SCHMIDT REBOUND HARDNESS TEST

STANDARD OPERATING PROCEDURE (SOP) FOR OPERATING THE SCHMIDT REBOUND HARDNESS TEST MACHINE FOR ROCK STRENGTH AND ANALYSIS PURPOSES

STANDARD OPERATING PROCEDURE (SOP)

FOR OPERATING SCHMIDT HARDNESS TEST

LOCATION - FACILITY	MOSELEY MORAMORO
SUBDIVISION	MINING – OK TEDI LABORATORY
REVISED EDITION	1ST EDITION
REVIEW DATE	1ST JULY 2022
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Table of Content

NOTE

- This equipment can only be operated upon approval from either the Laboratory Manager or a Technical Officer, or operated with the assistance or supervision of a technical officer.

- Strict compliance to operating procedures and safety requirements is required to operate this equipment. No Exceptions for substandard practices!

- If this equipment is acting unusual while operating STOP IMMEDIATELY! Please REPORT this malfunction to the Technical Officer and discuss the severity of the fault before proceeding or tag-out as faulty equipment.

- Any accidental damage to equipment or incidents encountered while operating this equipment must be reported immediately.

EQUIPMENT DETAILS

Proceq Schmidt Rebound Hammer

Purpose:

This SOP ensures that the operator may operate this equipment appropriately according to the operating procedures to get reliable output without damages to the equipment or causing injuries to the operator. The Proceq Schmidt Rebound Hardness Testing equipment is used to conduct rock instant strength tests to determine rock strength properties on specimen in the lab or insitu rocks out in field by applying load to the rock specimen to get the rebound spring to determine strength properties.

This Schmidt Rebound Hardness Testing equipment is composed of portable handheld spring gun operated manually to apply load pressing the point/pin to the surface of the rock specimen till the spring recoils to give the load.

Hazards:

- Footwear (safety boots) protecting the foot from risk of injuries out in the field.

Safety Requirements:

Personal Protective Equipment (PPE)
1. Safety glasses
2. Safety boots
3. Industrial Hardware Clothing (Reflector ware)

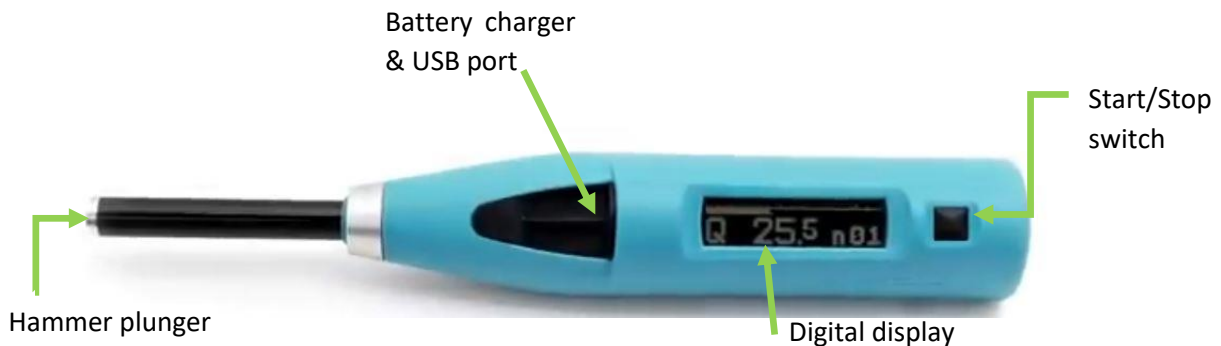**Tools & Materials Required:**

Recommended Test Specimens
1. Rock specimen (insitu)
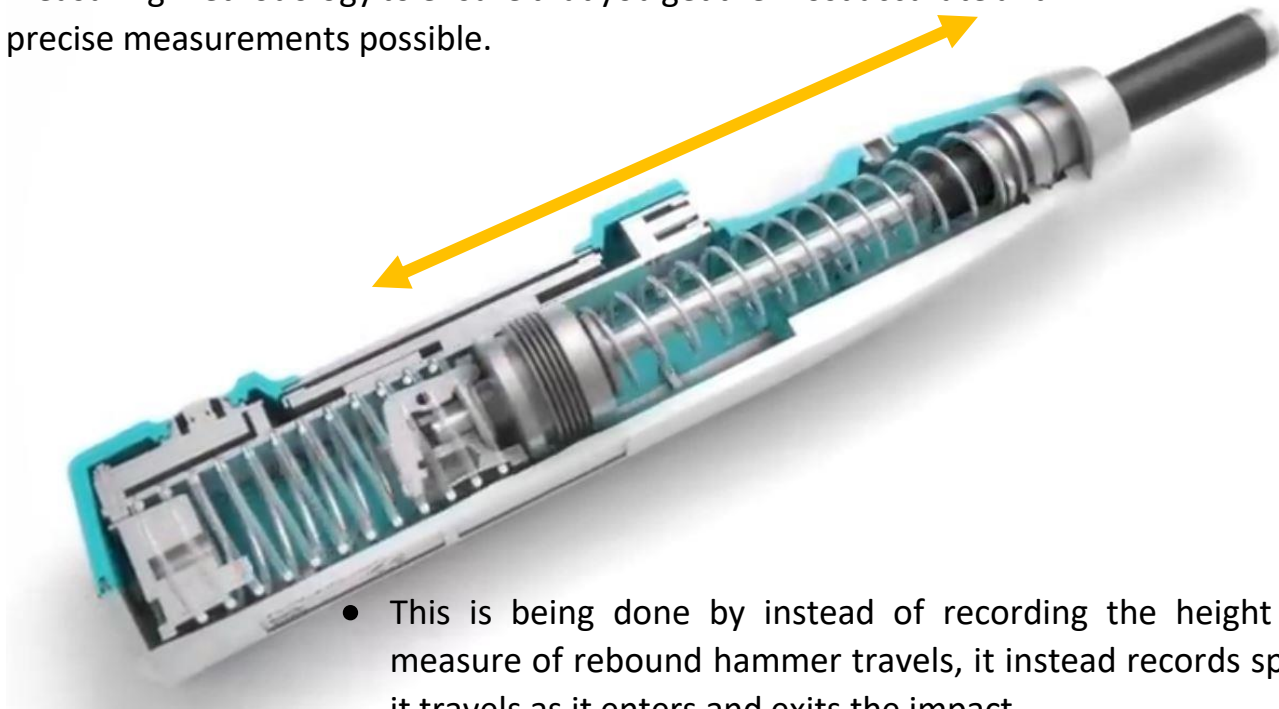2. Brick specimen (insitu)

Concrete Compressive Strength Range

1 - 5 MPa 145 - 725 psi	5 - 10 MPa 725 - 1,450 psi	10 - 30 MPa 1,450 - 4,351 psi	30 - 70 MPa 4,351 - 10,153 psi	70 - 100 MPa 10,153 - 14,504 psi	> 100 MPa > 14,504 psi
Fresh Concrete Very Low Strength Concrete		Normal Concrete		High Strength Concrete	Ultra High Perfor- mance Concrete

Battery charger
& USB port

Start/Stop
switch

Q 25.5 n01

Hammer plunger

Digital display

Compositions

- It's a completely digital Schmidt Hammer and they have change the measuring methodology to ensure that you get the most accurate and precise measurements possible.

  - This is being done by instead of recording the height the measure of rebound hammer travels, it instead records speed it travels as it enters and exits the impact

SETTING UP

Setting up Proceq Schmidt Hammer

Before operating the Proceq Schmidt Hammer, there are few features or modes of the equipments that needs to be set up before it can be operated.

- First, you need to prepare the surface of our concrete for our test. This is done using a grind stone or a grinder or cloth to wipe. You want to smooth the surface out so you have a flat level area to test on.

- The Silver Schmidt uses an icon-based menu, operated with a single button and by tilting the device. To reset the device you press the Start button and push the hammer to the ground (hard surface) to take an impact and it will reset.

- As shown by the icon you can charge and connect to your computer system to take off logs data and to install customer information using a standard type 'B' USB cable.

- One-one is used to select a single shot mode of the hammer. This mode is used mainly to test correct operation.

- This mode is use to select the averaging techniques used by the hammer and how statistical calculations are made

- This icon is used to review data stored in the hammer and also to leave records after they are been taken

- This icon is used to select the Correlation Curve used by the hammer

- This icon is used to select the units. MPa (Mega Pascals) is the unit used in Australia

- This icon is used to select the shape of the testing element. In Australia it's a cylinder but other countries often use cubes or similar shapes.

OPERATING PROCEDURE

Operating the Proceq Schmidt Hammer
As shown on the picture, this the correct way to hold the Proceq Rebound Hammer and press to the surfaces. If not held properly it may slide and nullify the data.

Operating the Proceq Schmidt Hammer to take single shot mode 1-1

1. One-one is used to select a single shot mode of the hammer. This mode is used mainly to test correct operation.

4. When you press the Single Shot Mode, it will display the X and tick icons, where you would select the tick button have it set to the mode

3. Take the single-shot impact by pushing the hammer at a 90° degree angle completely on to the concrete surface to take an impact.

4. Fires and it records a Q value in this case it is 61.5 _ This is, primarily a means of testing the hammer's log for rating

Operating the Proceq Schmidt Hammer to take a series of readings

1. First, you need to prepare the surface of our concrete for our test. This can be done using a grind stone or a grinder. You just want to smooth the surface out so you have a flat level area to test on.

2. You can check the settings in the hammer by depressing the hammer slightly. And as you would see, it's been set to MPa for the unit, a cylinder. The Lowest 10% Curve and an Averaging Method.

3. When you want to set up to use the hammer for actual testing, you'll select an Averaging Method. Don't want other options, we are going to use the custom one

4. The Correlation Curve can be selected from this icon. The lowest 10% Curve is a conservative curve, good for getting a reliably low value.
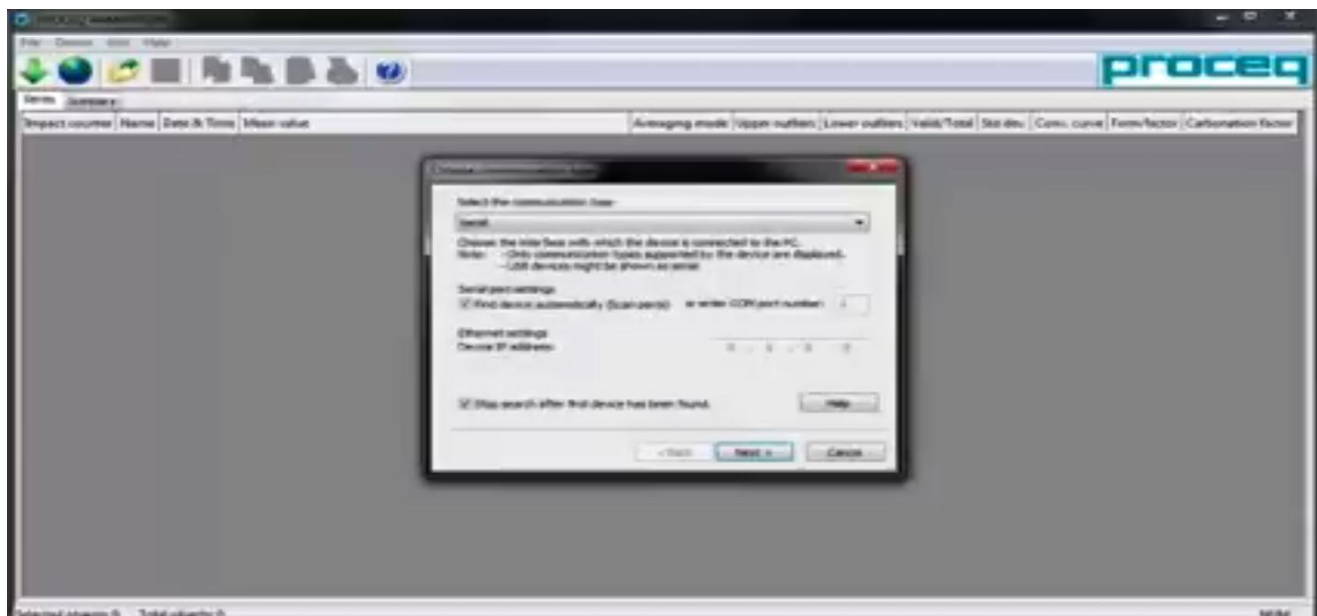

5. You are now ready to take the measurement, in this measurement series you would take 10 impacts. You would push it to the surface, 10 times, each time would give a different Q value.
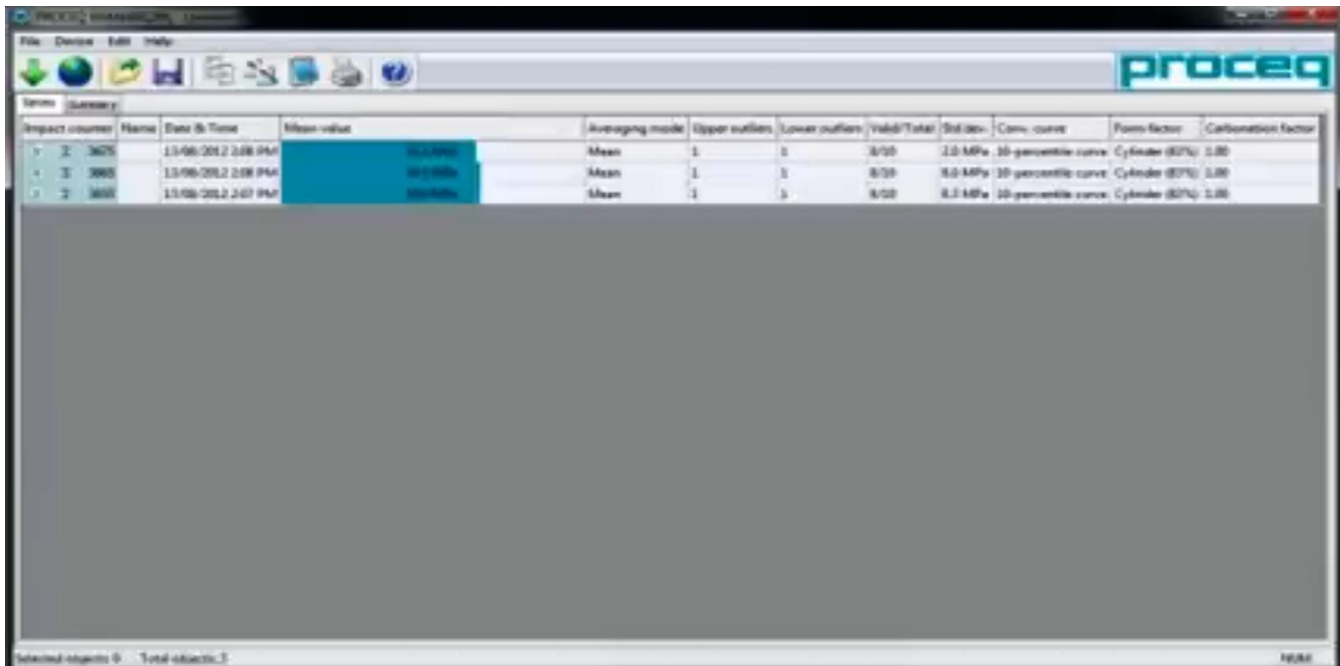
Downloading/uploading log data from the Proceq Schmidt Hammer to PC

- Proseq's HammerLink software is used to download data from the Schmidt hammer and also to upload custom Correlation Curves, and Averaging methods and to delete data from the Schmidt hammer.
- There's a File menu, Devise menu, Edit menu and Help menu available. The most useful options are available as a number of closes.
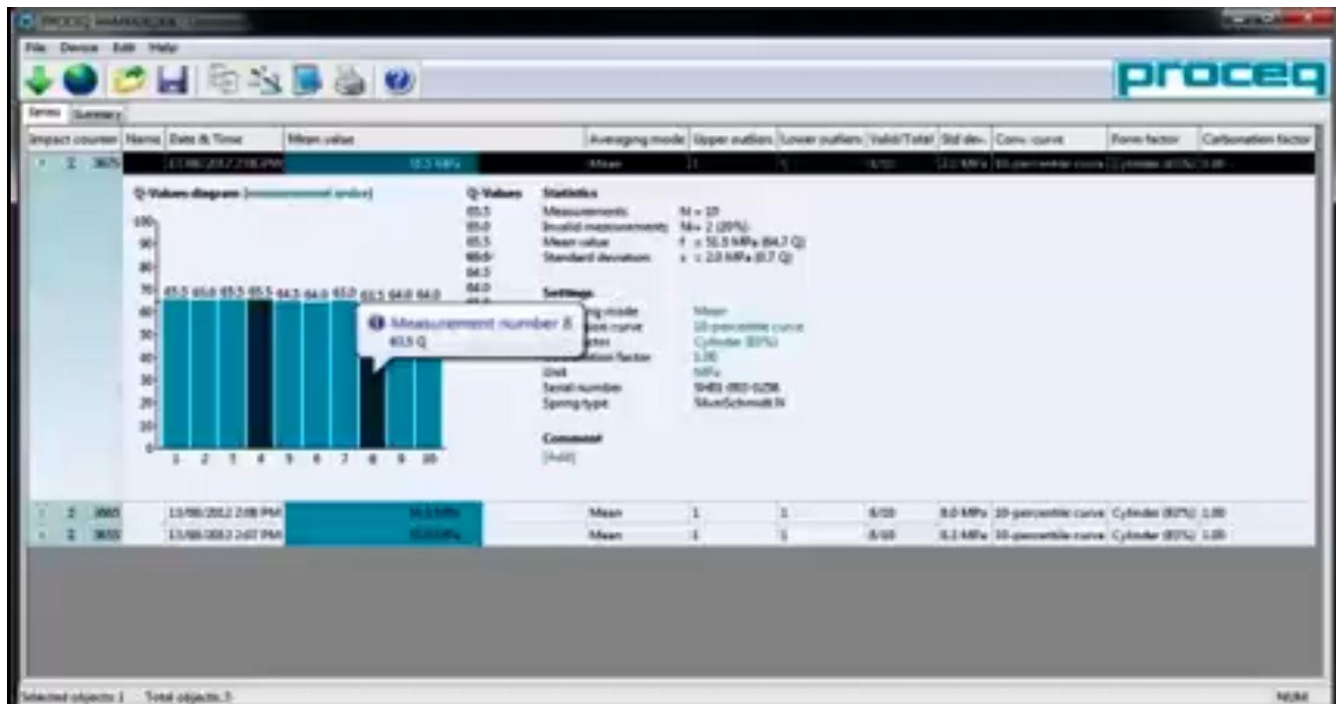

1. Clicking the green icon with an Arrow will allow you to download data from the Schmidt Hammer. You would now see the summary of the three (3) series that you've gathered with the Silver Schmidt.
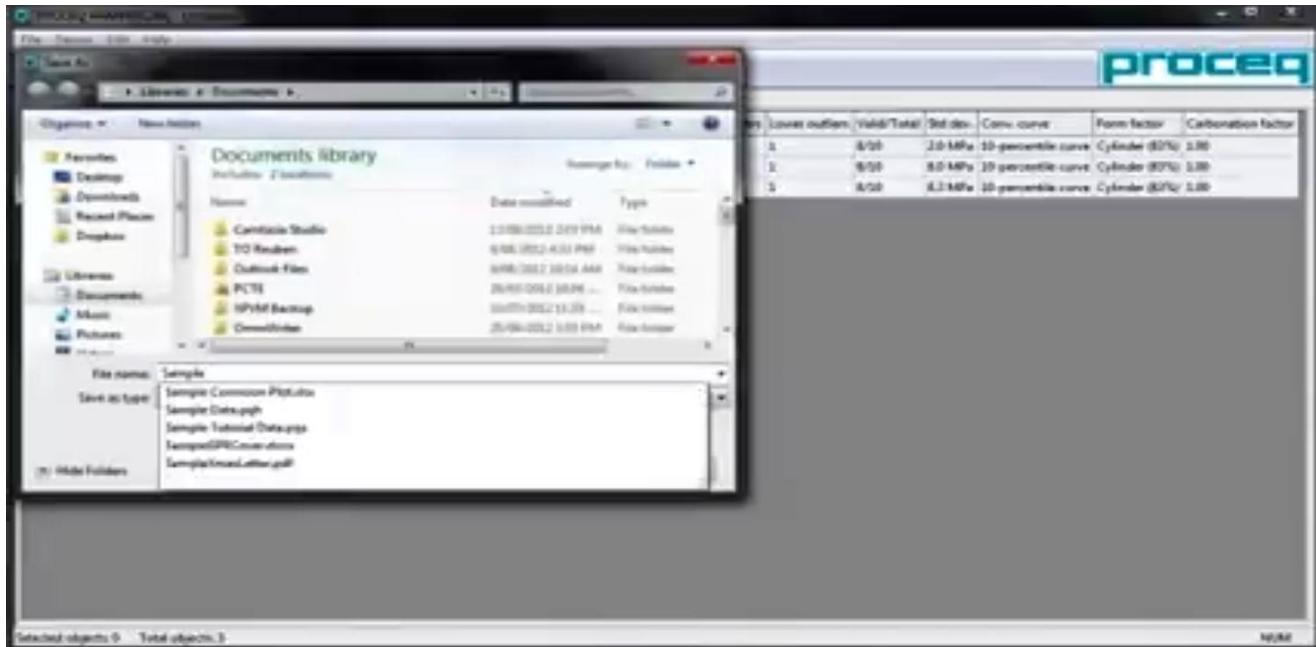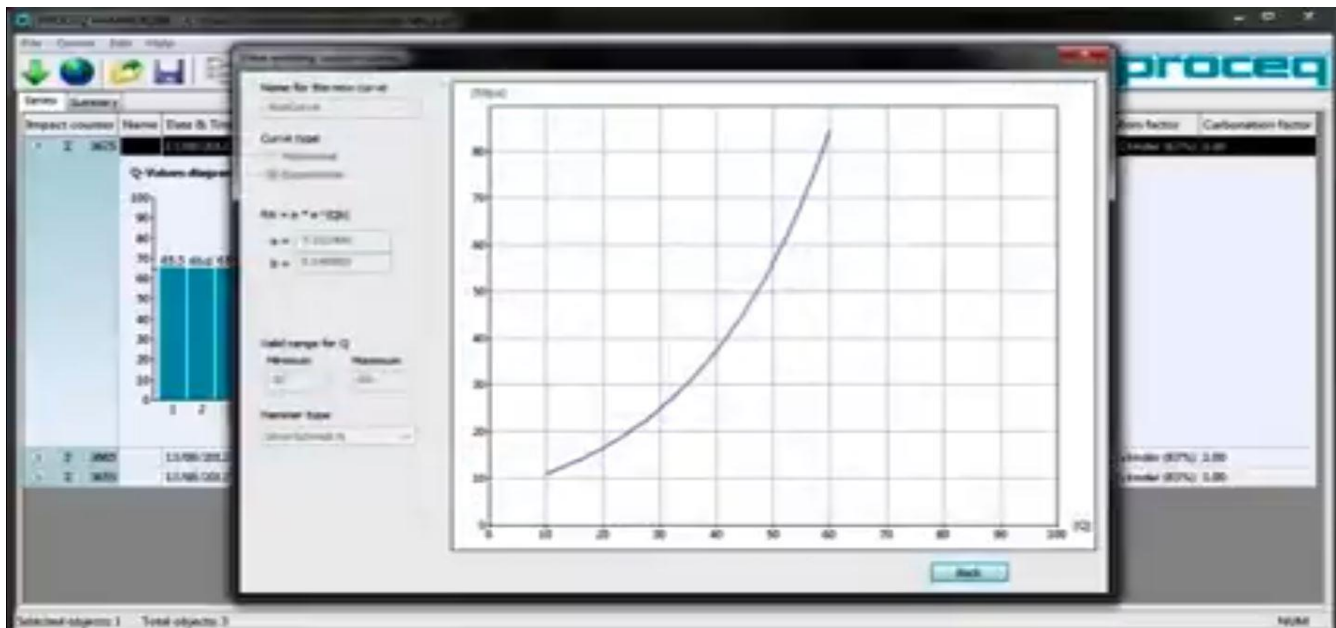
2. You can open any series to get a better view of what individual impacts make it up, as you would see, there are 2 dark colored impacts, each of this is the one that was dropped to use the Averaging method.

3. You are also able to update any of the settings, which you placed during hammer operation to a different value, so you can have different Averaging Modes, Cylinder types, you can also add a Carbonation Factor, which is used to correct for harden surfaces due to carbonation of all the concrete structures.

4. The Custom Curve setting allows us to create and load Custom Curves.
5. You can use Polynomial or Exponential Curves and you able to twig any of the data and the range of Q values for which the Curve is valid, along with the Hammer type.

6. You have a number of output options, you can copy the data as a text file or an image. You can also export to a text file or print the image.
7. If you choose to export, you have the option to save a text file, you can also save our project under any name we choose.