

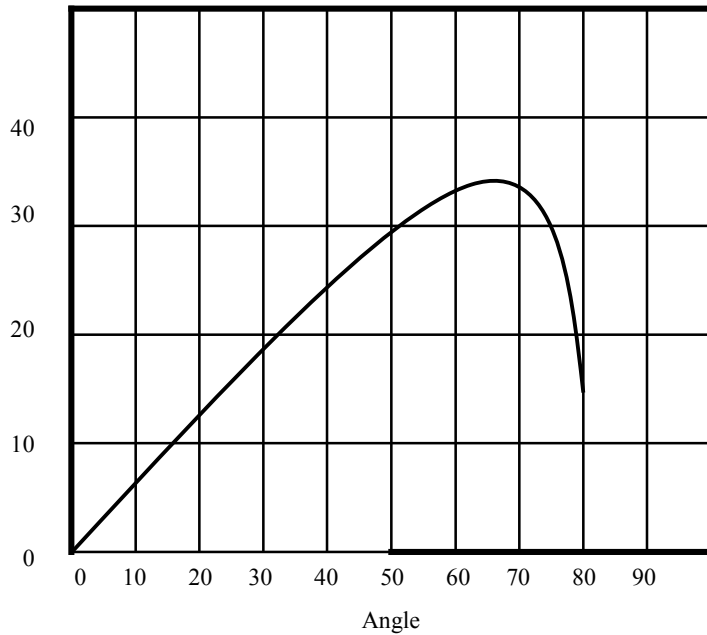
MemoVane™ for PC

Instruction Manual

torque
Nm

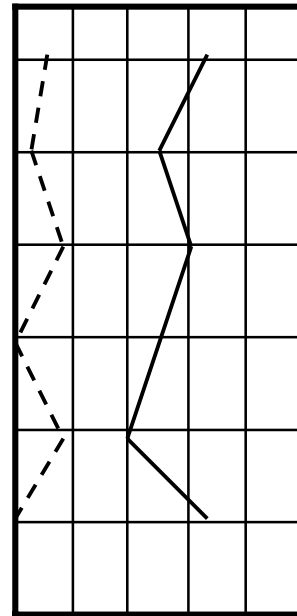
object no: 1234
date: 2000-11-16

depth: 14,0 m
company: GF-konsult AB



τ_v kPa (uncorrected)

0 10 20 30 40



Sensitivitet St

Introduction

The Vane shear test is an insitu method, used for determination of the undrained shear strength τ_{fu} and the sensitivity S_t in cohesive soils. The Vane shear test is carried out with a vane consisting of four plates, fixed at right angles to each others and connected to a system of jointed extension rods. Pushed into the soil to the desired depth, the vane is rotated. By measuring the torque required, to achieve failure in the soil, along the cylindrical surface circumscribing the vane, a value of the undrained shear strength can be calculated. After extensive rotation of the vane, whereby the soil becomes thoroughly remoulded, the soil's remoulded shear strength can be measured and it's sensitivity can be calculated. With instruments registrating the moment as a function of torsion, information is obtained on the character of the soil.



European Standard prENV 1997-3.

The Vane shall consist of four rectangular plates fixed at a 90⁰ angle to each other.

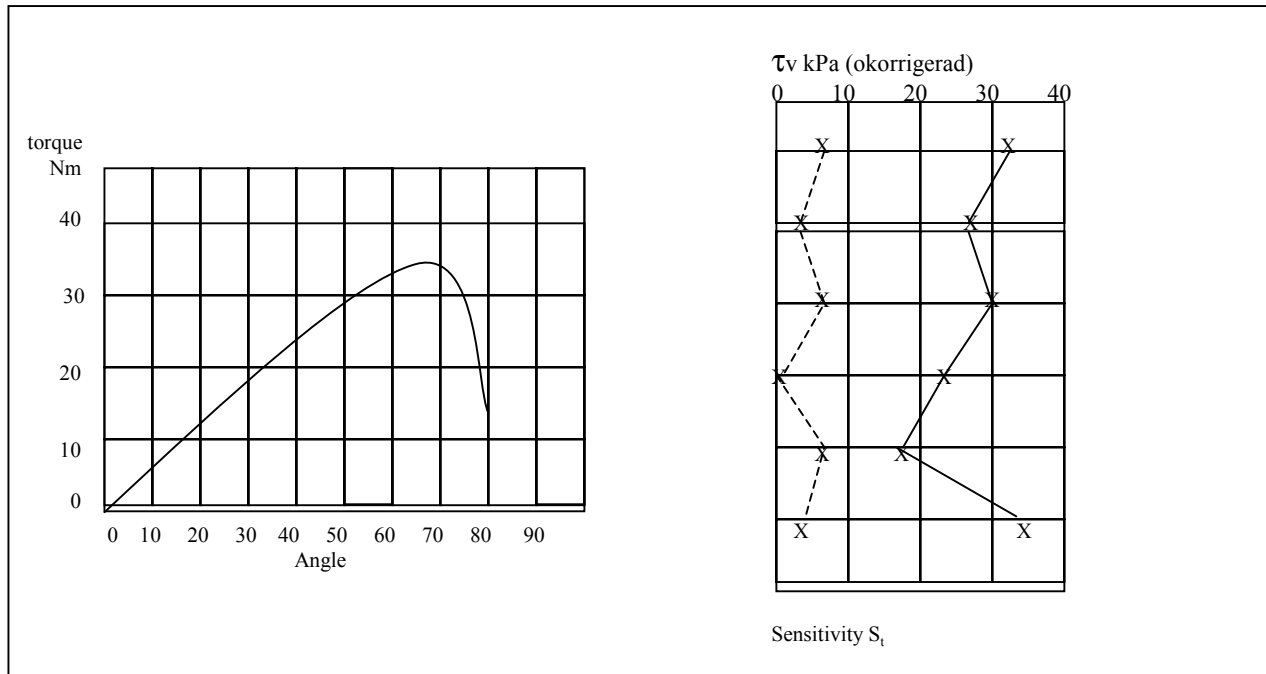
The Vane can be used with a protective shoe and casing from the vane up till the rotation gear box. This is to avoid buckling of the rods and to minimize the friction along the drill string.

The drill string must have a minimum diameter of 20mm. This is to avoid the snap on the vane, if the torque is high and the drill string is long.

The gear box for rotating the Vane shall be designed to provide rotation at a given and constant rate.

The recording instrument shall be designed to measure and store the value of the maximum torque.





The MemoVane™ from Environmental Mechanics AB.

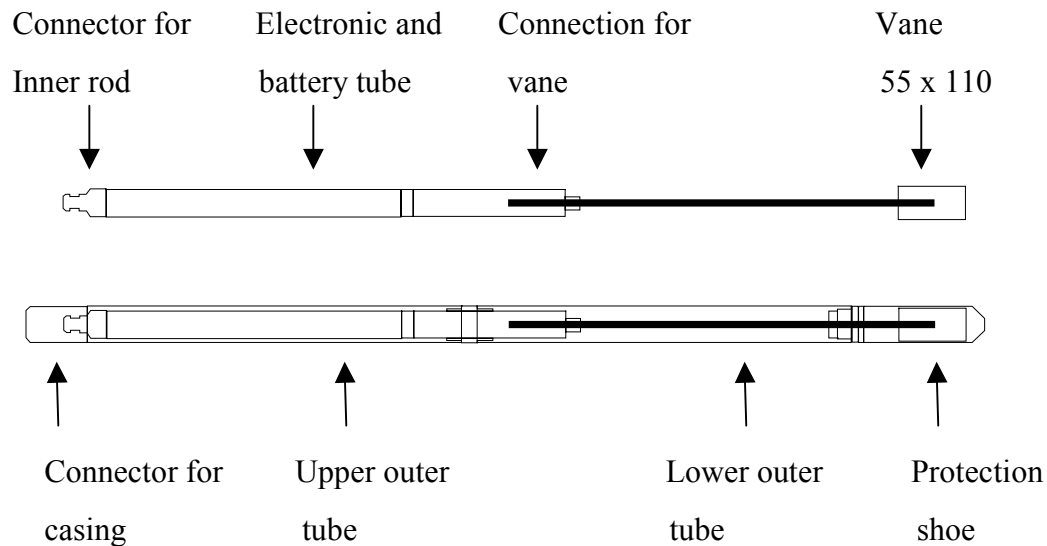
MemoVane fulfils and exceeds prENV 1997-3.

One different thing between MemoVane and most existing equipment for measuring the shear strength, is that in MemoVane, all the measurement and storage of data, takes place down in the vane. The sensor for measuring of torque is individually calibrated.

Quality Assurance.

The sensors are individually calibrated between 0 and 100Nm. In the calibration certificate one can either compare every reading and give the exact accuracy or use the maximum inaccuracy of 0,3 Nm. This means that every recording is given with QA, Quality Assurance.

Description of MemoVaneTM.



Connector for the inner rod is threaded M14 x 1.5 for the 20mm innerrod.

The electronic and battery tube consists of all electronics used, for measurement of the torque, datastorage of time and torque. Powersupply is 6 pcs of Alkaline 1,5V batteries type AA.

The vanes are replaceable and must be fastened very tight in the connection.

The vanes are in either 55 x 110 mm or 60 x 120 mm.

Connector for the outer rod is threaded, either for 42 mm coredrilling rods or M30 x 3,5 for 36mm casing.

The upper and lower outer tubes are exactly alike and they are exchangeable to eachother.

The protection shoe is of aluminum . The shoe protects the vane during penetration and cleans the vane, while it is rejected after each test level.

Operating instructions for MemoVane™

Prepare the MemoVane.

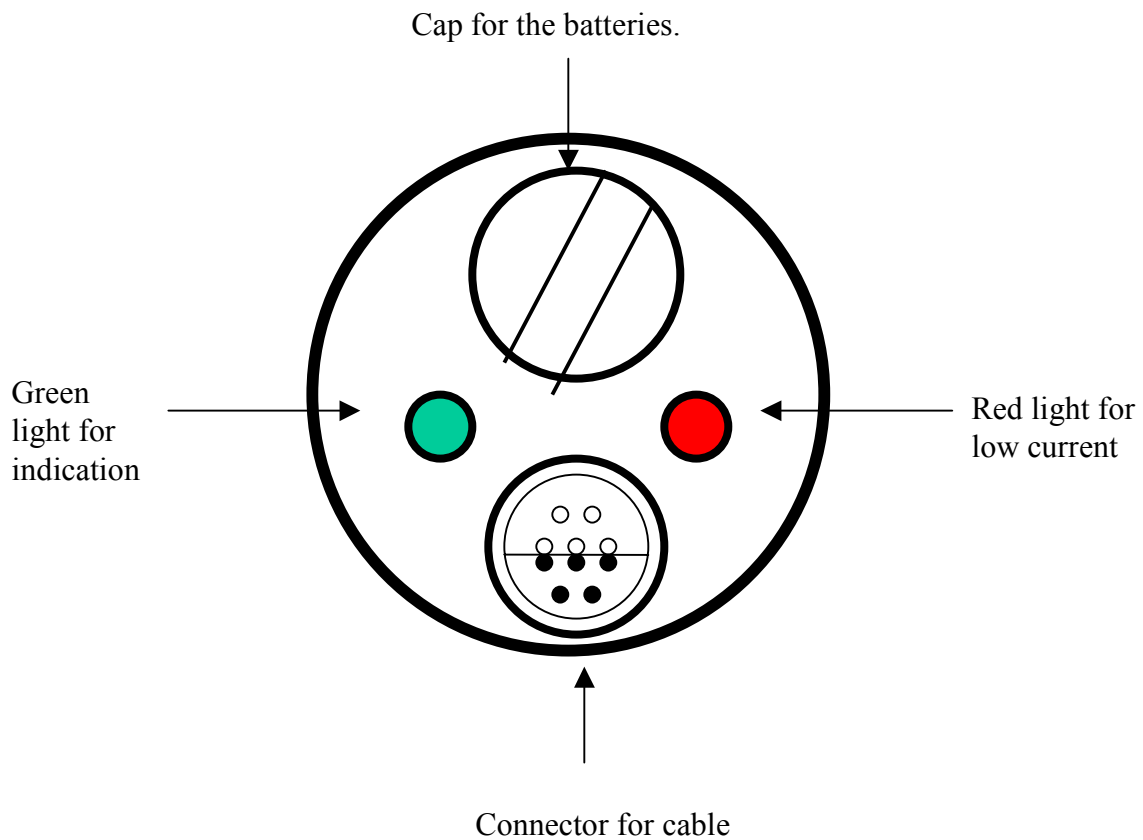
If the MemoVane is fully mounted.

Disconnect the connection for casing, upper outer tube and connector for innerrod.

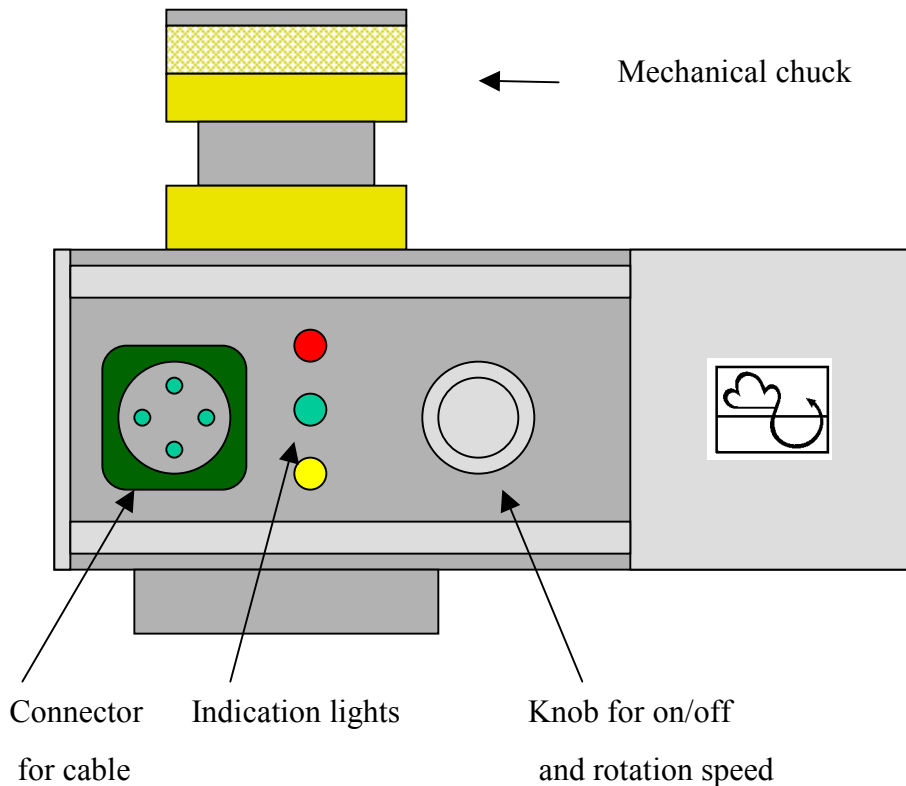
Unscrew the cap for the batteries.

Insert 6 batteries type AA. Observe the plus pole downwards.

Tighten the cap.



Description of electric gear box with indicators.



The mechanical chuck is connected and disconnected to the gear box in a very easy way. To open it, turn the upper part clockwise and press it down. To lock the chuck, lift the upper part and let it go anti clockwise. The inside spring will keep it in a locked position, towards the inner rod.

The connector for the cable will transfer power to the gearbox and transfer the data of angle towards time.

The red indication lamp will be lit, when the torque exceeds 100 Nm.

The yellow indicator lamp will be on, when the torque is exceeding.

The green indicator lamp will be on, when the torque is decreasing, after the failure.

The knob for on/off is used to start and stop the gear box and increase or decrease the rotation speed.

Operating the electric gearbox.

Mount the gear box on the drill head in a way so the hydraulic chuck can be used for pushing and retrieving of the vane can be achieved.

Connect the cable between the gearbox and the battery on the drill rig or the truck.

Lift out the mechanical chuck on the gear box.

Push the prepared vane down to the desired depth. Push the inner rod with the vane 40 cm more.

Put the mechanical chuck over the inner rod and lower it until it gets in the coupling on the gear box. Close the chuck by lifting the upper part and let go. The chuck will be kept locked by the inner spring.

Start the test by turning the knob clock wise until stipulated rpm is achieved.

The yellow lamp is on while the torque is increasing. When the soil has collapsed the yellow light is out and the green light is on. This indicates that the applied torque is decreasing. There is a failure in the clay and the test on that level is completed.

Stop the gearbox with the knob by turning it anti clock wise until stop.

Open the mechanical chuck.

If the test shall include also the remoulded test, rotate the inner string the number of revolutions as standardized.

Start the test as described above and proceed in the same way. Depending of the soil perhaps no failure is achieved and no green light is on. In this case rotate the inner rod approximately 90 degrees and stop the test.

Retrac the inner rod until the Vane is in it's protection. The Vane will automatically find the right way into the protection shoe.

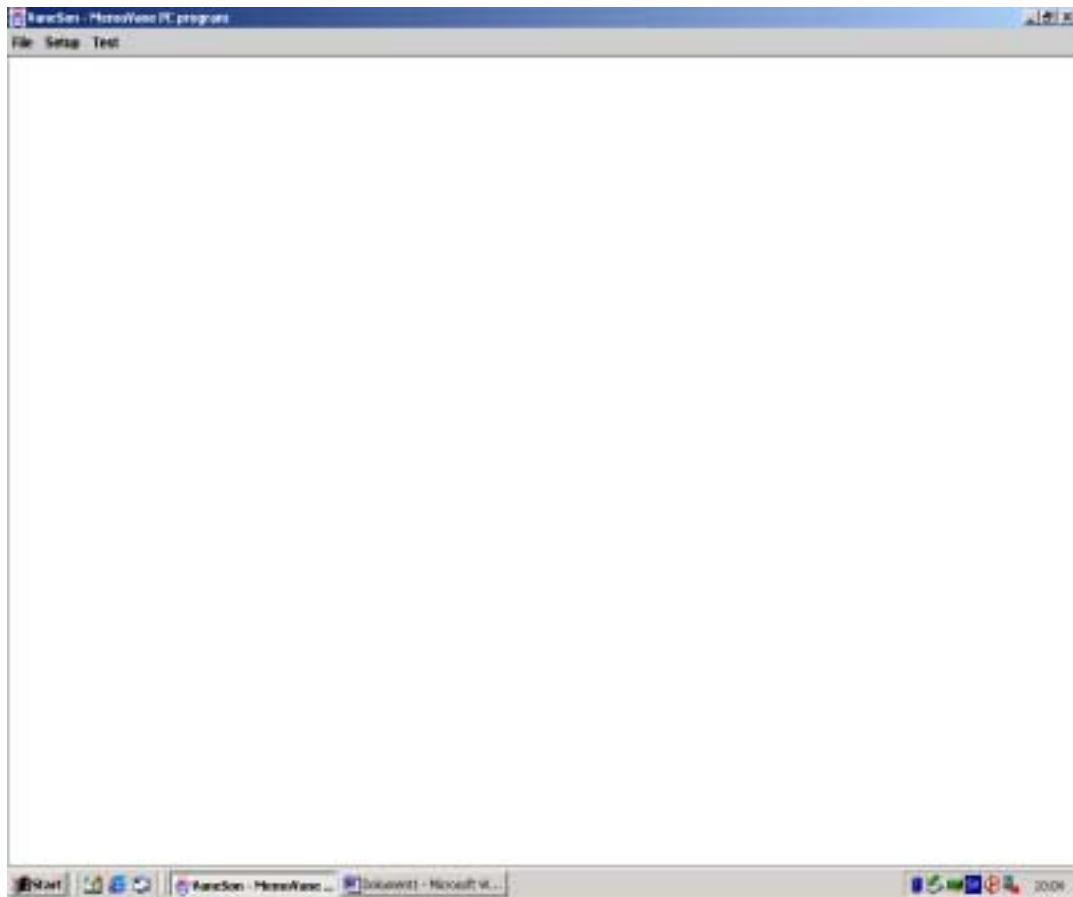
Continue with the next test level in the same way until the complete test is done.

Installing and starting VaneSon on your computer:

Put the CD rom in your CD rom drive.

The software gives all information on the screen. Follow the installation instructions.

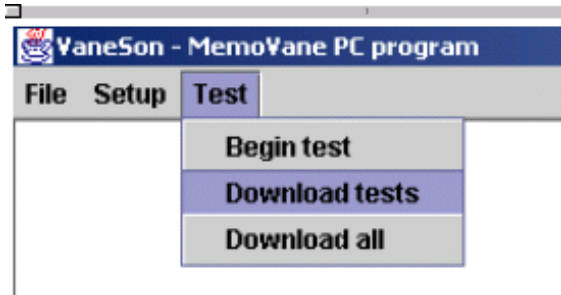
Start VaneSon.



This is the start display view of VaneSon

Operating instructions of VaneSon.

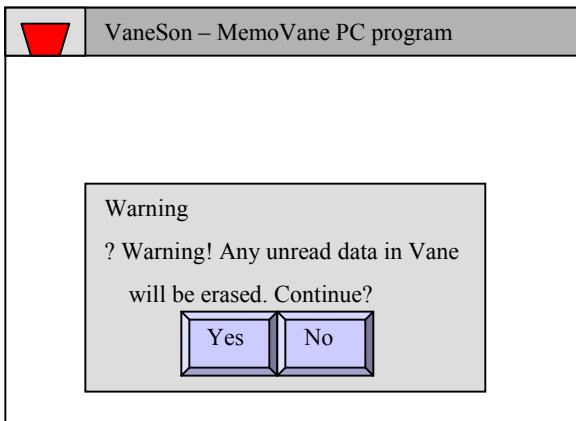
Upstarting.



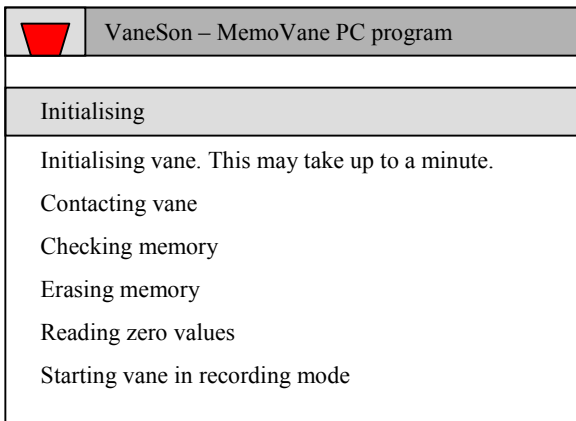
Open **VaneSon**

Click **Test**

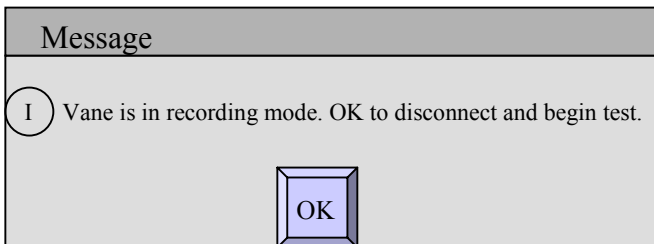
Choose **Begin test**



If the data from the last test, has not been downloaded, this warning gives the operator the possibility of saving the data. Yes is pre chosen. If yes, press Enter or use pointer and click. If No the soft ware goes back to the start page and the data can be down loaded. See page ?



The soft ware now automatically makes all preparations and starts the vane in recording mode.



Everything is now ready for start.

Use Pointer and click or press Enter.

The green lamp on the MemoVane is now on for one second and off for one second. This confirms two things. The power from the batteries is enough and that the MemoVane is in operation mode.

If the red lamp is on or twinkling, the battery power is low and they needs to be exchanged.

Disconnect the cable from the connector for cable on the vane.

The computer can now be turned off.

Mount the connector for inner rod, upper outer tube and connector for casing.

Mount one inner rod and one casing tube and tighten.

Lift out the mechanical chuck on the gear box.

Push the prepared vane down to the desired depth. Push the inner rod with the vane 40 cm more.

Put the mechanical chuck over the inner rod and lower it until it gets in the coupling on the gear box. Close the chuck by lifting the upper part and let go. The chuck will be kept locked by the inner spring.

Start the test by turning the knob clock wise until stipulated rpm is achieved.

The yellow lamp is on while the torque is increasing. When the soil has collapsed the yellow light is out and the green light is on. This indicates that the applied torque is decreasing. There is a failure in the clay and the test on that level is completed.

Stop the gearbox with the knob by turning it anti clock wise until stop.

Open the mechanical chuck.

If the test shall include also the remoulded test, rotate the inner string the number of revolutions as standardized.

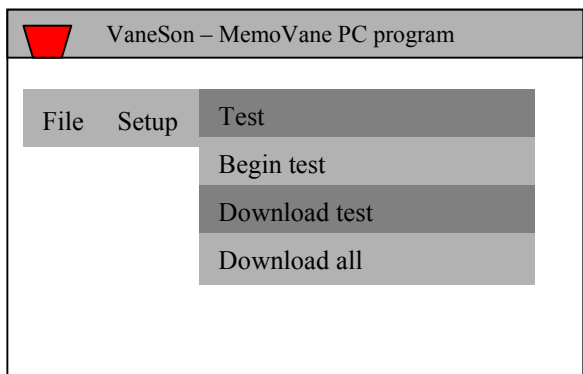
Start the test as described above and proceed in the same way. Depending of the soil perhaps no failure is achieved and no green light is on. In this case rotate the inner rod approximately 90 degrees and stop the test.

Retrac the inner rod until the Vane is in it's protection. The Vane will automatically find the right way into the protection shoe.

Continue with the next test level in the same way until the complete test is done.

When the MemoVane is retracted to the surface, disconnect the connection for casing, the upper outer tube and the connector for the inner rod.

Connect the cable between the contact in the MemoVane and the com port on the computer.



Start the computer and VaneSon

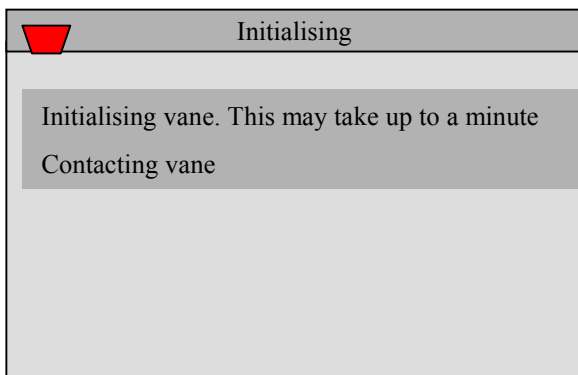
Click test

Choose Download test



If you see this on the screen you have chosen a non valid com port.

Go to Setup and change from com1 to com 2 or vice versa.



VaneSon is contacting the vane.

The software is searching through the entire memory and downloads all tests.

All tests shorter than 30 seconds will not be presented. To be able to see also these chose Download all.

All tests will be presented at the number of seconds they started from when MemoVane was initiated.

At start time you print the time when the first test started. The soft ware will now put every test at the right time of the day.

The former used Vane size is pre chosen. If changed put in the new vane size.

Project name is the name you want the test to be stored at.

ID type is how the test is positioned.

Free number is your own choice of positioning: 1, 2 124, A1, ABC or BEIJING 45.

X/Y/Z are the co-ordinates according to the valid system where you are.

Section/Distance is used e.g. for roads and railroads: length from zero (start) and distance from zeroline left or right: 2345 Left 20.

If free number is selected, print the ID-number and click continue.

If X/Y/Z or Section/Distance is chosen, print the values for these and continue.

Test	Start time	Test level
<input type="checkbox"/> 1	11:15	<input type="text"/>
<input type="checkbox"/> 2	11:43	<input type="text"/>
<input type="checkbox"/> 3	12:16	<input type="text"/>
<input type="checkbox"/> 4	12:22	<input type="text"/>

Now all tests will be presented at the right times of the day.

On the left all tests are marked. If some of tests are not going to be used unmark these tests.

Put the right test level for each test in the fields on the right.

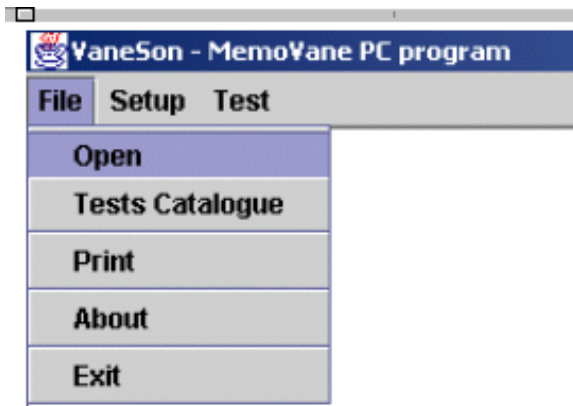
Press continue with the pointer.



Save the file in a directory, in a for Windows normal way.



The software is now downloading the tests one by one until all tests are downloaded.

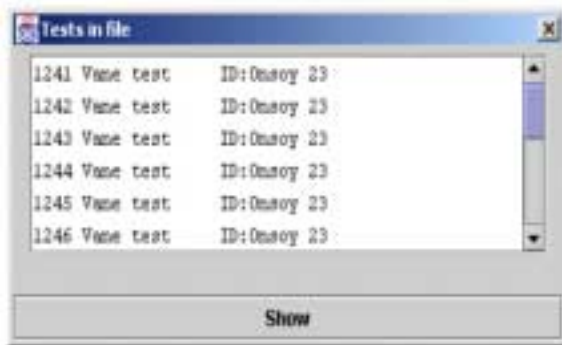


To be able to look at every test at every level, open pop up menu: File.

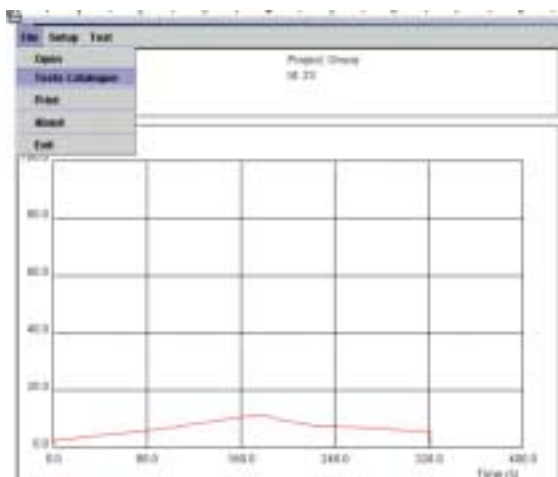
Click open.



Choose the directory where all the tests are stored and click open.



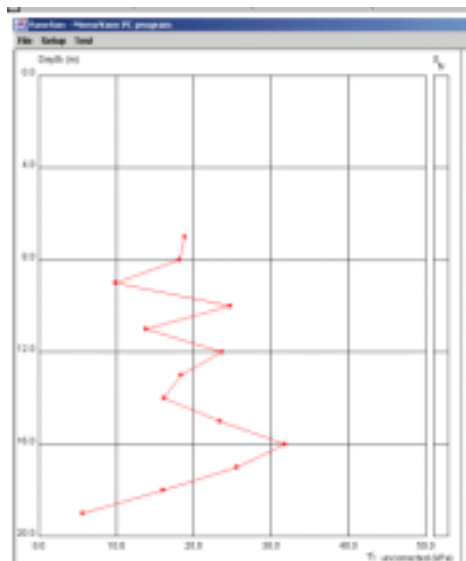
Chose test by test and get the presented one by one.



Every level is presented one by one.

For the next level don't select open but Test Catalogue.

If printouts is needed, print all one by one, while they are present at the screen.



When all levels are controlled, go to Tests in File and choose: Vane Summary.

This is the presentation of the uncorrected maximum values from each test level.

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