

Manual for the DynaRoot and DynaTree evaluation system

9 May 2025

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Introduction

The stability of urban trees is a key question that affects everyone. Diseased and unstable urban trees pose much risk for everyone and are a serious liability for municipalities in case of an accident. Tree stability assessment is therefore of the utmost importance. In the meantime, it tends to be much neglected in many areas.

At present, there is only one accepted method for tree stability assessment. The pulling test, while well established and accepted, has several drawbacks in terms of ease of use. Dynamic root stability determination is based on real life wind loads and is therefore more appropriate for assessing real life risks. It is also much simpler to carry out than the traditional pulling test, with the only drawback being that it requires windy weather to carry out.

The pulling test

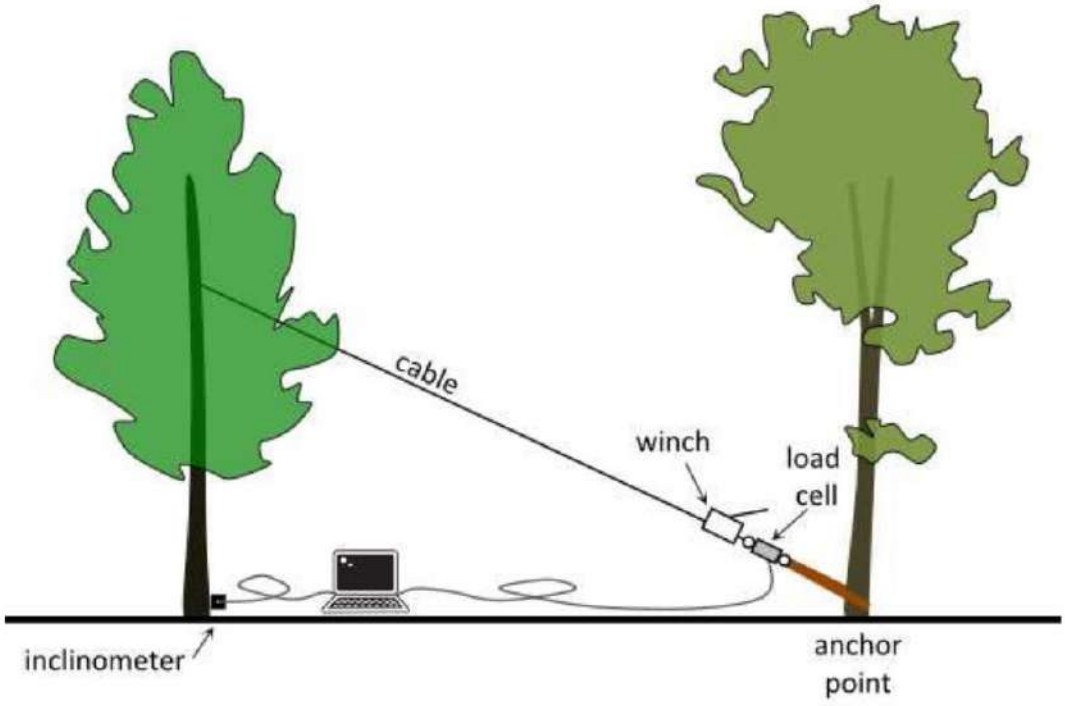


Figure 1 Schematic of the pulling test

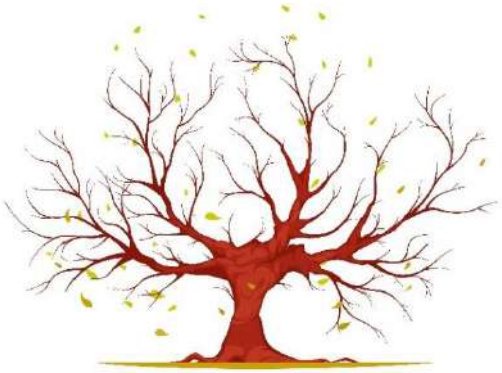
The pulling test is based on affixing a cable at approximately mid-height on the tree to be evaluated, and applying a moderate load, while measuring the inclination at the root collar. The induced inclination is very moderate (less than .25 degrees), to make sure that the test itself does not damage the tree and the roots. Based on the measured load, it is possible to extrapolate to the approximate torque required to uproot the tree. The maximum torque can also be calculated based on the crown surface, aerodynamic drag factor and the maximum wind velocity likely to occur in the area. The ratio of the two torque values is the safety factor (SF) of the given tree. If this value is above 1.5, the tree is declared safe, while a SF below 1 indicates high risk. In-between these two values, the safety of the tree is considered uncertain.

The advantage of the pulling test is that it is a fairly straightforward, well-researched and established method. On the other hand, the applied static load approximates the real-life situation, where trees are subjected to dynamic loading, rather poorly. It is also quite cumbersome; requires heavy equipment (high capacity cable and winch) and a ladder or climbing kit to be carried to the test site, lengthy preparation, and physical exertion during testing. The pulling cable must be fastened to some well-secured object on the ground (like another tree trunk or stump) that may or may not be readily available. Pulling test is not recommended to be carried out above 25 km/h wind velocity.

The DynaTree dynamic root evaluation system

It would be much simpler to use the loads that arise from the actual wind rather than a loaded cable to assess the tree's safety in a high wind situation. There are, however, two interrelated problems that makes this very complicated:

1. Trees consist of a complicated network of trunk, major, minor branches, twigs and (in the summer) leaves. This situation is not unlike a multiple pendulum that reacts to loading in a very unpredictable, erratic manner, when the load is not applied directly to the trunk (as is the case in the pulling test).



2. As a result, there is no direct relationship between the wind load (wind velocity) and the immediate response of the tree, i.e. no correlation between the load and the inclination of the trunk (see Figure 2).

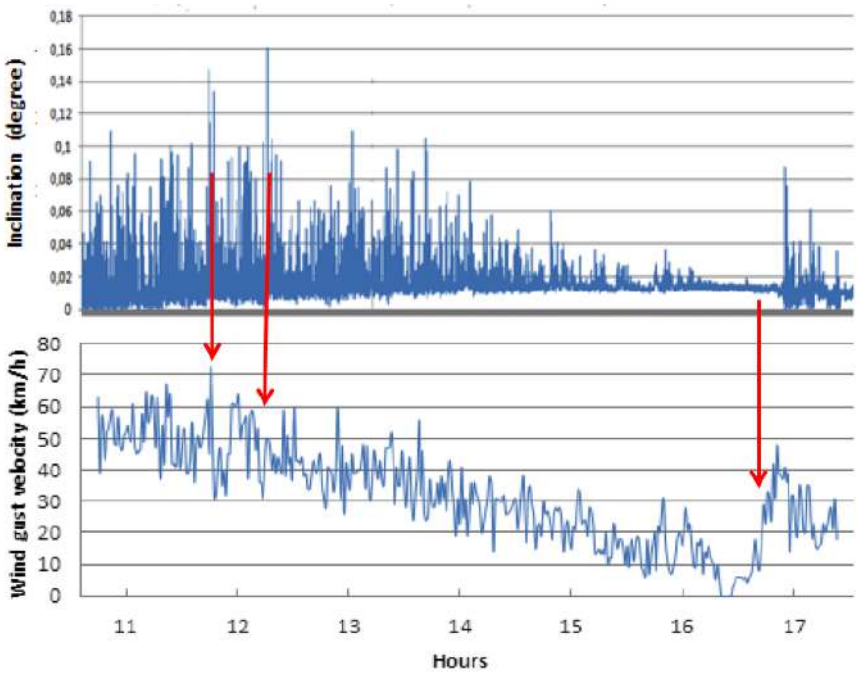


Figure 2 Time series plot of inclination and wind velocity

The behavior of a tree in the wind is highly sensitive to the initial conditions. Small differences in initial conditions yield widely diverging outcomes for such dynamic systems (a situation popularly referred to as “the butterfly effect”). It is impossible to predict the behavior of such systems on the long run. A definite relationship exists between the wind velocity and the inclination of the tree, but it is a complex relationship, not one of immediate cause and effect.
One way to evaluate such systems is using statistical parameters of the data taken over longer intervals. There is no immediate relationship between the wind velocity and the inclination at any given moment, but there is a relationship between their averages and other statistical parameters observed over a longer interval. The Dyna- systems take advantage of this statistical relationship.

How does DynaRoot work?

DynaRoot consists of three components (see Figure 3).

1. **Anemometer**; an instrument for measuring wind velocity at or near the tree to be evaluated. The closer to the better, but, depending on wind velocity DynaRoot may provide reliable data even with measurements taken several kilometers / miles away. The anemometer provides wind velocity data of sufficient frequency (1 Hz). Ideally the anemometer should be clear of buildings or other objects that may obstruct the wind, at a height of at least 10 m.

2. **Inclinometer**; an instrument affixed to the root collar that measures the inclination of the trunk in two different directions. The instrument provides very accurate (10 Hz) inclination data with sufficient frequency.

3. **Evaluation software**; a PC software evaluates wind velocity, x and y inclination and displacement. The data, recorded over a period of several hours (minimum of 70 mins, recommended 3 hours) are transferred from the anemometer and inclinometer on memory cards via Wi-Fi. The software breaks the data down into shorter intervals and calculates statistic parameters for each interval that are used for the tree stability evaluation.

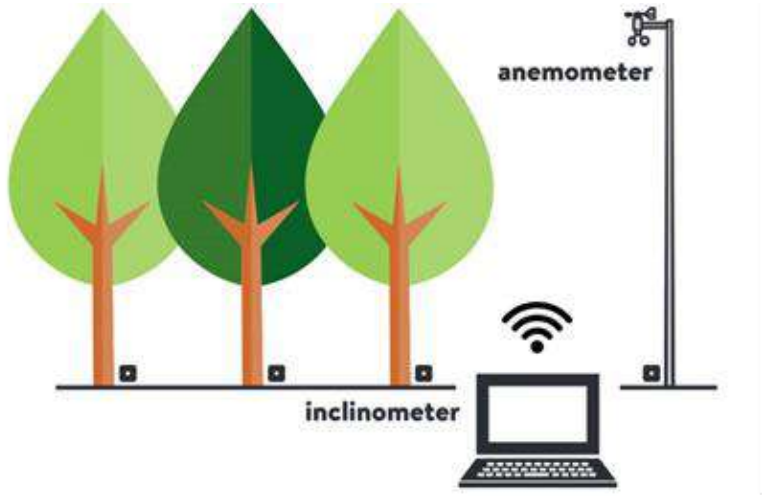


Figure 3 DynaRoot components

How does DynaTree work?

DynaTree system consists of four components (see Figure 4), three of which is identical with those of DynaRoot. The three components will only be listed below.

1. **Anemometer**
2. **Inclinometer**
3. **Evaluation software**
4. **Elastometer**; an instrument attached to the trunk for measuring the micro deformations.

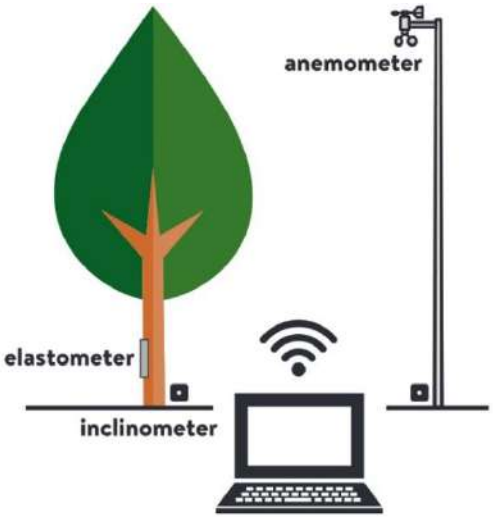


Figure 4 DynaTree system components

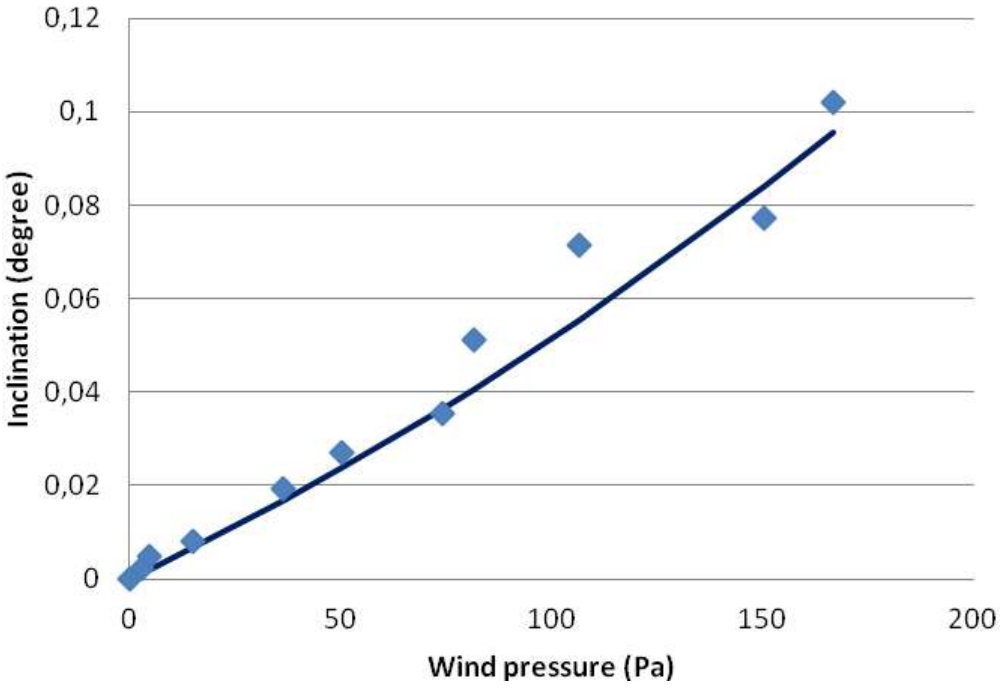


Figure 5 Relationship between the wind pressure and inclination

The Safety Factor calculation is almost the same as the one used for the pulling test, except, in this case, wind pressure is used instead of force, and statistical parameters used instead of the momentary wind pressure and inclination values. There is a tangential relationship between the wind pressure and the inclination of the tree, and the critical wind pressure can be calculated from the curves (see Figure 5). This critical value is used for calculating the SF, which is interpreted much the same way as the one calculated from the static pulling test.

Conditions for conducting the measurement

Reliability and validity of test results

DynaRoot and DynaTree results are based on statistical evaluation, hence we face statistical fluctuation in the results. Please be aware these tests are not 100% perfect, however a review of testing results has shown a 99.5% reliability in the Safety Factor calculation.

The Safety Factor generated by the software is not valid in case of User errors. For instructions, users must conduct the test in line with the latest user manual and use the most up-to-date software available on our website.

The validity of the test result is 1 year. The test determines the current stability of the tree and its resistance to overturning, or in the case of DynaTree, the strength of the stem in the area where the elastometer sensors are attached. These systems do not assess the health, vitality or longevity of a tree.

The stability of a tree can change rapidly and may need to be reassessed within a year when significant or rapid changes are suspected or observed, such as the following example factors:

- Root cutting, fracture, trenching or severance
- Intense fungal infections of the roots or secondary colonization by a secondary pathogen
- Changes in surroundings i.e. buildings constructed or removed or trees removed
- Drilling test performed at root collar (opens compartmentalization zone for fungal infection)
- Significant increase in soil moisture content (saturated soil) or localized soil erosion, cultivation or compaction
- Mechanical damage of the principal supporting roots, particularly the notional rootplate
- High wind gust velocity (above 100 km/h)

In the above cases, we don’t take responsibility for possible damage.

User errors

The DynaRoot & DynaTree systems are relatively straightforward and data collection is systematic. Provided the guidelines in the manual are followed, the safety factor can be calculated. However, care and consideration are required to provide a representative safety factor. Below are the key oversights and errors by users that are often overlooked and which we cannot rectify or be responsible for:

1. It is a user error when a joint evaluation of different wind directions is performed – Separate evaluation of different wind directions is required.
2. It is a user error to take the wrong wind direction dependency due to faulty anemometer orientation – Ensure the anemometer is correctly orientated.
3. It is a user error when using a Ball anemometer and Ball Head is not fixed correctly. This will compromise results – Ensure the Ball head is rotating freely and is mounted in a horizontal position rigidly to avoid swaying on the pole.
4. It is a user error to mount ultrasonic anemometer incorrectly, this will compromise results – Please ensure the anemometer is mounted horizontally and in position rigidly to avoid swaying on the pole.
5. It is a user error to perform testing in low wind speed (less than 35 km/h) – Ensure wind events have expected wind gusts of >35km/h.
6. It is a user error to take the test result of a tree standing in a wind shadow. A measurement taken while the tree was in a wind shadow should not be used to draw conclusions regarding its behavior under direct wind exposure. Such a result only reflects how the tree responds when sheltered from the wind – Ensure the anemometer is directly exposed to wind.

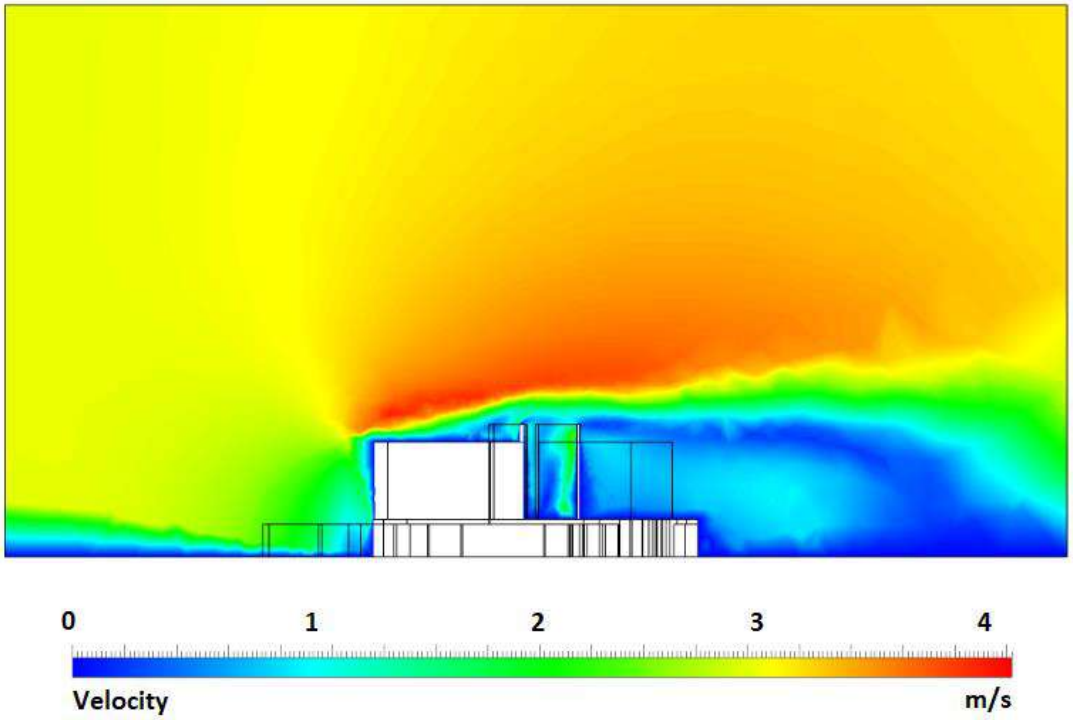
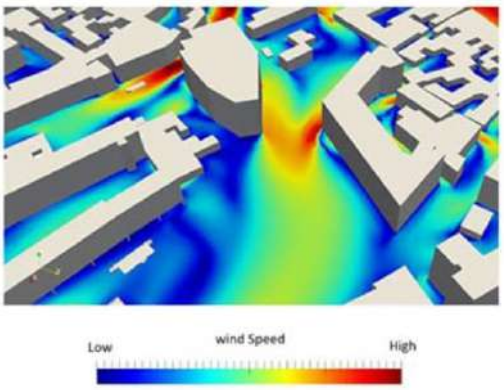
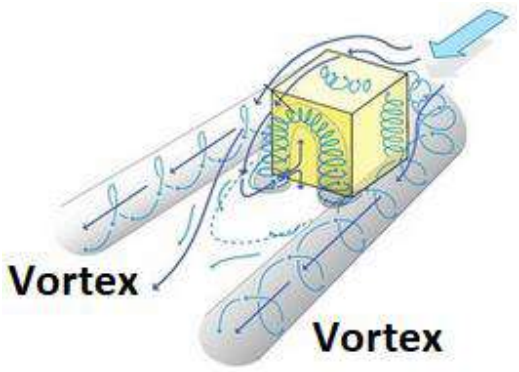


Figure 6 Blue area indicating the wind shadow

7. It is a user error to position the anemometer in the wrong place: wind channel (red area on left figure), or in a vortex zone (right figure) – Ensure the anemometer is well-positioned, with no wind channel and turbulence/ vortex effects.





8. It is a user error to test for a too short period of time (less than 3 hours) – Please ensure that test periods are of sufficient length.

9. It is a user error to perform an assessment using an old software version – Ensure assessments are undertaken using the most up-to-date software.
10. It is a user error to perform a faulty evaluation e.g. by ignoring the option "Out of leaf" when measuring a tree without leaves – Ensure measurement options are correct for the circumstances of testing.
11. It is a user error to position the inclinometer in the wrong place where the inclinometer is not moving together with the roots, e.g.
    - buttresses
    - on a decayed area of the root collar
    - on a root collar with cracks
    - on isolated parts of the buttress (i.e. bi-forked, tri-forked and multiple stemmed trees with included unions, where multiple inclinometers per tree are required)
    - too high on the stem
    - on too young trees without heartwood formation: on hardwood species with
    - DBH less than 30 cm or on softwood species with DBH less than 40 cm

    Ensure you place the inclinometer sensor on safe and intact areas of the root collar as close to ground level as possible.

12. It is a user error to ignore visual indicators of root failure:
    - dislocation of the root plate
    - sudden soil moisture changes or flooding
    - soil cracks radiating from the tree, indicating a lifting primary root or roots
    - soil cracks encircling the root plate suggesting movement
    - lifted soil on the windward side of the root plate
    - depressions in the soil on the leeward side of the root plate
    - recently leaning trees i.e. leaning trees without vertical adaptive or epicormic regrowth

    Please consider the above visual indicators and make your assessment accordingly.

In these cases, the resulting safety factor is not applicable and will require additional interpretation or secondary testing using a more appropriate system.

Some considerations concerning the measurement

The distance between the measured tree and the anemometer

The relationship between wind intensity and inclination is obviously closer if wind velocity is measured close to the tree. Nevertheless, fairly accurate correlations can be achieved if the anemometer is located within 1.5 km (~1 mile). It is, of course, best to set up the anemometer close to the measured tree, but this may not always be possible due to the terrain constraints. As long as wind data collection happens reasonably close, and there is sufficient wind, the evaluation is possible.

Selecting anemometer location

The height of the anemometer should be 10 meters above ground. It should measure wind undisturbed by nearby objects. It should be placed 30 meters away from busy roads. When there is a tall object from the direction of the wind, the anemometer distance from the tall object should be at least 10 times the height of a given object.

Wind velocity

The most important condition for the application of this technique is windy weather. The higher the wind, the better the accuracy of the measurement. The minimum requirement is a wind speed of at least 25 km/h ~15 mph (see Figure 5). In the software, at the evaluation step where the safety factor is shown, a low gust velocity warning appears between 25 km/h and 35 km/h maximal wind gust velocity. The minimum average wind velocity is 12.5 km/h.

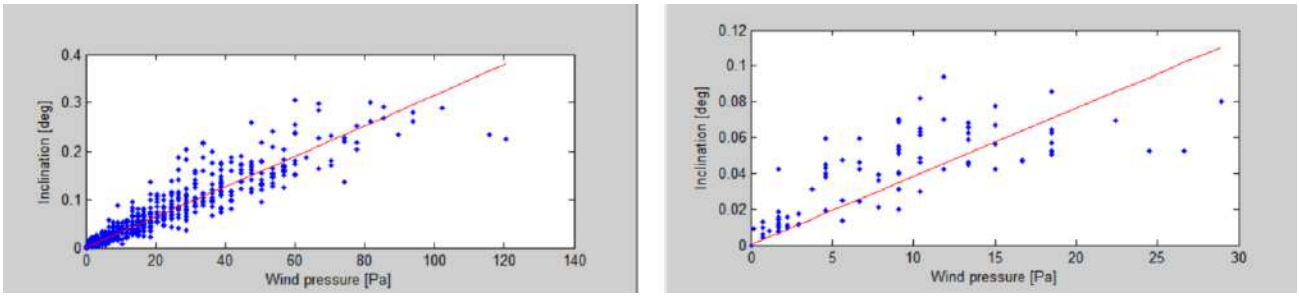


Figure 7 An important condition for DynaRoot to be applicable is a sufficiently large wind speed

Statistical approach

As mentioned before, instead of using momentary wind velocity and inclination data, values are collected over a longer period (3 hours is recommended), and several minutes' worth of information is evaluated statistically. The accuracy of the data (the tightness of the correlation) depends on the time interval.

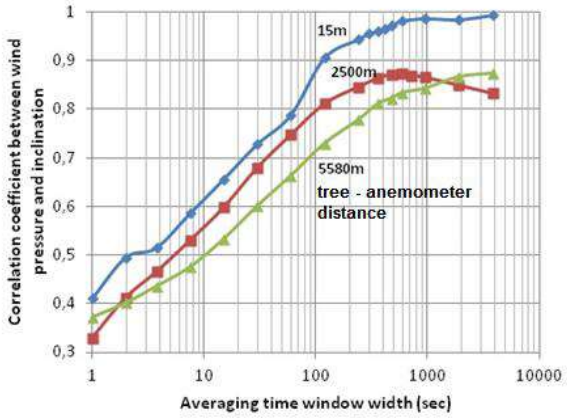


Figure 8 Relationship between averaging time and the resulting correlation coefficient

The time interval can be specified in the software when evaluating. We recommend 5-minute time window; however, this also means that long measurement periods are required to collect enough data points. 5 min (default setting) or even 2 min measurement intervals offer more data points without seriously compromising the accuracy of the measurements, if wind velocity is measured nearby. If wind velocity is measured more than 300 meters away, we recommend longer collection periods and using 10-minute window for the statistics.

Wind direction sensitivity

If the examined tree is located near a tall object, the measured SF is sensitive to the wind direction. In case the tree is shielded from the wind, we will get a higher SF compared to an open field measurement. Asymmetrical roots can also cause directional differences in SF.

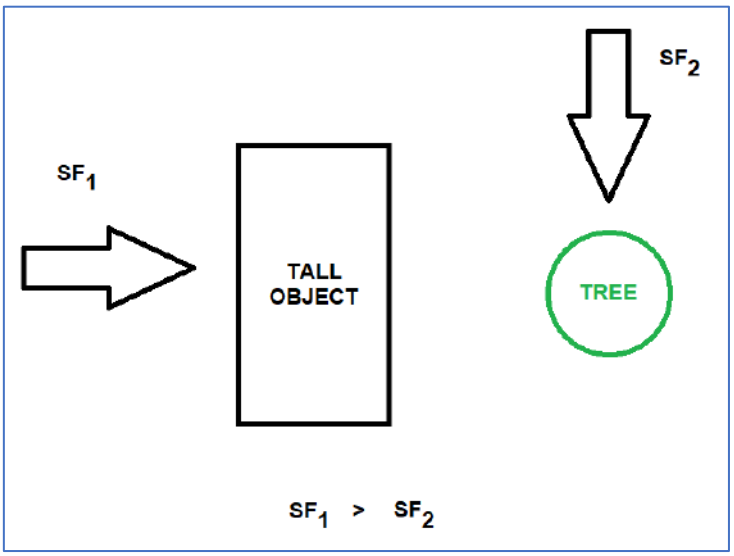


Figure 9 The SF will be higher when the tree is shielded from the wind

Multiple measurements

The efficiency of the DynaRoot system multiples when measuring several trees simultaneously. This is possible, because – unlike in the case of the pulling test – the operator doesn't have to supply the pulling load for each tree. The only thing required is an inclinometer mounted on each tree to be evaluated, while the same anemometer can provide the wind velocity data for each tree. The anemometer should be within a radius of 1.5 km, but keep in mind that it is best to have the anemometer close to the tree. Placing the anemometer at high distances might render the measurement unusable.

Advantages and disadvantages

The DynaRoot and DynaTree system offers inclination measurements under real wind load conditions, which is a can provide a good approximation of the actual situation that eventually leads to the uprooting of a tree when measuring with sufficient wind. It is easier to set up and carry out than a pulling test; no need for heavy equipment, climbing equipment and physical exertion during the test. There are only two disadvantages to this measurement. One is that sufficiently high wind velocities (at least 25 km/h) during the measurement are required, which may be a problem when urgent results are expected. The other issue is that the measurement is more time consuming than the traditional pulling test. However, it does not require constant monitoring – after setup, the system can be left alone for the several hours required to collect the data. It can also be more efficient than the traditional test when measuring multiple trees simultaneously. Table 1 compares the Dyna system to the traditional pulling test.

Issue	**Pulling test**	**DynaTree**
Required equipment	Cable, slings, winch, load cell, ladder, inclinometer (approx. 50 kg)	Anemometer, inclinometer, elastometers (for DynaTree only) (approx. 20 kg)
Load	Static	Realistic
Time required	1-3 hours / tree	At least 3 hours / several trees
SF calculation	Crown area, drag factor and critical wind speed required	Only critical wind speed required
Weather conditions	Wind speed < 25 km/h	Wind speed > 25 km/h

Table 1: Comparison of the DynaRoot and DynaTree system and the traditional pulling test

System components

Anemometer



- Sampling rate: 1 Hz
- Measurement range: 0-150 km/h
- Accuracy: 0.2 km/h
- Integrated GPS
- Data storage capacity: 16 GB (SD card)
- Best location: open field, 10 m height, undisturbed by buildings or other large objects
- Completely weather proof

Dual axis inclinometer



- Measurement range ±5 degrees
- Resolution: 0.001 ° (standard deviation, 1 σ= 0,0014)
- Temperature compensated
- Sampling rate: 10 Hz
- Integrated GPS
- Data storage capacity: 16 GB (SD card)
- Mounted by a single screw
- Operating voltage and current: 12V, 30 mA
- Weather proof, IP65

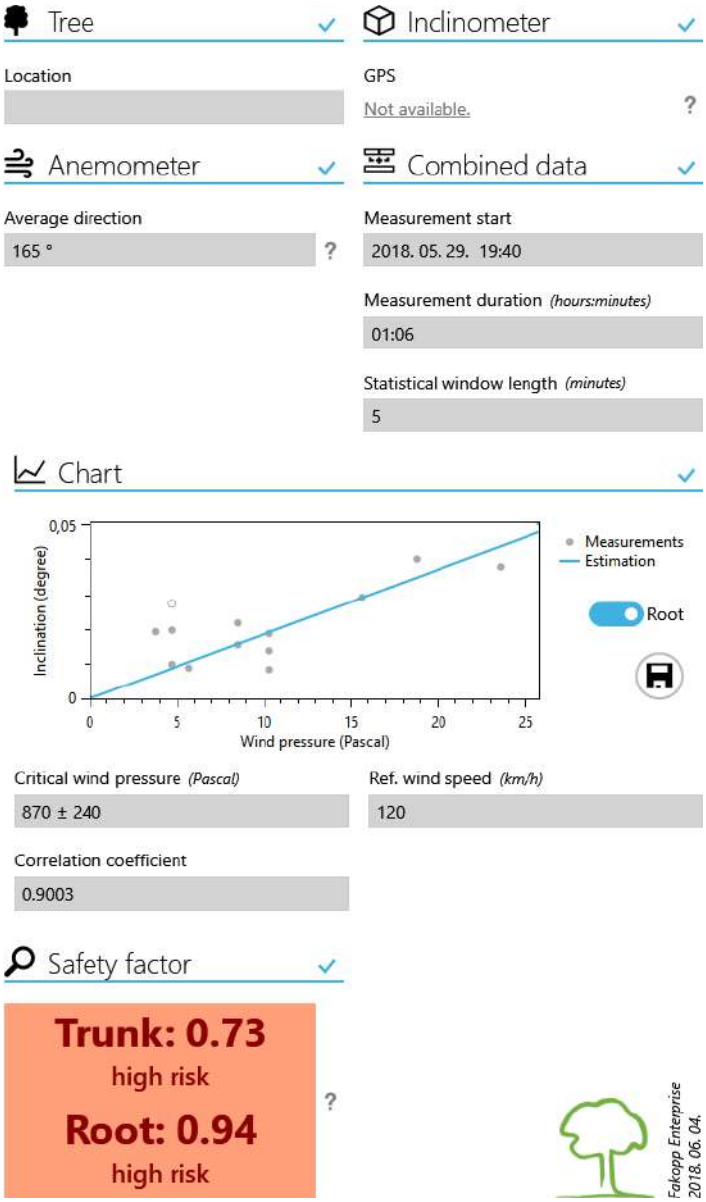
Elastometer



- LVDT elastometers
- Dimensions: 30x30x270 mm (closed)
- Span: 250 mm
- Sampling rate: 10 Hz
- Resolution 1 µm

Dyna software

- Simple yet efficient software for determining the safety factor
- Automatic merging of wind velocity, extension, and inclination data
- Diagram, critical wind pressure, correlation coefficient and safety factor calculation
- Runs under Microsoft Windows



Operation guide

Dyna system should be used on days with at least 25 km/h (15 mph) wind gust velocities. Setting up the measurement involves mounting the inclinometer(s) on the tree(s) root collar to be assessed and erecting the anemometer in the vicinity of the trees, within 1.5 km if possible. In case of DynaTree the elastometers should be placed on the tree at 90 degrees relative to the pith.

Inclinometer setup

- Attach the mounting plate using a screw to the tree collar (as close to ground level as possible.)
- Use the ball head to level the mounting plate (using the two leveling tubes) and set it in the horizontal position.
- Slide the inclinometer onto the mounting plate and secure it with the bolt.
- Connect the wires to the external battery (12 VDC). Make sure not to reverse the polarity!
- Wait for the OK LED to light up.



Figure 10 Inclinometer during data collection

- When the OK LED is lit, you may press SD START on the control panel located on the side of the instrument box (see Figure 10). Use the provided magnetic stick to operate the buttons. Once pressed, the OK led starts blinking once every 4 seconds to indicate that the data collection has been started. A few minutes later the OK led turns off to conserve battery.

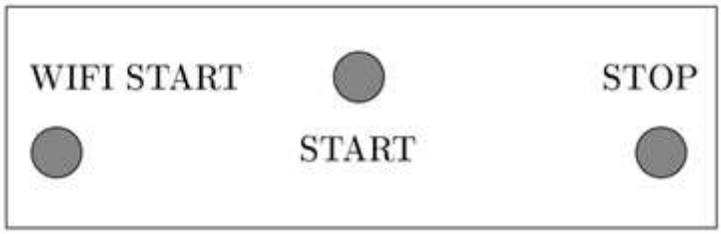


Figure 11 Buttons of the control panel

- Record data for a suitably long period of time (the longer the better, 3 hours recommended with high enough winds).
- Hit STOP on the control panel and wait for the recording to finish.
- Transfer the data from the SD card to a different device for further processing (see subsection 7.3 for more instructions) via Wi-Fi.
- Remove the power cable.

For troubleshooting purposes there are seven led indicators on the High Precision Inclination (and Deformation) Recorder (see Figure 9). They provide information concerning the operating conditions. When powering up the device, LEDs are turned on for the short period, then the LEDs indicate the state of the system.

- BA (battery low): the batteries are too low and you will not be able to start data recording. Replace the battery with a sufficiently charged one.
- GP (GPS status)
    - GP continuously on: neither time nor position received yet
    - GP led blinking: it means time received, no position yet
    - GP off: both time and position received
- SE (sensor error): indicates an issue regarding reading data from the sensor. Try to reboot by disconnecting then reconnecting to the battery.
- SD (sd-card error) led: indicates that the SD card has an error and data collection is not possible. Replace your SD card with a new one. New SD cards have to be formatted FAT32.

In summary, if either the BA (battery low), the SD (sd-card error) or the SE (sensor error) LEDs stay on, then you will not be able to start data collection. The measurement can be started regardless of the GPS state. If the GP led stays on, you can start the data collection and the GPS module will continue to work in the background. If the green OK light is on it indicates that the data collection can be started.

Anemometer setup

Assemble the anemometer tower, attach the anemometer on the top of the pole, and erect the tower. Wind velocity readings are sent to, and data is collected at the instrument box located at the bottom of the tower. Starting and stopping the data collection, recording and transferring data happens much the same way as described above at the inclinometer. The instrument box contains the same control panel (including start and stop buttons) as that of the inclinometer.

Elastometer setup

Mount the first elastometer on the tree trunk. Try to select the weakest region (based on visual inspection.) Screw in the top (2) and bottom (6) screws without releasing the securing jaws. Then loosen the thumb screw (4) and slide up the collar (3) to release the jaws (5) and thus allow the elastometer to move freely.



Mount the second elastometer in 90° angle to each other relative to the pith. Both of them should be parallel to the direction of the trunk itself.



Connect the elastometer cables to the dual elastometer unit and connect the unit to the High Precision Inclination and Deformation Recorder.

Transferring data from the SD card to a different device

During the data acquisition phase, several files are created on the SD card of your inclino- or anemometer. The DynaTree evaluation software will automatically know how to interpret the format of these files so there is no need to do any preliminary conversions. After the data acquisition phase, you need to transfer the data stored on the SD card in the instrument box your PC for further analysis. At the moment there are two possible ways to accomplish this:

1. Opening the data collector box and removing the SD card manually.
2. Putting the instrument into Wi-Fi mode and downloading/deleting data from the SD card via FTP without opening the case.

The first method should be straightforward and won't be detailed here.

Warning! Always make sure to stop the data collection by pressing STOP with the magnet before disconnecting the power from the High Precision Inclination (and Deformation) to avoid data loss.

Transferring data wirelessly to an external device consists of:

1. Putting the instrument into Wi-Fi mode (press STOP and the WIFI with the magnet).
2. Connecting to the wireless network of the instrument from the external device.
3. Downloading data to the external device via FTP protocol.

In order to establish wireless connection to your device, it should be set into Wi-Fi mode by pressing the WIFI START button.

If Wi-Fi mode is successfully activated, then the white indicator light labeled WF is lit and the device is ready to accept connection requests from any sort of devices which has a wireless network interface. The name of the Wi-Fi network to connect to always starts with DDAR. The Wi-Fi connection parameters:

- **Wi-Fi password (2023 and after):** 11111111
- Wi-Fi password (2022 and before): Ddar-123

After connecting to the Wi-Fi, you can use any application that supports FTP to transfer the files.

- **FTP Host name**: 192.168.4.1
- **FTP User name**: ddar
- **FTP Password**: ddar9876

There is a step-by-step description of the process in the section named *Transferring data wirelessly on Windows*.

Analysis using the DynaRoot-DynaTree software

In the following section, we will assume that data has been successfully transferred from the inclinometer(s), elastometers and the anemometer to a PC that runs Microsoft Windows and the DynaRoot-DynaTree software has been installed. After starting the program, first enter the *Options* menu by clicking on the top left corner. See Figure 11 for a screenshot of the menu. This is where you can choose your language (default is English) and turn DynaTree function on.

If you have only inclination and wind data, turn off the DynaTree option. Otherwise, if you have used the elastometers, turn on the DynaTree function. Elastometers sold after 2021 will not need calibration values C1 & C2 entered. If you have elastometers shipped with C1 and C2 calibration values, please enter them after selecting DynaTree. Finally press OK to close the Options window.

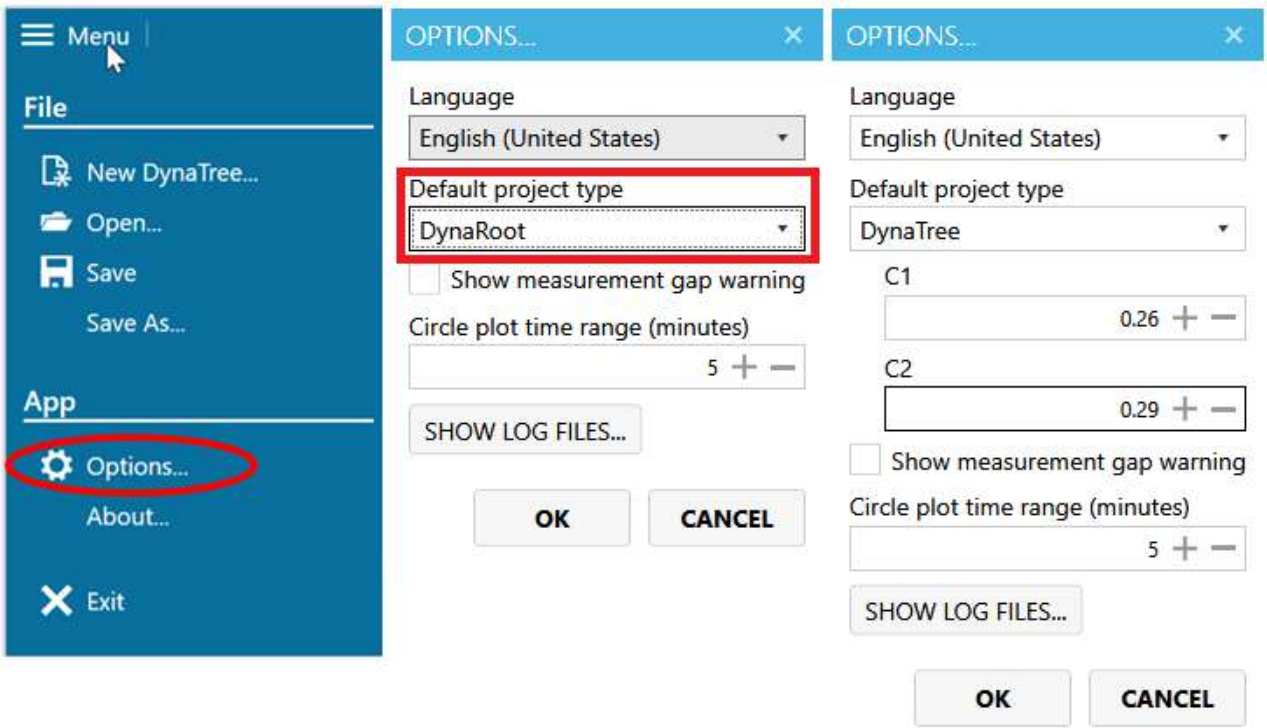


Figure 12 The options menu

After returning to the data window (see Figure 12), you can specify the location of the tree (optional), and the location of the source data. First, you need to select the type of anemometer. Currently, there are seven types of anemometers included in the software (see Figure 13).

Use the folder button on the right to select the location of the wind velocity and the inclination data folder. You also have to set the reference wind speed (expected maximum wind velocity for the area), for which you wish to calculate the Safety Factor.

If “Advanced parameters” is turned on “Max. merge error” and “Statistical window length” can be modified. The maximum merge error specifies how much wind and inclination data may be shifted from one another. Statistical window size specifies the length of the interval, over which statistical parameters of wind velocity and inclination is calculated. You only need to specify this information once.

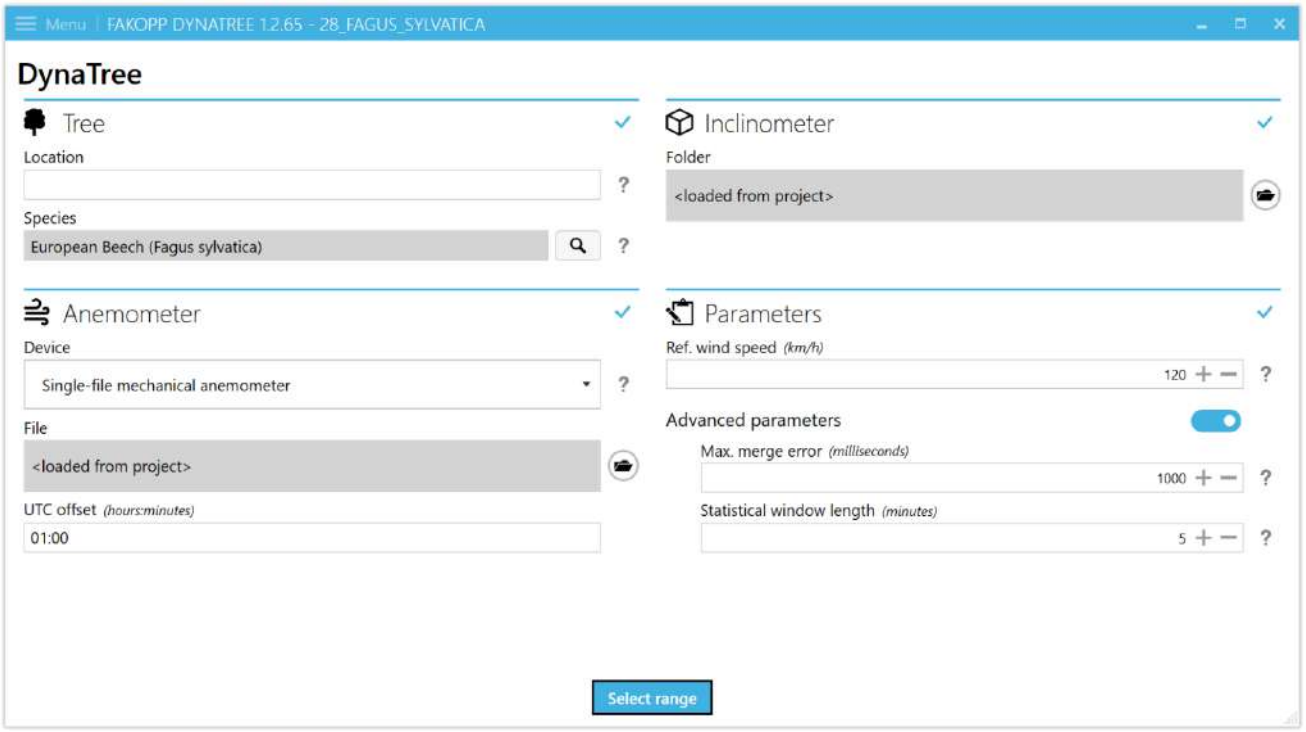


Figure 13 Data window

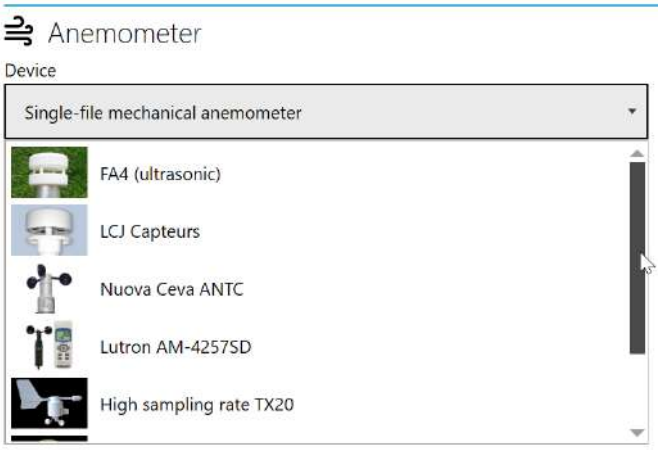


Figure 14 Anemometer list

Finally, after entering all the information, hit the “Select range” button. For range selection, the “Charts” page of the software is shown.



Figure 15 The “Charts” window

In “Charts” page, the measured wind, inclination and (if elastometers used) strain are visualized. You can inspect the value of the measured data points by moving the red line. You can zoom into the chart by clicking and dragging with the middle mouse button. You can reset the zoom in the chart by a single press of the middle mouse button.

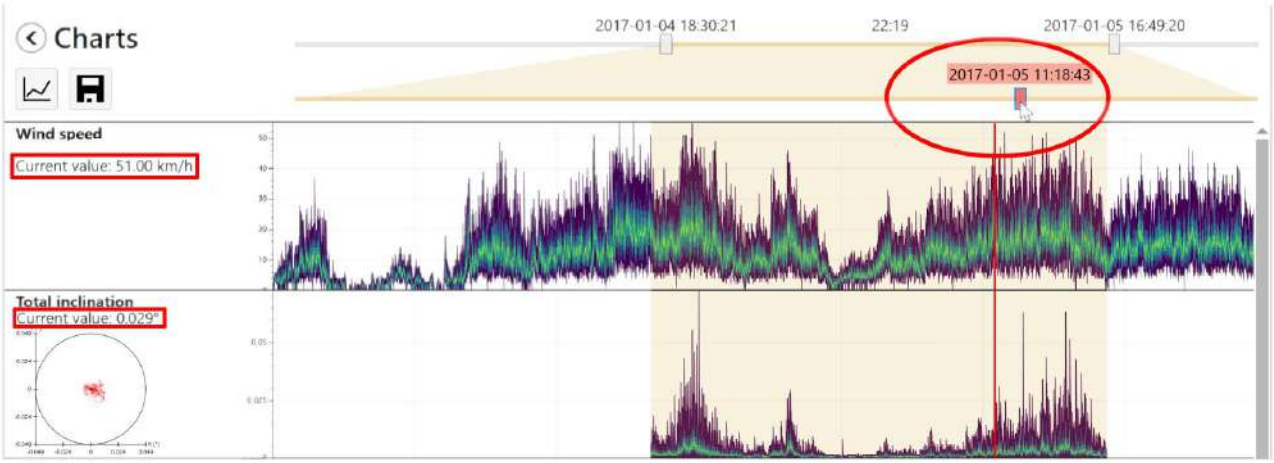


Figure 16 The moment in time is set with the red slide. The measured values of that specific moment, which is indicated by the red line, can be checked on the left side

You can set the red line to any time data, which is inside of the selected range (where the background is light orange), and check the values which were measured at that exact moment. Use the scroll wheel on the mouse for fine movement. The slide goes from one end of the screen to another end of it. An XY plot for the inclination value near the red marker is also displayed.

The slide on the top (with the two white rectangles) is used to select the evaluation time range. The dates and times of the beginning and the end of the selection is shown above the slider rectangles. The duration of the range is shown in the format “hours: minutes: seconds” above and between the two sliders.

The safety evaluation will be done for the selected time interval. It is best to select a range where the wind and inclination values are higher and excluding the regions of no-wind.

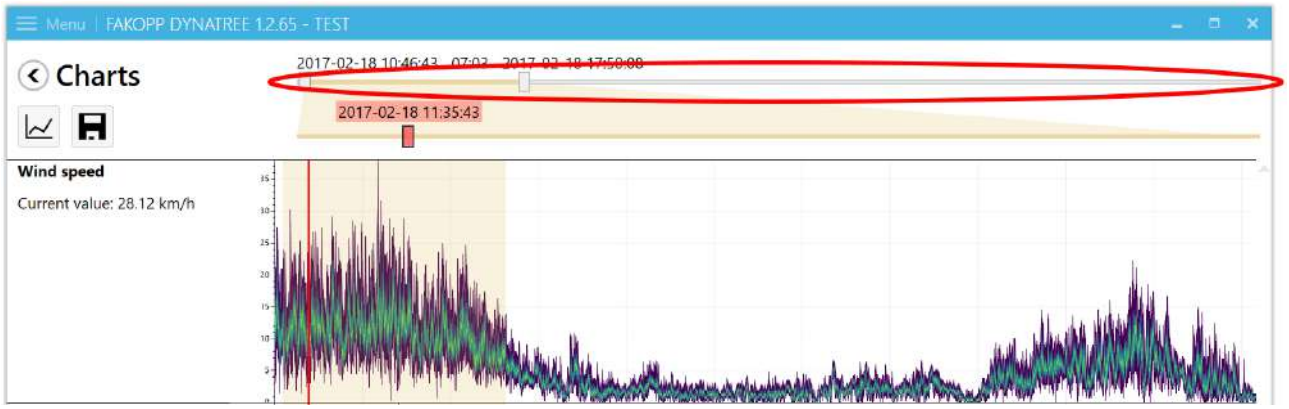


Figure 17 The upper slide is to select the time interval for safety evaluation

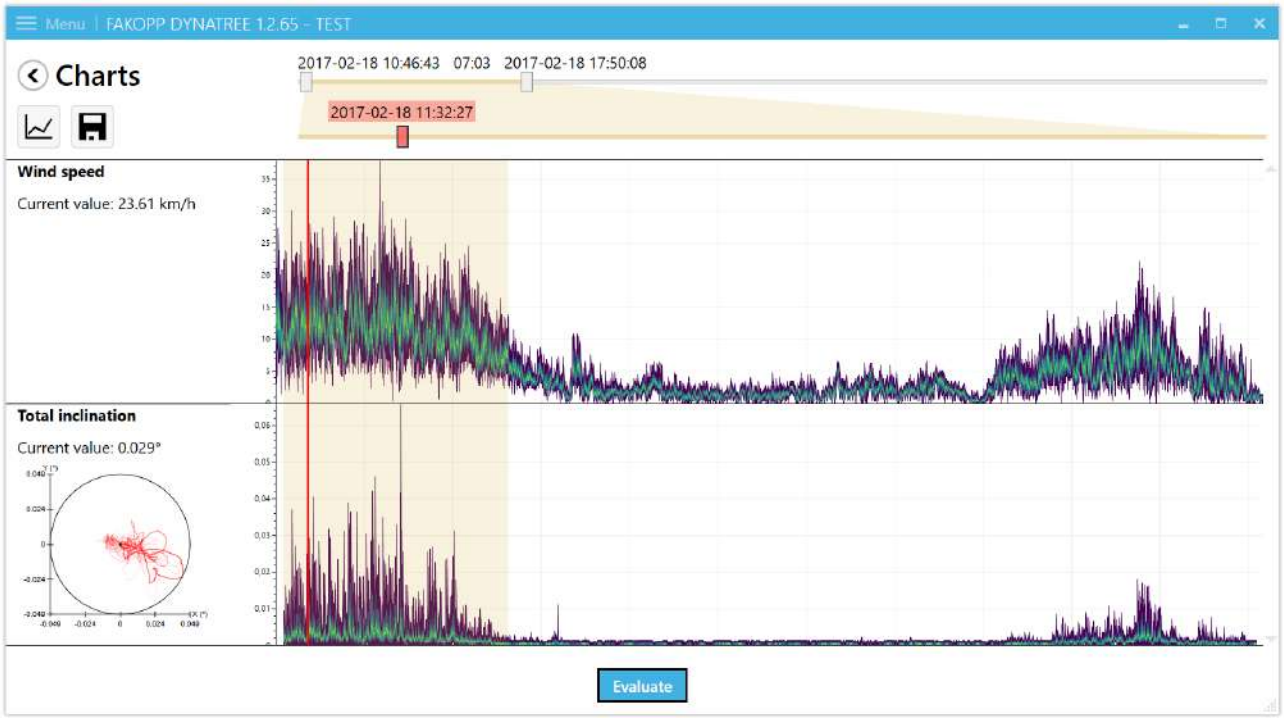


Figure 18 In this example the first part of the measurement is selected. This part of the measurement started at 10:46:43 on 18 February 2017 and ended at 17:50:08 on the same day. The selected interval lasts 7 hours 3 minutes. This selected time range is indicated by the yellow-colored background on the chart. With the red slider the red line can be moved inside the selection.

Raw data can also be saved to a .csv file the clicking floppy icon. (As wind speed is sampled at least 10 times in a second, usually the data sheet is quite long.)

The first icon under the text “Charts” is for selecting the data to visualize.

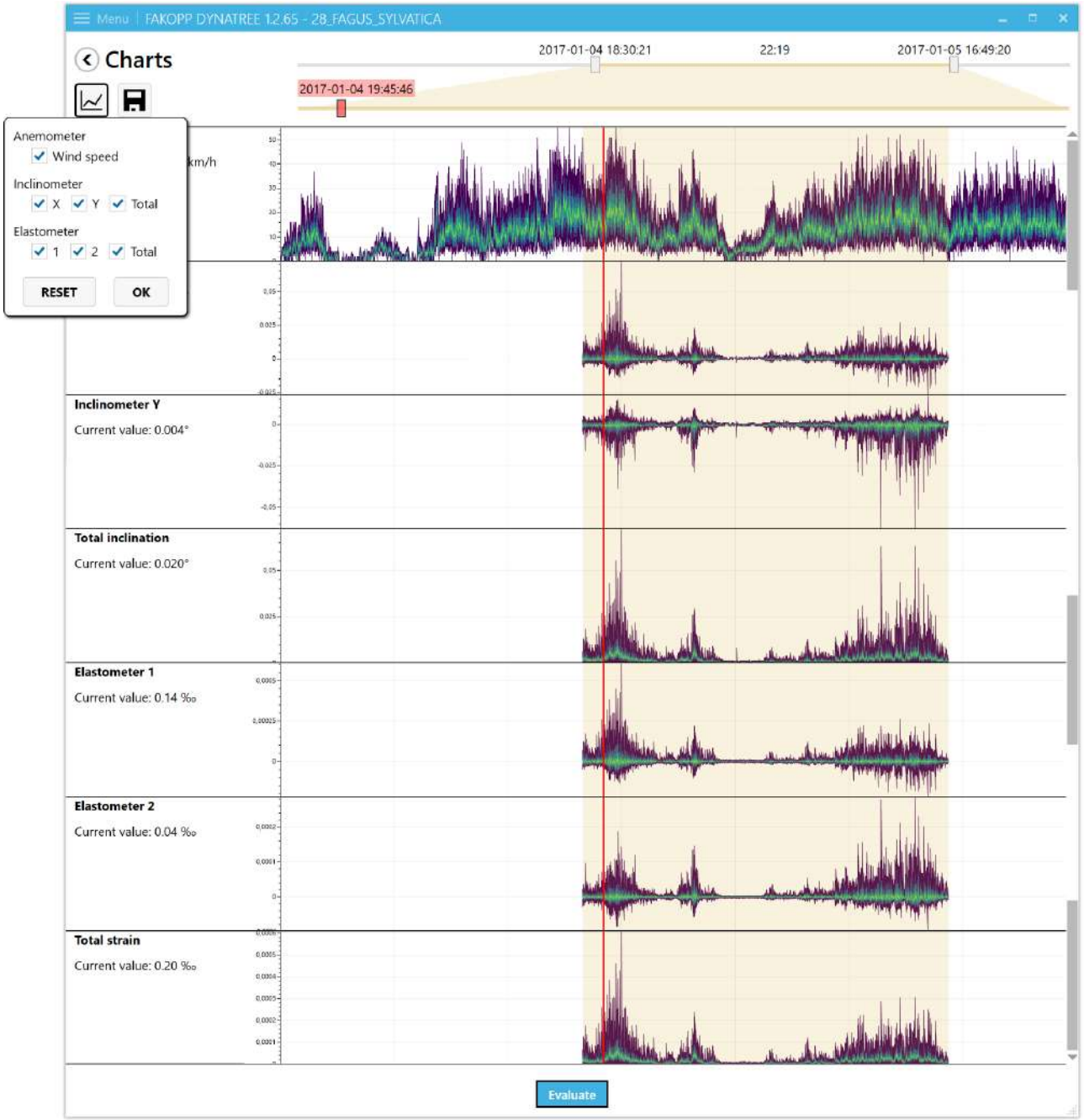


Figure 19 Wind speed, inclinometer and elastometer data can be turned on and off. As both inclination and elongation are measured on dual axes, the separated axes (like x or y directions) can also be presented. Total is for the whole inclination or elongation.

The evaluation window (see Figure 19) displays the location of the tree, which you can also verify in Google Maps by clicking the Show in browser link. The software displays the average wind direction, the starting time and duration of the measurement, and the statistical window length.

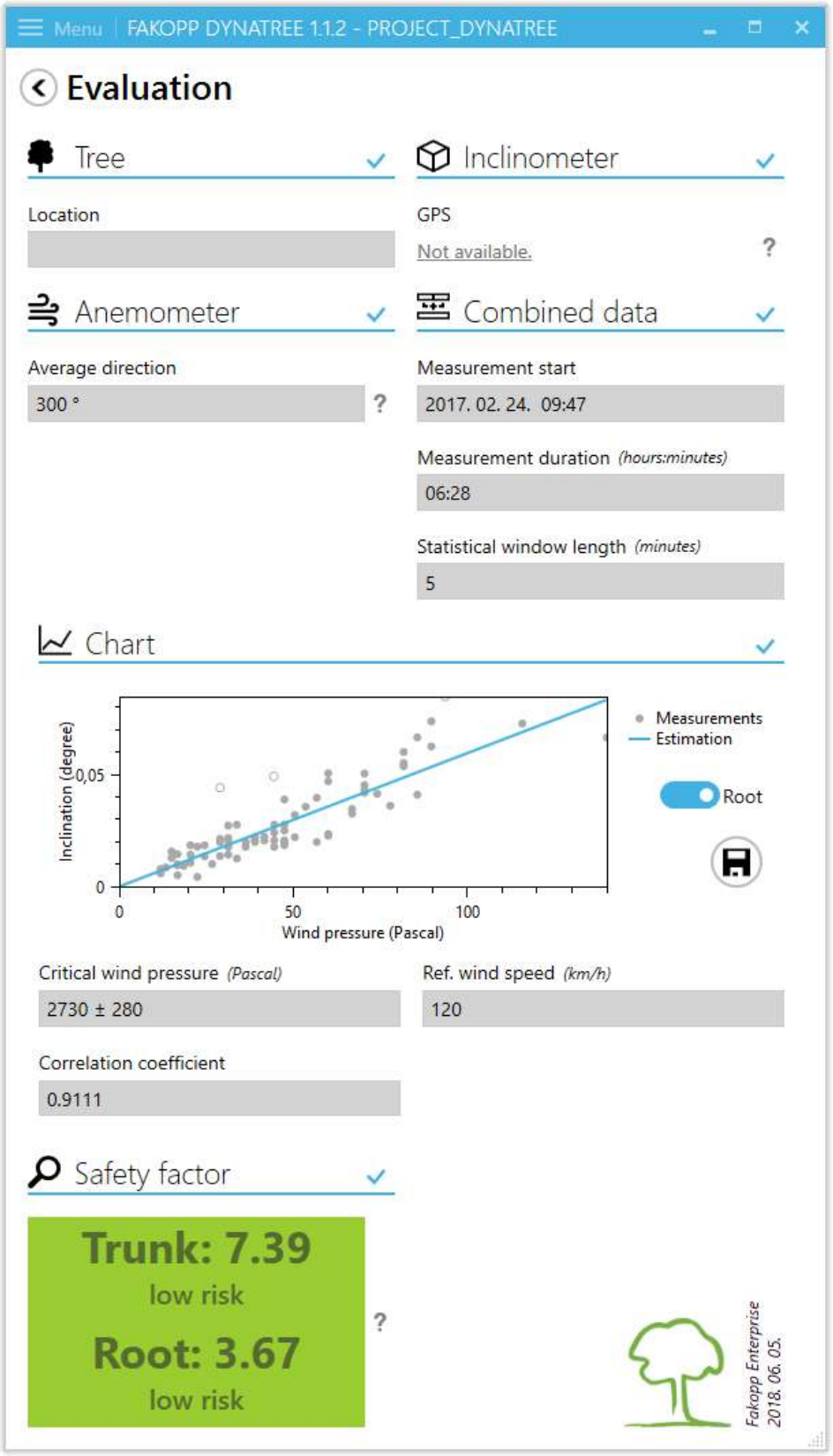


Figure 20 The evaluation window

The measured wind velocity (converted to wind pressure) and inclination data points are displayed in a diagram, along with the line fitted on the values. You will typically see only a small section of the curve that looks linear. The software calculates the critical wind pressure and its error and the correlation coefficient. The higher the coefficient, the better the data fit the curve (1 means perfect correlation.)

Switching between evaluation data of trunk and roots is available as well.

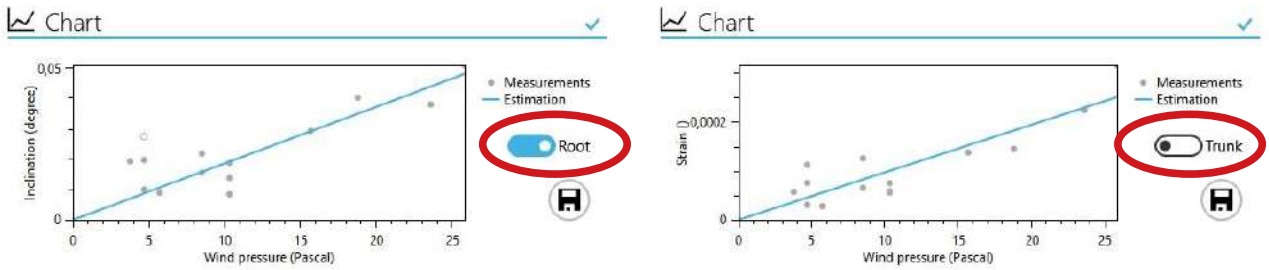


Figure 21 Root and trunk data

For reports the results can also be saved as images.

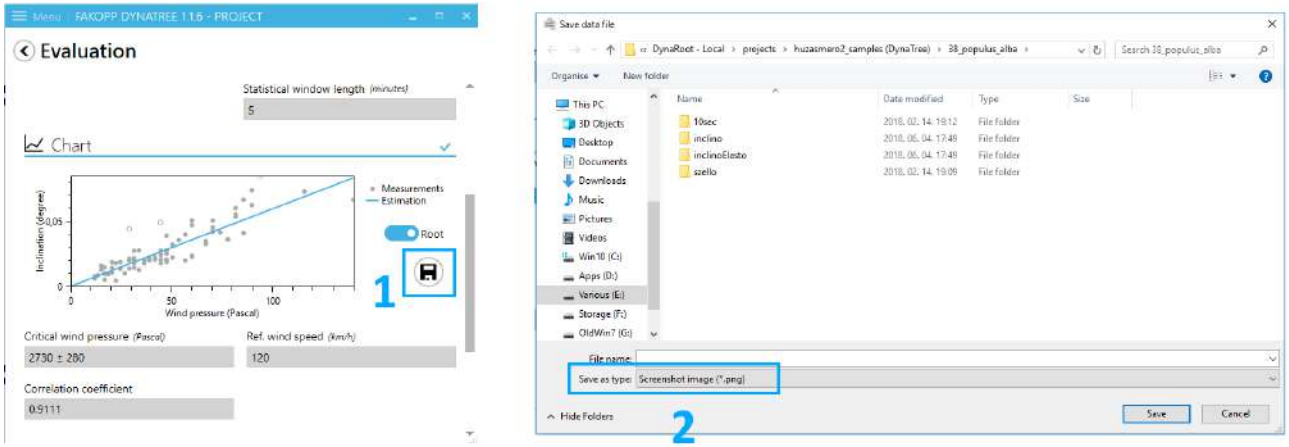


Figure 22 Saving images for reports

Finally, the Safety Factor (SF) for the trunk and the roots are also calculated. A safety factor above 1.5 represents low risk, and one below 1.0 indicates a serious risk of uprooting or breaking. If SF is between 1.0 and 1.5, the risk is moderate.

Warning! Safety Factor depends on the maximum wind velocity specified! Even low risk trees may be uprooted or broken if winds higher than the specified maximum occur!

Important note! The Safety Factor calculated for the trunk is the Safety Factor of the measured layer (where the elastometers are placed). Safety Factors in other layers can be different according to the conditions of the trunk.

Transferring data wirelessly on Windows



Figure 23 The DDAR network appearing on a Windows desktop. Connect to it and enter the password 11111111 when asked for it. For older devices: Ddar-123

On Windows platform, we recommend to use Total Commander for establishing the FTP connection. Figure 43 shows the connection setup dialog of Total Commander.

1. Press the 

icon located in the icon bar.
2. Press “New connection”.
3. Fill out the appropriate input fields with the following information:

Session: dynaroot
Host name: 192.168.4.1
User name: ddar
Password: ddar9876

4. Press OK.

5. Press the  icon again, select “dynaroot” from the list of saved connections and press “Connect”. If the authentication was successful then the content of the SD card will be visible in one of the panes of Total Commander.

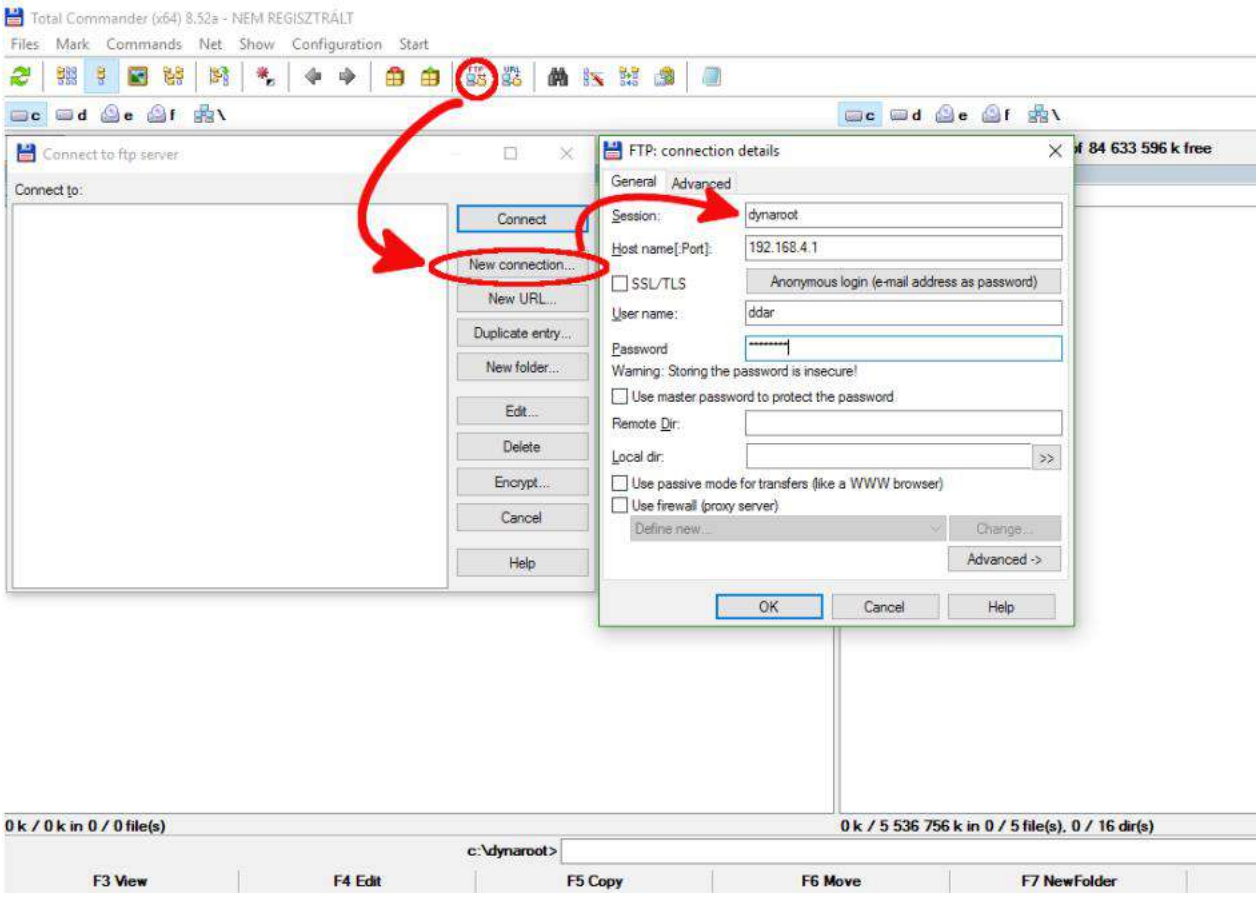


Figure 24 At first, press the “FTP” icon, then press “New connection” and finally, fill out the input fields in the “FTP connection details” dialog according to the picture. Press OK, then Connect and you are ready to copy/delete files from the SD card.