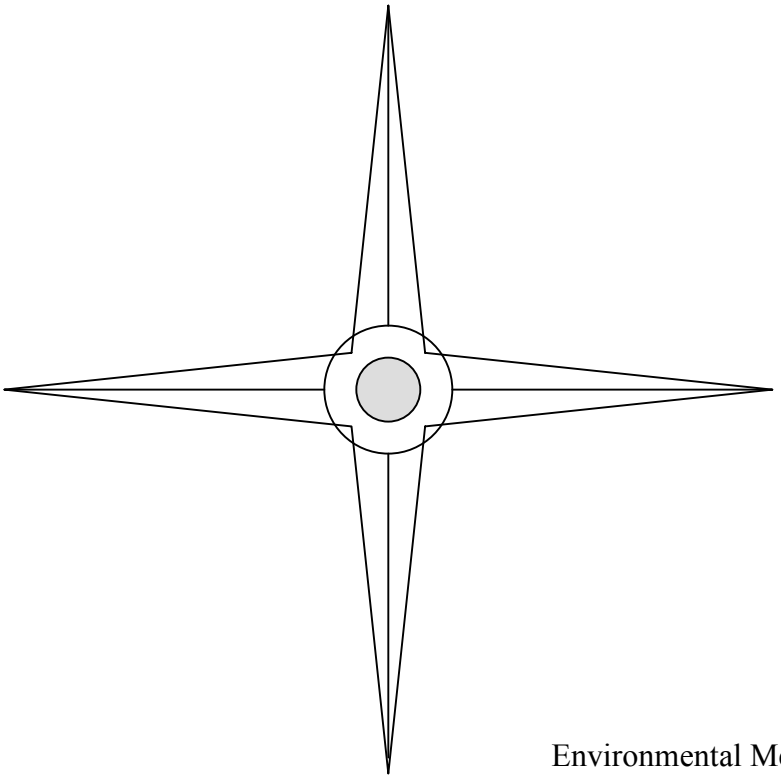
MemoVane™

for Geoprinter 60

Instruction Manual



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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.

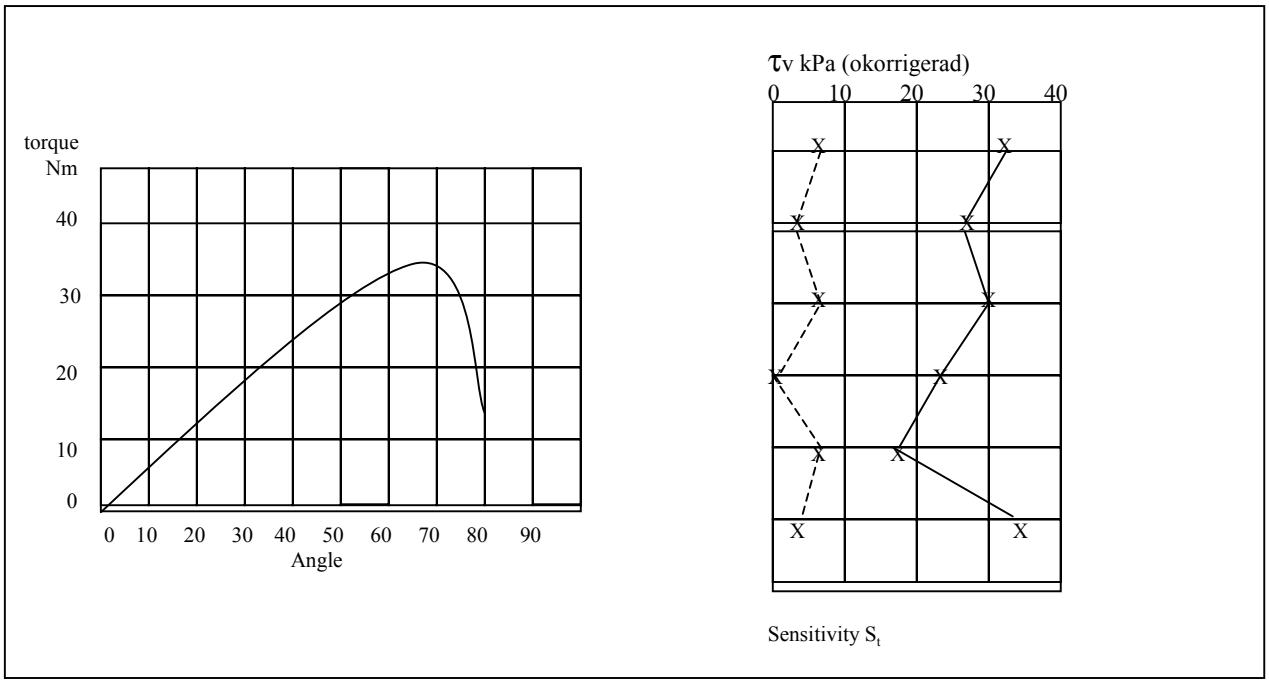
The Vane shall consist of four rectangular plates fixed at a 90^0 angle to each other.

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.

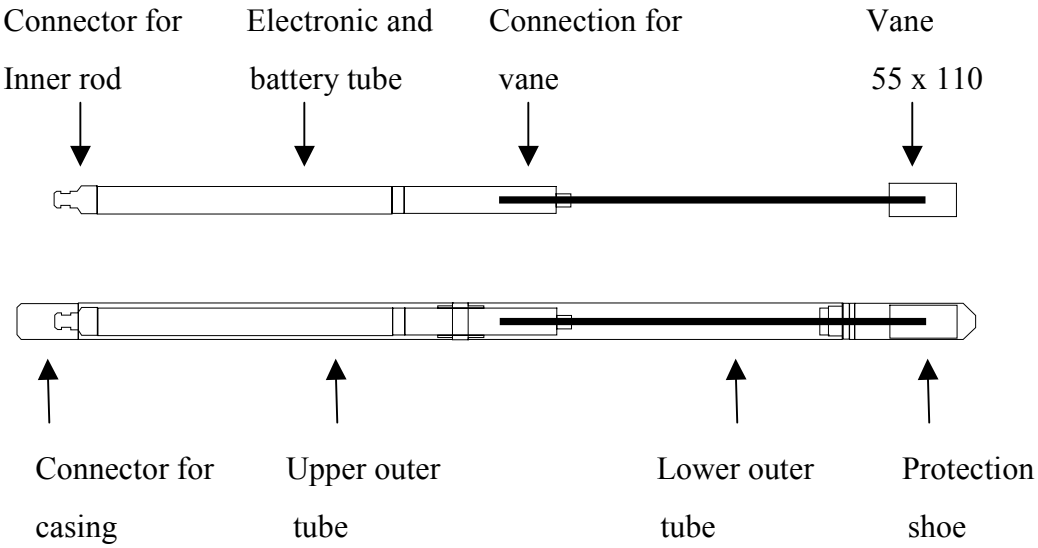
MemoVane fulfils and exceeds prENV 1997-3.

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 MemoVane™.



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™

When data collector **Geoprinter 60** is used as registration instrument.

Prepare the GP60 according to the instruction: Geoprinter 60 General Description.

Go to program **25 MVII TEST** and press **E**.

Prepare the MemoVane.

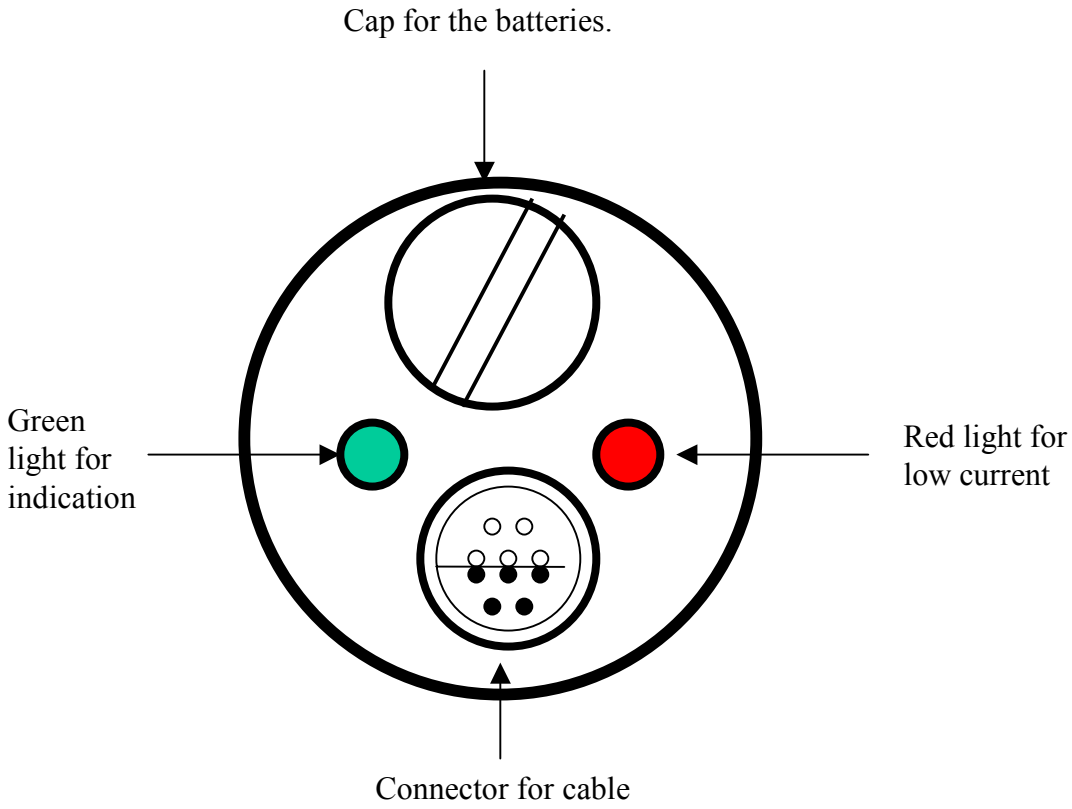
If the MemoVane is fully mounted.

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.



Connect the cable between the contact in the MemoVane and the Geoprinter60. No mistakes can be done since all connectors are exclusive.

The green lamp is on for 10 seconds and off for 1 second.

The GP60 asks: **LEVEL IN METER** or **LEVEL IN FEET**.

Put in the level: for instance 3.5 followed by **E**.

The GP60 asks: **OBJECT <ENVI>**. The former projectname is prechoosen. Print the new job name **Beijing45**, followed by **E**.

The GP60 says **READING ZEROES, wait**.

The GP60 asks: **VANE SIZE IN MM <55>**: Confirm with **E** or put in the **new values** and confirm with **E**.

The head is now printed on the paper in the GP60.

On the screen you now see: **VANE TEST**

TEST OFF

DEPTH: 03.50

ANGLE: 00.0

The green lamp is now on for 1 second and off for one second. This confirms that the MemoVane is in operation mode.

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

Disconnect the cable from the Vane.

Mount the gearbox on the drill head and remove the mechanical chuck. Connect the cable between the gear box and the GP60 and the battery on the drill rig.

Here are variations depending on how the rig is prepared.

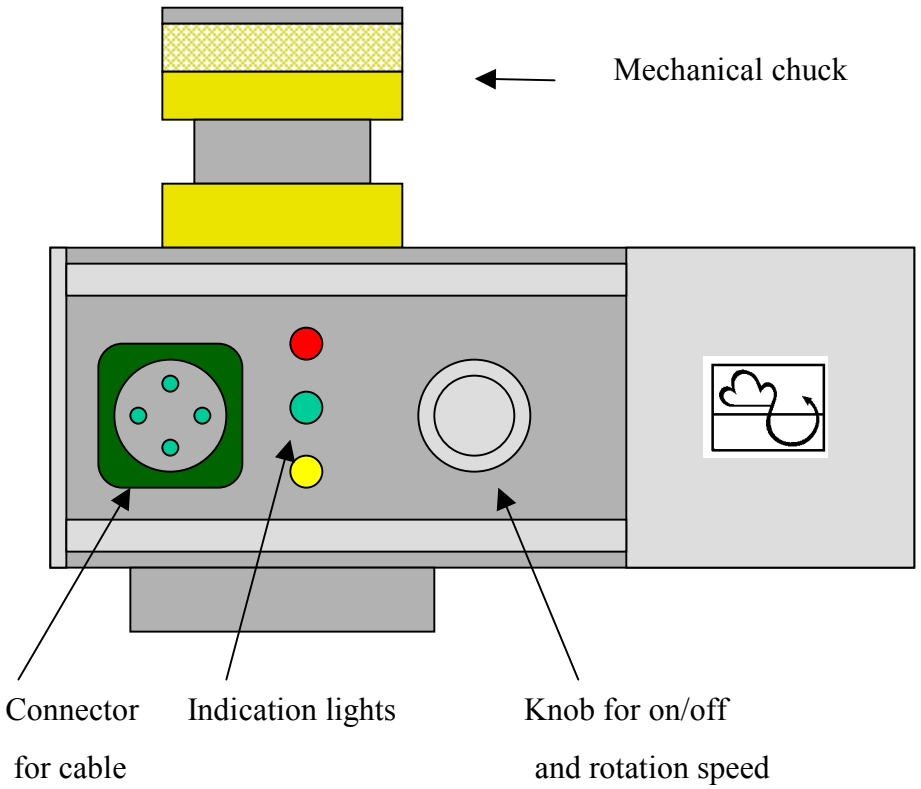
On some rigs you get both power and datacable in a premounted plug on the drill head. On some rigs you have to connect both cables manually towards the GP60 and the battery on the rig.

Push the Vane down to the wanted depth minus 40cm. Push the innerrod rod down 40cm until the desired depth is reached.

Mount the mechanical chuck on the inner rod and lock it.

Start the soft ware in the GP60 by pressing key **F1** and start the gearbox with the knob for rotation speed. Increase speed by turning the knob clock wise until proper speed is achieved. Failure shall be obtained within 120 – 180 seconds.

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 close 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 instructions continued.

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 knob by turning it anti clock wise until stop.

Stop the GP60 by pressing the **F2** key.

Loosen 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.

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 Vane is back on the surface, disconnect the connection for casing,upper outer tube and the connector for the inner rod.

Connect the cable and start soft ware **26 MVII READ** on the GP60.

The Geoprinter is now downloading all tests. Each test is printed on the paper strip. Also the **MVII MAX** is plotted.

Automatic dumping of data to Floppy Disk.

From software version 6.0 there is a possibility to recall the data automatically to a Floppy Disk.

When the test is completed press the **–** and **+** key for 5 seconds to terminate the registration program.

GP60 asks:	**OK to transfer new data**	**Y/n**		Y for yes
	to diskette now?			is preselected
Press:			**E**	E for Enter
GP60 asks:	**Data format>**	**0 SGF**		.STD format
		1 ASCII		EXCEL
Press:		**0** or **1**		
GP60 asks:	**Install a floppy disk**			
	type HD 1,44 Mb			
Press:			**E**	E for Enter

The first time a download is taking place during the day, a datafile is created with the date of the day e.g. **010830.STD**. All tests during this day are stored in the same datafile.

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