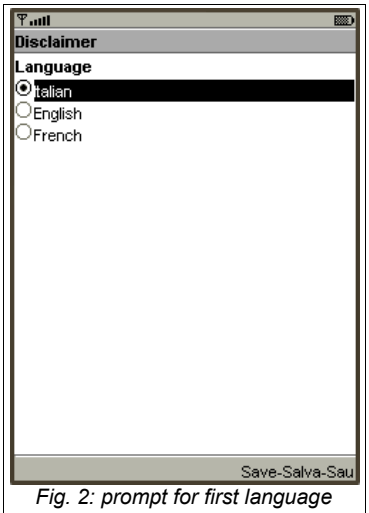


Fig. 2: prompt for first language selection

NB: any purchased version needs an activation, which MUST be done in an area where you can have network (GPRS, UMTS, HDSPA or WiFi) coverage. The activation is performed only once, the first time you run the application. To activate the application, a connection is needed. Depending on your device settings, you could be prompted to authorize the connection, as in Fig. 1. Please, be aware the if you do not authorize the connection, the application won't start.

3 Instructions

3.1 Menu

The main menu let the user choose the desired function:

Fig 3: Main Menu

To start a function, just select the desired menu item and press "**Go**".
To close the application press "**Exit**".

3.2 User Preferences

Thanks to the Settings form you can choose or set several options, which will have effect on the full program's functions.

The settings that can be set are:

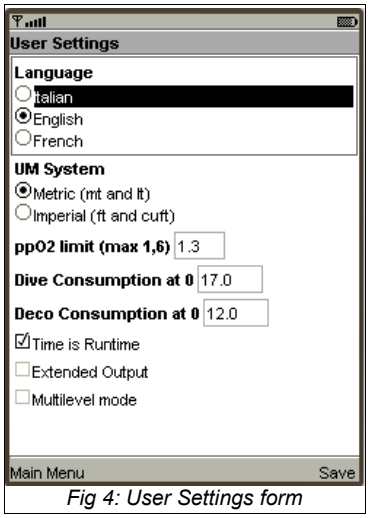


Fig 4: User Settings form

1. the language
2. the measure system (default: metric)
3. the maximum ppO2 (used to calculate MOD)
4. the surface air consumption in diving conditions, in lt/min (default: 17 lt/min)
5. the surface air consumption in deco conditions, in lt/min (default: 12 lt/min)
6. the kind of output you desire on time: selecting "Time is runtime" you will be shown time as the time from the beginning of the dive. Unselecting it means that time interval are shown as duration of single element of the profile
7. the kind of general output: selecting extended (which is advised only if you have a screen size large enough), the output will be more verbose and detailed
8. Multilevel mode: if selected means that decompression calculations start to consider the first ascending segment to compute stops. If not selected, the algorithm will start deco stop calculations at the end of all segments of the dive. For example, lets consider a dive with two segments, the first at 30 mt for 20 mins, and

the second at 22 mt for 15 min. With Multilevel mode selected decompression calcs start at the end of first segment, since the second is shallower. In the other case deco stop calculations start at the end of the second segment.

3.2.1 Measure System note

Please consider that all calculations and data storage consider the metric measure system. That means that there could be some rounding effects when you select the imperial Measure System. Furthermore, when using the imperial measure system, consider that the decimal part of the values you enter is actually considered decimal: for example, entering a depth of 20.5 feet means that you are entering a depth of 20 feet and half a foot, not 20 feet and 5 inches.

3.2.2 Air consumption note

The two values that you have to enter are the values of air consumption at surface in case of activity (dive) and in case of rest (deco). These values are then correctly adjusted to the ambient pressure. In other words, if you enter 17lt/min for dive consumption and 12 lt/min for deco consumption, these values are adjusted to the depths of dive and deco. For example, when you dive at 30 mt, your consumption will be 17x(1+30/10)=68 lt/min. When you deco at 6mt, your consumption will be 12x(1+6/10)=19.2 lt/min.

3.3 Dive Settings

This form allows entering specific preferences for the dive. In particular you can set:

1. the speed of ascent and descent. Please remember that descent speed must be between 5 and 50 mt/min (15, 150 ft/min), while the ascent speed must be between 1 and 10 mt/min (3.3, 33 ft/min). Defaults are 10(ascent) and 20(descent) mt/min (30 and 60 ft/min)
2. the altitude which must be between 0 and 5000mt (15000ft). Default is 0.
3. the low and high gradient factor (see below)
4. The depth interval between stops, which must be between 1 and 10mt (3.3 and 33 ft). Default is 3mt (10ft).
5. The depth at which the last stop should be performed. Must be between 1 and 10mt (3.3 and 33 ft). Default is 3mt (10ft).
6. The minimum increment of deco stops time, which must be lower than 5 mins. Default is 1 min.

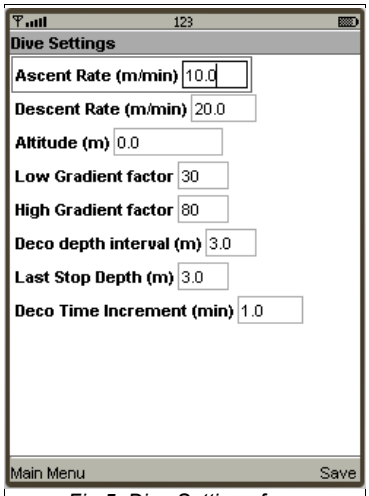


Fig 5: Dive Settings form

3.3.1 Note on entered values

Please be aware that, if you enter a value which is outside the mentioned boundaries, the software will reset the corresponding value to its default.

3.3.2 Note on deco stop increment

The value entered is used to increment a deco stop. Since the deco calculation is a recursive algorithm, this means that any deco stop which is not long enough to allow the desired tissues decompression, will be incremented by this value, in order to obtain the desired decompression level. For example, let's consider that deco stop increment is 3 minutes: if a deco at 6mt of 8 min is not enough, the program will try to calculate the profile

with a deco at 6mt of 11 min (8+3). If the deco stop increment is 1 minute, the program will otherwise try to see if a deco stop of 9 minutes is enough.

3.3.3 Low and High gradient factor

The gradient factor method is a natural extension of Buhlmann's tissue compartment model.
The high gradient factor is, in percentage, the maximum difference between ambient pressure and accumulated gas pressure on each tissues at the end of dive.
The default value is 80 means that at the end of the dive the tissues will be exposed at a difference of pressure of 80% of the ambient pressure, i.e 0.8 bar at sea level.
This difference should never be higher than 100%, that means it is not possible, following the Buhlmann decompression model, to expose your tissue at an ambient pressure wich is less than half the tissue pressure.
For security reasons, the program wil not accept values of high gradient factor larger than 95.
The lower is the high gradient factor, the longer will be the deco stops.

The low gradient factor is the so called Erik Baker's strategy. The strategy consider that at the beginning of the deco you shouldn't expose yourself to a difference of ambient pressure as like at the end of dive. That means that the first deco stop will be at a depth that will expose you to a difference of pressure that is the low gradient factor. The default value is 30, and has the same limit of the higher gradient factor. Of course, Erik Baker says that the low GF should be lower than the high GF.
The lower is the low gradient factor, the deeper will be the first deco stop.

Setting the low and high GF gives the user the freedom to modify substantially his or her dive profile. This freedom comes with the responsability of knowing how to adjust the values considering the physical condition, the dive charateristics and so on.
If you're not sure on how to tune these values, please leave them to their default values

3.4 Mixes

This screen show all the mixes that can be used in the dive.
Each gas is a mix of three gases, Oxygen (O2), Nitrogen (N2) and Helium (He).
The name of the mix is automatically defined by its composition:

- a mix of 100% oxygen is called Oxygen (of course)
- a mix with no Helium is called NitroxNN, where NN is the percentage of Oxygen (eg Nitrox32, Nitrox36). If the percentage of Oxygen is 21 the mix is called Air.
- a mix with Oxygen and Helium is called TrimixOO/HE, where OO is the percentage of Oxygen and HE is the percentage of Helium.

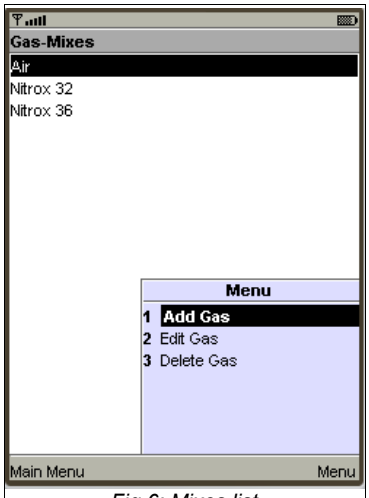


Fig 6: Mixes list

Please be noticed that in some phones the rounding of numbers can lead to have the Air called Nitrox21. This strange effect will disappear by exiting and restarting the software.

It is possible to modify, add and delete a mix.

You can not delete a mix if it is used in a segment.
Please be aware that the program comes with the mix Air, Nitrox32 and Nitrox36 already built in. It is in any case possible to delete them.
You can also enter a mix which is already in the list, i.e there is no check that a gas with the same percentages exists already.

3.4.1 Mix form

This screen allows you to edit the percentages of the gases the mix.

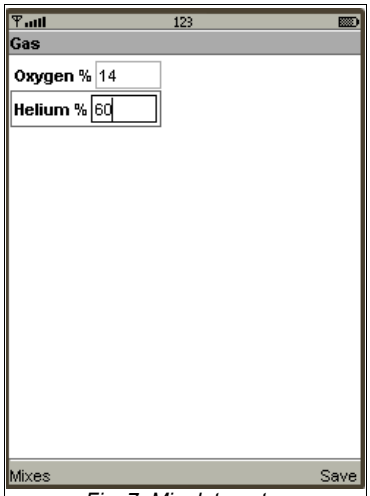


Fig 7: Mix data entry

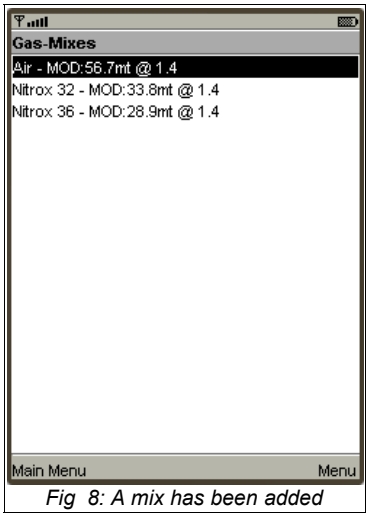


Fig 8: A mix has been added

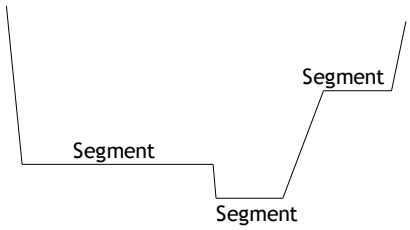
When you save, the program will return the mix list, showing the modified or added mix. The list is not ordered, but shows the mixes in the same order you edited them.

The list will show the MOD (Maximum Operating Depth) for the mix at the give ppO2 limit.

If you are in the Mix form and select the "**Mixes**" menu, the mix edit is cancelled.

3.5 Dive planning

A dive is made of segments. Each segment represents a constant depth portion of your dive and is associated with a mix.
To input a dive you have to input all the segments.



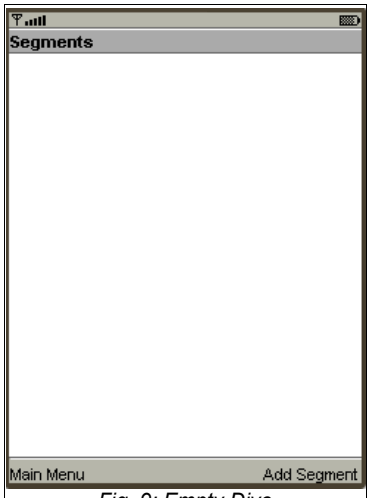


Fig 9: Empty Dive

When you enter in the dive menu for the first time, the program will show an empty list, since no segments have been entered yet: the only operation possible is to add a segment.
Each segment is defined by a depth, a duration and the mix used.

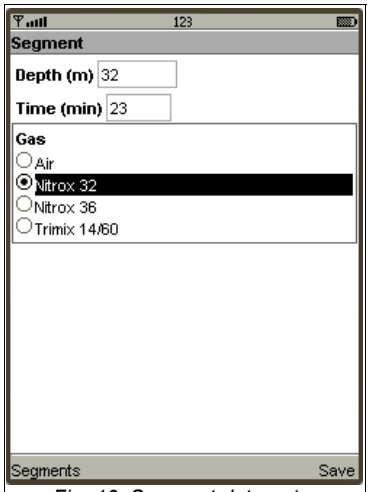


Fig 10: Segment data entry

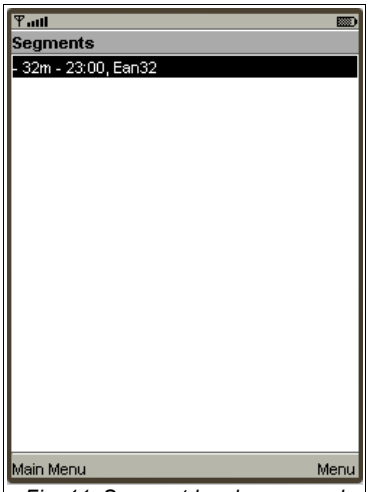


Fig 11: Segment has been saved

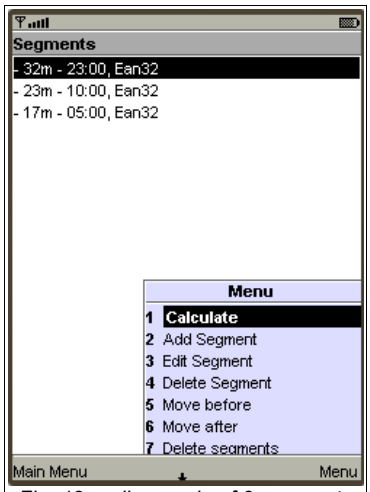


Fig 12: a dive made of 3 segments

Selecting "**Save**" you save the segment. Selecting "**Segments**" the program will return to the segments list without saving.
You can add as many segments you like.
Each segment can be:

- deleted
- modified
- moved before the previous segment
- moved after the following segment

It is also possible to delete all segments in a single shot.

Once you have finished entering segments, you can calculate the profile, selecting the "**Calculate**" menu item.
The calculation will take all the entered segments and compute the other segments (descent, ascent, deco stops).
The output will show you all the phases of the dive.
It starts with the altitude, then comes the segments list.
The first character tells the kind of segment

- v means a descent
- ^ means an ascent
- - means a constant depth dive
- ~ means a deco stop.

Then comes the final depth of the segment.
Next there is the time, which can be a duration or the elapsed time from the beginning of the dive, depending on the user setting "Time is runtime".
Finally there is the mix used in the segment.

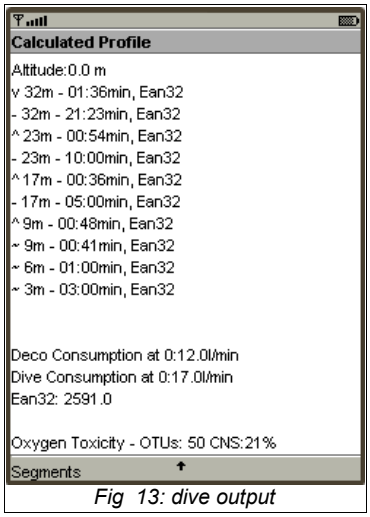


Fig 13: dive output

Let's explain the sample output of Fig 13:

- we have a descent to 32mt that takes 1 minutes and 36 seconds (this time is calculated using the descent speed)
- then we have 21' and 23 seconds of dive at 32 mt. Take note that 21'23” plus 1'36” gives (with some rounding) the 23 minutes of the first segment, i.e. The descent is taken into the account of the first segment
- then we have a 54” ascent up to 23mt
- 10' at 23mt
- a 36” ascent to 17mt
- 5' at 17mt
- 48” ascent to 9mt
- 41” deco stop at 9mt. Please note that the first deco stop can have a duration which is not an integer number of minutes
- 1' deco stop at 6mt
- 3' deco stop at 3mt

All segments are done with Ean32. Ean32 is the abbreviated name of Nitrox32, and in this case the output is the shorter one. If you prefer to have an extended output, you have to select the corresponding flag in the User Settings form.

After the profile come the consumption and the Oxygen toxicity, in OTUs and CNS percentage.

When you go back to the segments list, there is a warning, in the upper part of the screens: it says that the program has calculated a dive, so the next calculation will be considered a repetitive dive and will use the tissues saturation values calculated previously.

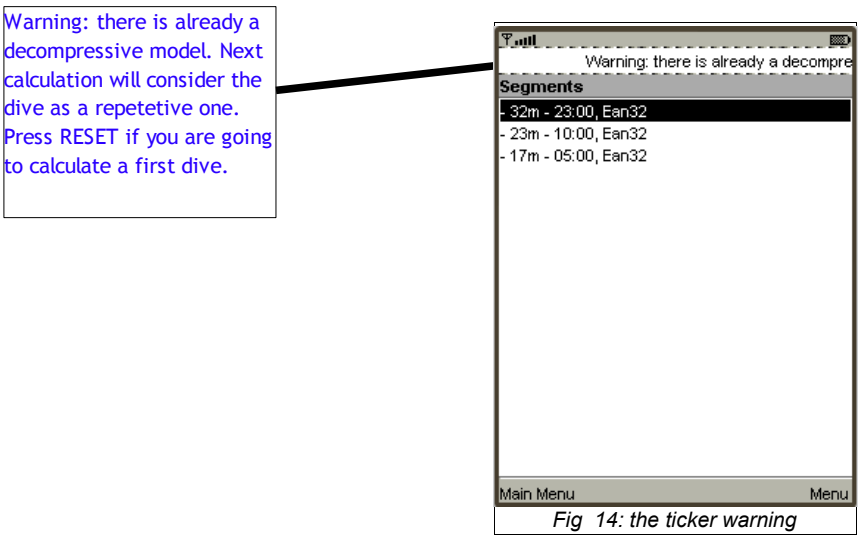


Fig 14: the ticker warning

When a decompressive model is in memory, it is possible either to:

- calculate a following dive
- entering a surface time
- reset the model, i.e. the next calculation will consider the dive as a new one, with no saturation

If you calculate a following dive and haven't entered any surface time, a warning will be shown. The program will prompt you wether you want to enter a surface time or if you want to calculate with no surface time.
The warning says, more or less:
"*Warning: you are going to calculate decompression for a repetitive dive with 0 surface time.Please select OK to continue or NO to edit the surface time*"

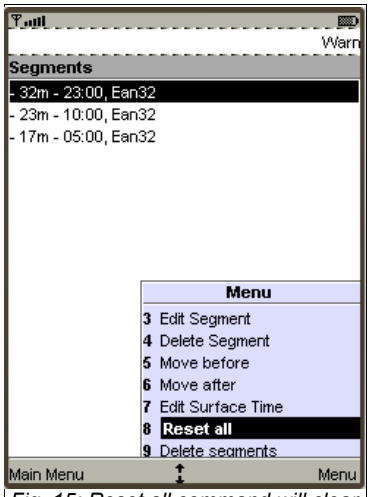


Fig 15: Reset all command will clear the segments AND the model

Fig 16: Calculation with 0 surf time

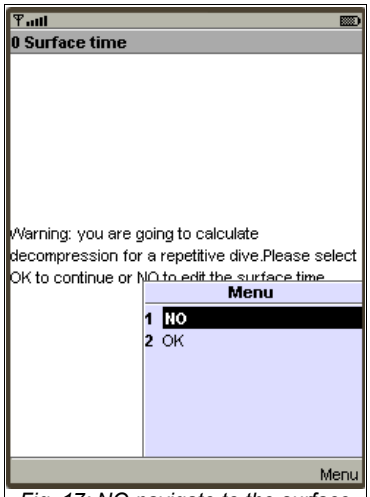


Fig 17: NO navigate to the surface time form. OK will calculate

The Surface time form simply ask for a surface time in minutes.
Once entered the surface time, the program will return to the list of segments. To calculate the dive simply select "**Calculate**".

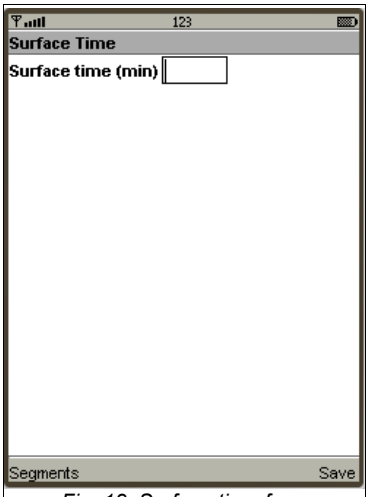


Fig 18: Surface time form

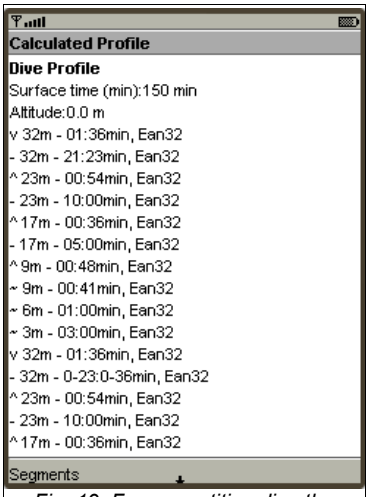


Fig 19: For a repetitive dive the surface time is the first line of output

4 Help

A simplified version of this guide is always available pressing "**Help**" in the main menu.

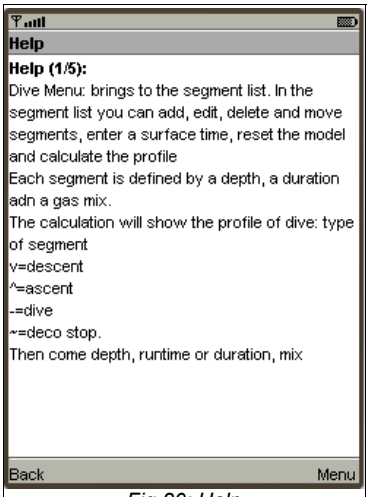


Fig 20: Help

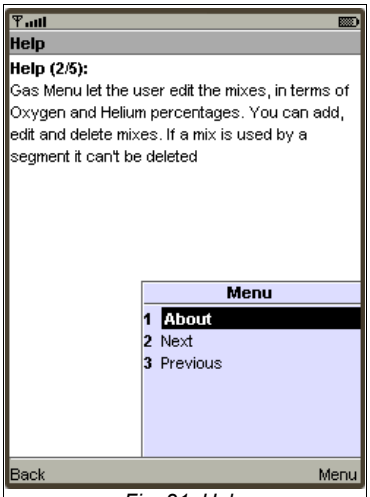
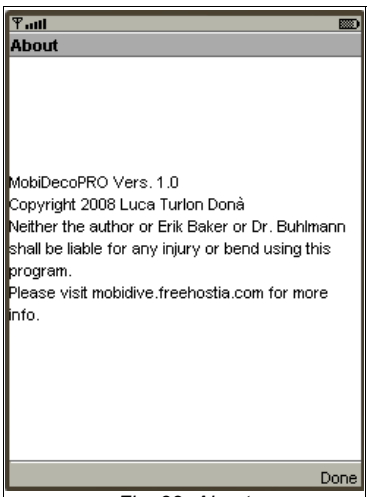


Fig 21: Help



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