



Sylvius Generic User Guide

www.sylvatest.com



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1 PREAMBLE

1.1 Purpose of the document

The purpose of this user guide is to explain how to install and use Sylvius Generic app designed to manage a pair of Sylvatest 4 transducers.

1.2 Sylvius Generic App

Sylvius Generic App is installed on a handheld computer - or smartphone - and, in addition to managing the probes, allows the user to obtain the measurement results according to the selected area.

Sylvius Generic is a non-specific version of the application. Depending on the use, a customized application can be developed (on demand).

Sylvius Generic application is not intended to be used with previous versions of Sylvatest.

The application updates are made through the distribution channel.

1.3 Training

This user guide is a help for the user and doesn't replace the training proposed on Sylvatest 4 equipment.

2 INSTALLATION OF THE APP

2.1 Compatibility

The Sylvius Generic application is compatible with the following operating systems:

- Android, version 5 and later
- iOS, version 8 and later
- Windows, version 10 (1903) and later

2.2 Prerequisites

To be able to access the application stores (Play Store, App Store and Microsoft Store), the computer must:

- Be connected to the Internet
- Be linked to an account

To be able to communicate with the probes, the computer must be equipped with Bluetooth equipment that is BLE (Bluetooth Low Energy) compatible. This is generally the case for recent devices.

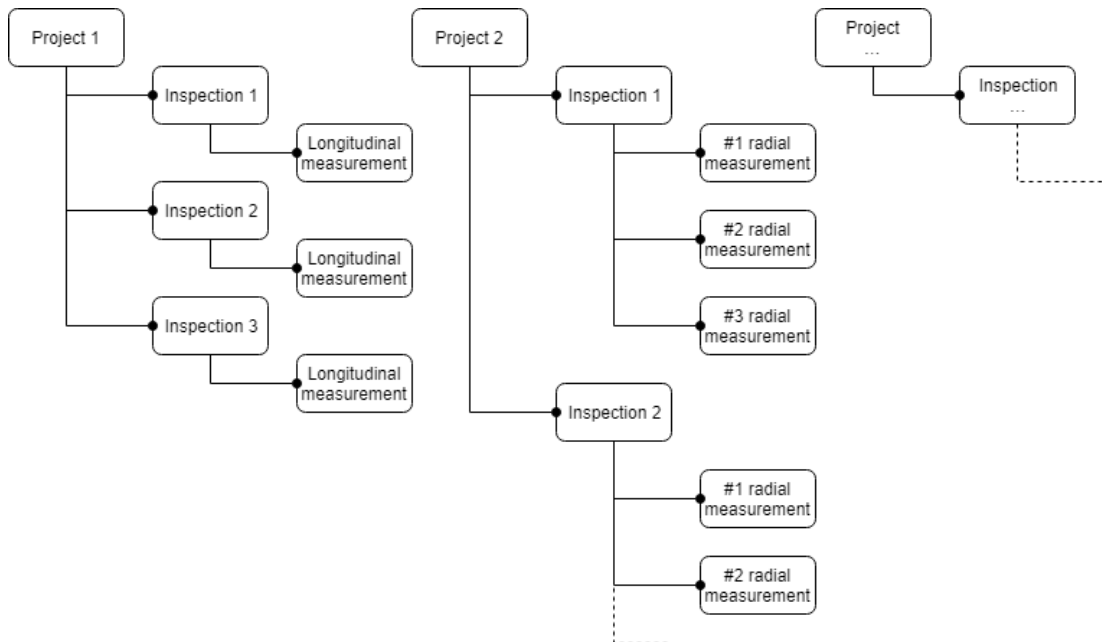
2.3 Installing Sylvius

- Open the application access software on the field computer:
 - For Android: Google Play Store
 - For iOS: App Store
 - For Windows: Microsoft Store
- Search for "Sylvius Generic" and press the icon.
- Choose "Install".
- Wait for the download and installation to complete.

3 DATA ARCHITECTURE

3.1 Structure

Data that are managed by the software Sylvius are structured as follow:



3.2 Projects

Data are contained in projects. Projects gather the inspections that are made of measurements.

A project can be, for example, a field campaign, a mandate, or a part of a building to be inspected.

3.2.1 Project types

There are different types of projects. The choice of a project type is important because this influences the measurement protocol.

The project type determines the result of the calculations and cannot be changed.

List of the various project types:



"Trunk": one longitudinal measurement by inspection



"Log": one longitudinal measurement by inspection



"Structural frame": one longitudinal measurement by inspection



"Standing tree": one or several radial measurements by inspection



"Analysis": one measurement by inspection

3.3 Inspections

An inspection means the measurements and data collection for one – or part of – element (or object).

3.3.1 Inspections for "Trunk" type

Each inspection represents a measurement performed on a trunk.

Once the object is measured, the software classifies it under the following categories:

- R: reject
- Q4: low quality
- Q3: acceptable quality
- Q2: good quality
- Q1: very good quality

The following species are available for this inspection type:

- Spruce
- Fir
- Pine
- Larch
- Douglas Fir

3.3.2 Inspections for "Log" type

Each inspection represents a measurement performed on a log.

The software evaluates the strength grading classes group to which the future sawn timber should – in average – belong:

- R: reject
- C14-C16
- C18-C22
- C24-C27
- C30 and higher

The following species are available for this inspection type:

- Spruce
- Fir
- Pine
- Larch
- Douglas Fir

3.3.3 Inspections for "Structural frame" type

Each inspection represents a measurement performed on a structural frame object.

This object can be a component of a future frame or of an existing one.

Examples:

- A beam
- A glue laminated timber beam
- A pole
- A truss
- ...

The software evaluates the strength grading class of the measured object.

For softwoods, the following strength classes are available:

- R: reject
- C14
- C16
- C18
- C22
- C24
- C27
- C30
- C35
- C40
- C45

For hardwoods, the following strength classes are available:

- R: reject
- D50
- D60
- D70

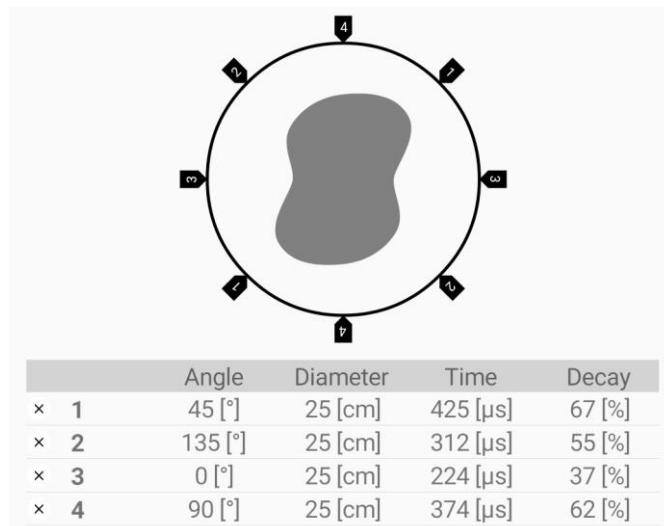
The following species are available for this inspection type:

- Spruce
- Fir
- Pine
- Larch
- Douglas Fir
- Oak
- Poplar

3.3.4 Inspections for "Standing tree" type

Each inspection for this project type represents a combination of several measurements performed around a tree crown.

The result of these measurements gives an estimation of the percentage of degradation of the tree, in the area where the measurements have been performed. The result is not only given by a percentage but by an illustration too.



The following species are available for this inspection type:

- Spruce
- Fir
- Pine
- Larch
- Douglas Fir
- Beech
- Oak
- Hornbeam
- Ash
- Maple
- Chestnut
- Poplar
- Plane tree
- Cedar
- Walnut
- Sequoia
- Other

3.3.5 Inspections for "Analysis" type

Each inspection for this project type represents a measurement on an object.

This kind of inspection can be selected especially for R&D projects or for specific applications.

The software doesn't express any result and only save the rough data of the measurements including the eventual comments of the user.

3.4 The measurements

A measurement in Sylvius means a measurement performed with Sylvatest 4 on an object.

3.4.1 Measurement types

The measurement type deals with the application the equipment is used for and more precisely:

- Longitudinal measurement for a mechanical performance evaluation
- Radial measurement for a percentage of degradation of a standing tree
- For the specific analysis, the user is free to perform any kind of measurements: longitudinal, radial, transversal, cross section...

3.4.2 Results of a measurement

A measurement delivers various results:

- The time of flight of the ultrasonic waves in microseconds (10^{-6} s)
- The measurement reliability, expressed by the standard deviation, in microseconds (10^{-6} s)
- The wave shape (optional)

The main outcome is the time of flight of the ultrasonic wave. Given the distance, this time of flight expresses the speed of the transmitted wave that is correlated to the MOE (Modulus of Elasticity) and MOR (Modulus of Rupture) for a longitudinal measurement or to the percentage of degradation for a radial measurement.

Concerning the "Analysis" mode, only the rough data are displayed. The expression of the results is at the user's interpretation.

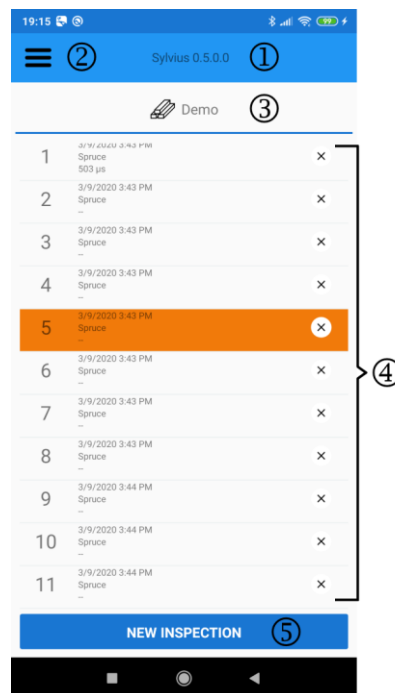
3.4.3 Number of shots per measurement

During the measurement, several shots are launched to increase the result reliability and more specifically:

- 10 shots if no signal digitalization (wave shape) is selected.
- 12 shots if signal digitalization (wave shape) is selected.

4 SYLVIUS MAIN SCREEN

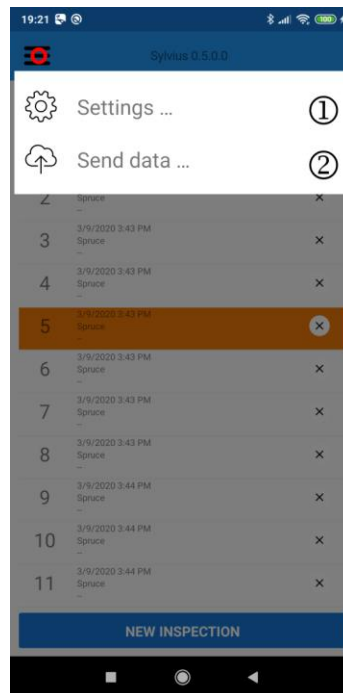
4.1 Global view



- ① App name and version
- ② Main menu
- ③ Selected project name
 - Press on this caption to display the projects' list. This allows to select, create, or delete a project.
- ④ Inspections list
 - Each element in the list represents a measured object (a beam, a joist, a log, etc.)
 - Press on an object to edit it.
 - Press on the **x** at the object's right to delete it.
- ⑤ Button "Create a new inspection".

5 MAIN MENU

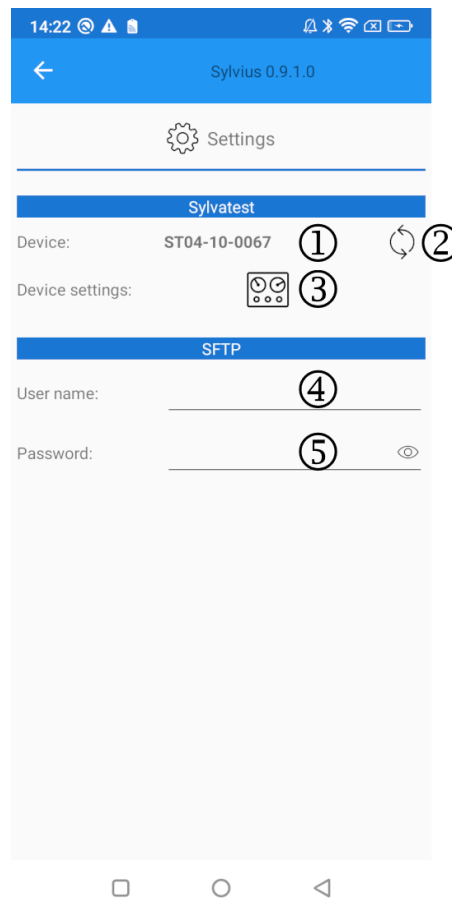
5.1 Global view



- ① Parameters
 - To select the paired transducer to be used
 - To set the parameters for data synchronization with the online service CBS-CBT server
- ② Send the data to CBS-CBT server.
 - To send the inspection data to the online service CBS-CBT server

5.2 Parameters

This screen offers the possibility to select the Sylvatest 4 Master transducer to be used and to fill the username and password for the online CBS-CBT data service.



- ① Displays the number of the Sylvatest 4 probe with which the software will communicate.
- ② Click on this button to select the probe with which Sylvius will communicate (see next point "Probe coupling")
- ③ Display the screen regarding the transducer settings.
 - Any settings modification should be done under CBS-CBT technical support agreement (sylvatest@sylvatest.com)
- ④ Username to access the online CBS-CBT data server.
- ⑤ Password to access the online CBS-CBT data server.

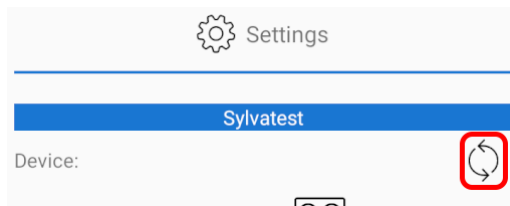
5.2.1 Probe Coupling

Before being able to perform a measurement with the Sylvatest, Sylvius must know the name of the master probe with which it will communicate.

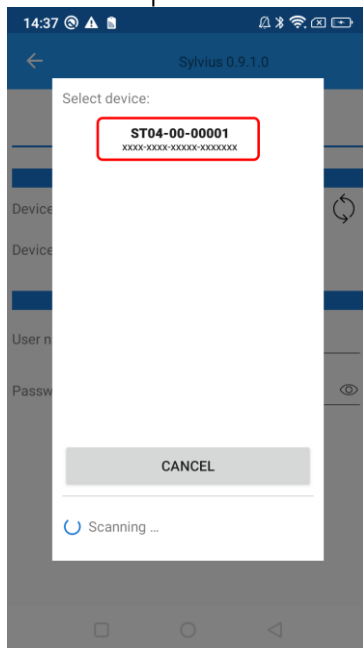
Reminder: Only the transducer Master should be paired to the handheld device. The transducer Slave communicates with the Master thanks to an intern Sylvatest protocol independent from the Sylvius Generic software.

This operation is done through "Parameters" menu, here are the steps to follow to pair the master probe to the computer:

- Switch on the master probe
- In the "Parameters" page, click on the "Search" button:

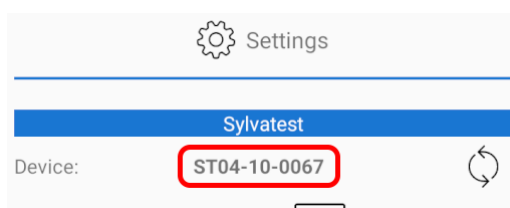


- Select the probe in the list displayed on the screen:



If no device is visible in the list, check that the Sylvatest is switched on, localization is active on the computer and Sylvius application has authorization to access the localization.

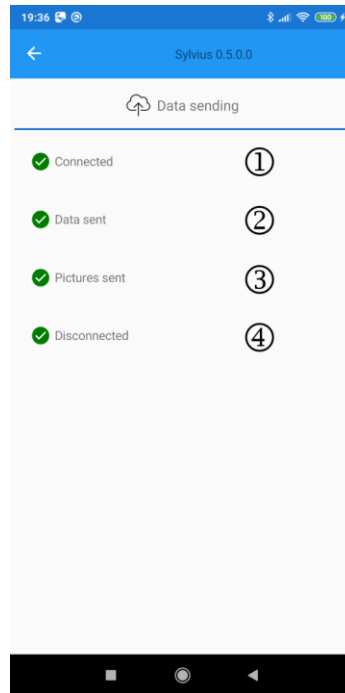
- If the computer asks for a verification code, enter the code: **123123**
- Once selected, the probe number is displayed in the parameters page:



5.3 Synchronizing data to the online CBS-CBT server

To send the data, a subscription to the online CBS-CBT service center is required. The login information should be filled in the software parameters (ref. "5.2 Parameters").

The process starts automatically once this screen is open.



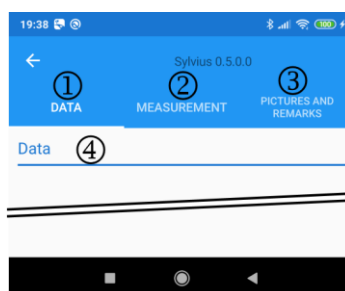
- ① Connecting to the server
- ② Synchronizing the data with the server
- ③ Synchronizing the pictures with the server
- ④ Disconnecting from the server

6 EDIT AN INSPECTION

6.1 Edition screen layout

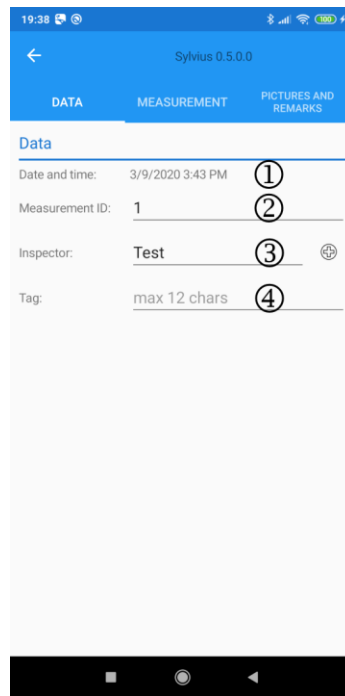
When creating a new inspection or when editing one, the software displays a screen with various tabs in order to view, fill or modify the information of this inspection.

The tabs offer the possibility to gather the information by topic.



- ① Tab "Data": to set the global information concerning the object to measure
- ② Tab "Measurement": to manage the Sylvatest 4 measurement(s) of the selected object
- ③ Tab "Pictures and remarks": to take pictures and edit remarks about the selected object
- ④ Title of the active tab

6.2 Tab "Data"



- ① Date and clock: automatically set from the handheld device
 - This information cannot be modified
- ② ID of the measured object (50 alphanumeric characters max)
- ③ Dropdown list to select the inspector who performs the measurement(s)
 - Press the icon ⊕ to add a new inspector's name
- ④ Numeric ID (12 numeric characters max)

6.3 Tab "Measurement"

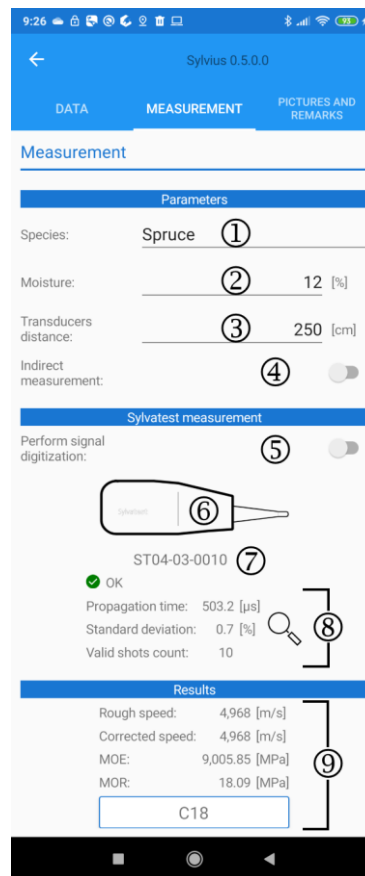
The tab "Measurement" adapts itself automatically to the selected project.


Three types of measurements are proposed:

- Longitudinal measurements: available for the following project types:
 - Trunk
 - Log
 - Structural frame
- Radial measurements: available for the following project type:
 - Standing trees
- Measurements for analysis
 - For this kind of measurements, only the Sylvatest 4 rough data are displayed. This allows the device to be used for any specific application.

6.3.1 Longitudinal measurements

For this project type, only one measurement per inspection is required

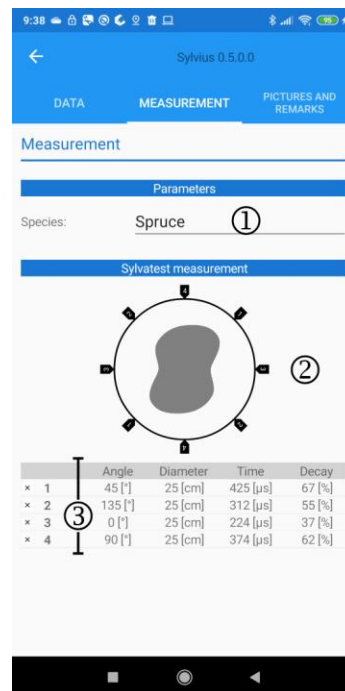


- ① Species selection. The list can change according to the project type.
- ② Wood moisture content (in %)
- ③ Distance between transducers (in cm)
- ④ Activate the switch button to select an indirect measurement (cf. Sylvatest 4 user guide)
- ⑤ Activate the switch button to enable the signal digitalization (longer measurement)
- ⑥ Button to launch the measurement
 - Refer to the chapter "6.3.5 Doing a Sylvatest 4 measurement" for more details
- ⑦ Select Sylvatest 4 master transducer to be used
- ⑧ Outcomes of the measurement
 - Click on the icon  to see the measurement details
- ⑨ Results given the information filled by the inspector and the Sylvatest 4 measurement:
 - Rough speed: ultrasound speed not corrected by wood moisture content (in m/s)
 - Corrected speed: ultrasound speed not corrected by wood moisture content (in m/s)

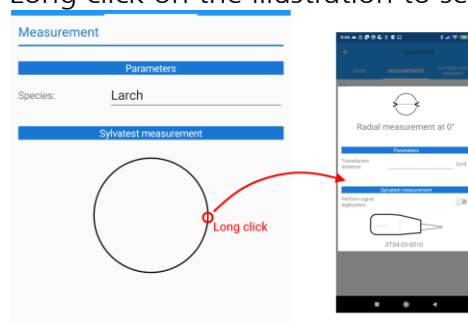
- MOE: Modulus of Elasticity according to the corrected speed and the species (in MPa)
- MOR: Modulus of Rupture according to the corrected speed and the species (in MPa)
- Result: evaluated mechanical strength class

6.3.2 Radial measurements


For the inspection of a standing tree, several radial measurements can be done. The illustration is used to set the measurements location around the tree's trunk



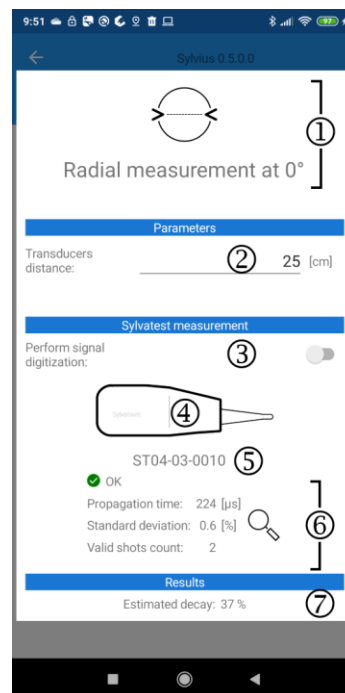
- ① Select the species
- ② Use the illustration to set the measurement location
 - Long click on the illustration to set the location of the measurement




- Tap on a measurement label to edit it
- Refer to the chapter "6.3.3 Edit a radial measurement" for more details
- The grey area in within the illustration expresses the estimated degradation

- ③ Measurements list
 - For each measurement, Sylvius Generic displays: the angle, the diameter at the measurement location, the ultrasonic time of flight and the evaluated degradation rate.
 - Click on the icon  to erase a measurement

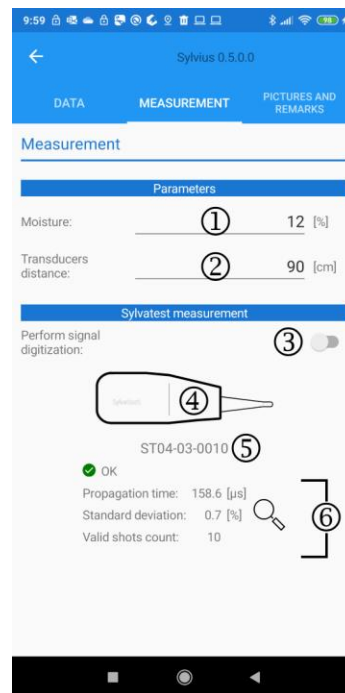
6.3.3 Edit a radial measurement




- ① Title of the edition screen including the active measurement angle
- ② Distance between transducers (in cm)
- ③ Activate the switch button to enable the signal digitalization (longer measurement)
- ④ Button to launch the measurement
 - Refer to the chapter "6.3.5 Doing a Sylvatest 4 measurement" for more details
- ⑤ Select Sylvatest 4 master transducer to be used
- ⑥ Outcomes of the measurement
 - Click on the icon  to see the measurement details
- ⑦ Results given the information filled by the inspector and the Sylvatest 4 measurement:
 - Estimated percentage of degradation given the ultrasonic time of flight, the diameter and the species filled by the inspector

6.3.4 Measurements for analysis

Regarding the measurements for analysis, only the rough data are collected and displayed by Sylvius Generic.



- ① Wood moisture content (in %)
- ② Distance between transducers (in cm)
- ③ Activate the switch button to enable the signal digitalization (longer measurement)
- ④ Button to launch a measurement
 - Refer to the chapter "6.3.5 Doing a Sylvatest 4 measurement for more details"
- ⑤ Select Sylvatest 4 master transducer to be used
- ⑥ Outcomes of the measurement
 - Click on the icon  to see the measurement details

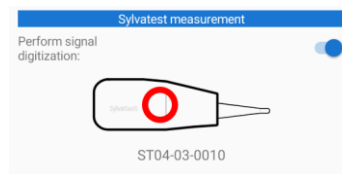
6.3.5 Doing a Sylvatest 4 measurement

Steps to follow to do a measurement with Sylvatest 4:

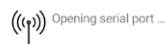
- Install the two transducers on the object to be measured
 - Refer to the Sylvatest 4 user guide for more information
- Make sure the two transducers are switched ON
 - The blue led should flash on the Master transducer



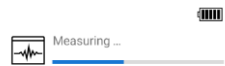
- Press on the button "Sylvatest measurement"



- The software connects to the Master transducer



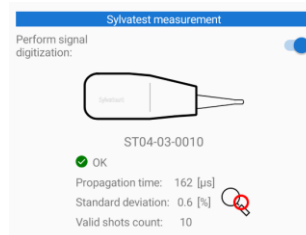
- The both transducers communicate together and do the measurement




- Sylvius Generic collects the measurement outcomes

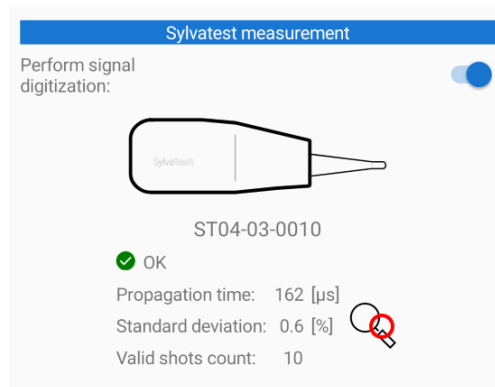


- Sylvius Generic computes and displays the measurement results

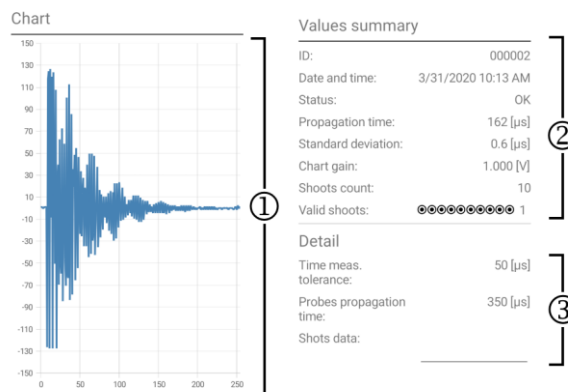


6.3.6 Measurement details screen

A click on the icon  located on the side of the Sylvatest outcomes displays the measurement details.



The content of the screen is as follow:



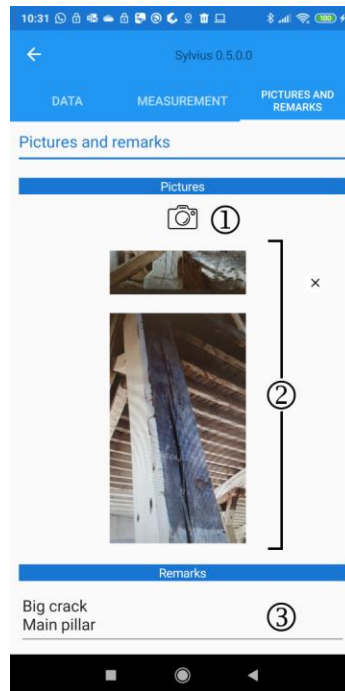
- ① Graph of the signal shape received for the last shot
 - To get this graph, the option "Signal digitalization" needs to be selected prior to the measurement (refer to the chapters dealing with longitudinal or radial measurements)
 - Zooming and moving on the graph is possible
 - If the option "Signal digitalization" has not been selected before the measurement is performed, the software displays the following icon:




- ② Values and status of the measurement including the number of valid shots and their order
- ③ Measurement detail
 - Click on the dropdown list "Shots" to see the detail for each shot

6.4 Tag "Pictures and remarks"

Each inspection can be illustrated by pictures and completed by free remarks from the inspector.



- ① Button to open the camera and take a picture
- ② List of pictures done for the active inspection
 - Click on the icon  to delete the selected picture
- ③ Remarks for the inspection
 - Several lines are possible