Stonemasonry

Section 2

Selecting & Ordering Natural Stone

THIS BOOKLET EXPLAINS HOW TO SELECT AND ORDER NATURAL STONE.

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Introduction

Selecting stone is a key part of a your work as a stonemason—the stone you choose and order has to have the look and style that the client requires, while also allowing you, as a tradesperson, to be able to create attractive and well-built structures that will last over time.

This section introduces you to some common stone types so that you understand the key differences between them, which will let you select and order stone with greater confidence.

Ordering stone

If you are ordering stone, the purchase price will be based on the weight of your order. Different stone types have different weights (or densities). For example, if all the pieces of stone were the same size, basalt would be heavier than limestone; West Coast schist would be heavier than Queenstown schist. As well as the purchase price, the weight will also has a direct affect on what the cost will be to transport it to the worksite.

Comparing stone weights

The usual quantity measure that stone is sold by is cubic metres (written m^3).

$1m^3$ is an amount of space 1 metre high x 1 metre wide x 1 metre deep.

$1m^3$ of:

- water weighs exactly 1 tonne
- Oamaru limestone weighs approximately 1.6 tonne
- schist can weigh between approximately 1.7 to 2.8 tonne
- basalt weighs approximately 2.6–2.8 tonne.

Yield is an area of stone compared to its weight

A common phrase is used when ordering flat stone such as schist–yield. Yield is a comparison–it tells you how much area a certain weight of stone (normally a tonne) will cover, for example, "One tonne will yield approximately 4m² (4 square metres) of coverage".

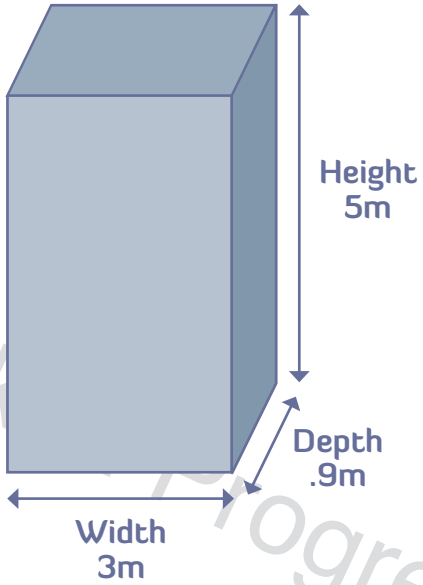
Finding the weight of stone needed

To find out how many m^3 of stone is needed, you would have to

1. Find the m^3 of your job.
2. Compare that to the weight of the stone you are using.
3. Arrive at a total weight and from that, the overall price.

Here is an example of that process

- Get your calculator out and multiply together the height, width and depth of your job. You will now have a m^3 figure.
  Example: 5m high x 3m wide x 0.9m deep = 13.5 m^3



- Allow for wastage, say 5%.
  Example: 13.5m^3 + 5% = 14.2m^3
- Then, by talking to the stone supplier, find out the weight of the particular stone you are planning to use, for example you may find that the basalt weighs 2.6 tonne per m^3.
- Multiply the area by the stone weight.
  Example: 14.2m^3 X 2.6 = 36.92 tonne. By rounding the .92 up, you would need 40 tonne of basalt for the job.
  - As a comparison, if you were using Oamaru limestone for the job you would need less weight of stone—22.72 tonne (rounded up to 23 tonne).

Once you have found this quantity out, and you have a price per m^3, it pays to check the job budget before ordering so you can be sure that you are in line with that.

Over time, your supervisor and your work experience you will help you get a better understanding of the different stones, and how much stone may be needed for a particular type of job.

Note

Order your stone at least 3 to 4 weeks before it is needed on-site, this gives the supplier time to make up your order and allows the time needed for transportation.

The stone will be delivered in bags or sometimes wrapped up on pallets. Because of the heavy weight involved trucking or rail are the most economic delivery methods. Plan ahead so as to get as much stone in one load as possible and it will cost less compared to several loads.

If you have arranged truck transport, in a lot of cases a line-haul trucking company will pick the stone up from the supplier and deliver it to a depot in your area. You will need to arrange a local carrier to collect and deliver the stone to your worksite.

A truck with a strong enough crane (for example a Hiab) will be needed.

You will need to think about where the load will be placed on arrival.

Consider

- Room for the truck to swing its crane arm and safely unload.
- The space the stored stone will take up.
- The need for easy access to the bulk stone.
- The space requirements and movement needs of others on the worksite —tradespeople, the residents.
- How far the stone storage will be from the processing and work area (get the stone as near as possible to reduce the carrying distances, especially for larger, heavier pieces of stone).

Health & Safety reminder

The best working position for a truck and crane would be an area that is as level as possible, has ground sturdy enough to accommodate the truck stabilisers/outriggers, and one that provides clear views of the unloading area for the crane operator.

Stone types

Basalt

Basalts are a dark grey to black rock that mostly has the same colour, texture and shape. Basalt naturally occurs in Northland, Auckland, Banks Peninsula, Timaru and Dunedin, but most of the quarried supplies are from Auckland.

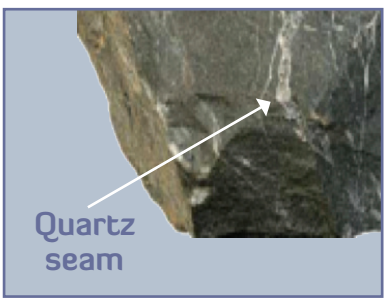
Basalt comes slab sided with flat edges. It can be hand-shaped to a fine finish with tools (for example made into circular columns) and finished by polishing. When knocked or tapped with a hammer a good quality basalt produces a sound that 'rings'.

(Need more information about ordering basalt.)

Greywacke

Greywacke is a common stone in New Zealand—most of our mountains are made up of it.

Greywacke can look a lot like basalt, the difference is that greywacke very often has veins of minerals through it, the most common being quartz.



Note

Greywacke will generally not be cut because of its hardness, and it is best to use tungsten tipped tools when working on the fit and face appearance, as the stone will blunt normal hardened masonry tools more quickly than other rock types.

As it is being prepared greywacke can break easily along fissures (grooves or furrows) and faults in the stone, so expect some wastage when using this for a project.

Greywacke can be sourced from local quarries or riverbeds. The style that is needed for the job will guide you as to which source of stone to use. Normally greywacke is left looking natural, and wet, dry or lime mortar used.

Quarried greywacke

It is good practice to see what the greywacke being stored or quarried actually looks like before ordering. This means a personal visit to the quarry, but expect that there will be Health & Safety restrictions in getting to the actual quarry face so you can see what is being extracted that day.

There are differences in greywacke from quarry to quarry, and even between different seams of stone within the same quarry, which means that a greywacke seam being quarried this week may not look the same as that extracted a month ago. If there is a particular stone that you like, you need to order it straight away, even if it means storing the stone in the lead-up to the job, as it may not be available in the future.

Over time, as you get to visit and see greywacke coming out of the different quarries in your district, you will build up a knowledge of what is available from the different stone seams.

You can get a local trucking company to deliver your quarry greywacke, or if a trailer can cope with the weight, you might be able to collect it yourself.

River stone greywacke

River stone greywacke comes from rivers, or gravel pits in places where there used to be a river—as New Zealand's greywacke mountains erode away the stone is washed down the rivers. Because it is so common, river stone greywacke is not often transported between districts.

The river stone will be smooth—the effect of having been in a river for many years where it will have tumbled and ground against other stones, with the end result that the stones will be rounder and sometimes flatter than quarried greywacke.

Permission is usually needed before stone is gathered from a riverbed in any quantity. Before you head to the river, it is good trade practice to speak with the local district or regional Council and check what permissions are needed. They will normally want to know where you will be gathering the stone from and how much you will be removing.

Normally you would take a trailer or small truck to collect river stone greywacke. When you are walking around selecting, keep in mind that you will be building a wide bed for the wall so that it is stable, and that you will need a variety of rock sizes for strength, gap filling and as capstones, so you can construct the style that is planned for the wall.

Check

- ❑ Choose the type of stone that your wall needs at that point in time, but do set aside and store, if possible, any stones you come across that will be special to the wall, for example because of their size or shape?

Limestone

Limestone is made from the shells of long dead tiny marine fossils that have been compressed and cemented together, which is the reason it can have colour variations, holes and impurities in it. Limestone appears as a layer in the ground, and those layers can be deep, and sometimes change in depth to become shallower.

Limestone localities include the Te Kuiti area in the North Island and near Oamaru in the South Island.

Quarries extract large blocks of limestone, which are then further cut with saws to the customer's actual specification.

Grades of limestone

Limestone can vary in hardness between areas—for example Te Kuiti limestone is hard compared to Oamaru limestone.

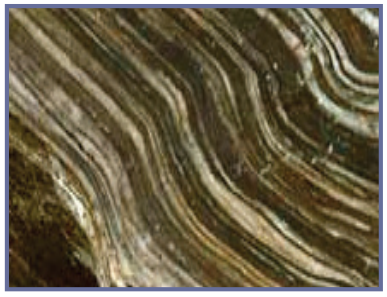
The deeper the limestone is in the quarry, the better the grade—it becomes harder, has less impurities and a more consistent colour to it.

If you want the higher grade limestone from the bottom of the quarry face, it pays to pre-order that as early as possible from the supplier so they can keep aside what you need when they work down to that level of the quarry.

Limestone can be left with rougher surfaces, or dressed to a smoother finish using hand and power tools, and it is even able to be turned and made into columns.

If required, limestone can be left with a natural finish, for example in a restoration project, or sealed using a breathable water repellant. If the stone is being left natural, care must be taken in the selection of the stone to ensure that the colour matches to the old stone and there are no holes or impurities.

Schist



Schist is a rock that has layers of minerals such as quartz or mica in it. The minerals allows schist to split off easily into flakes or slabs.

All schist is sourced from quarries in the South Island. The type of schist is normally named after the area it is mined in.

You will need to work out the area to be covered in m^2, compare that to the yield that the supplier publishes, allow for waste and then place an order. Discuss transport arrangements with the supplier at that stage. They may recommend a particular company or method of delivery.

The quarry mines the stone and does the initial sizing (which you will then need to finish off to suit the style you are working to). Schist is normally delivered to the site stacked in very large bags with lifting handles for a crane to attach to.

Schist differences

The look of schist does differ between quarries, so the job specification and supplier information will guide you as to where to order the schist.

Here are just a few colour differences as an example

West Coast Grey	Silver
Queenstown Green	Grey
Alexandra	Brown with quartz
Tarras	Black with gold
Oturehura	Tan
Gibbston	Grey

Note

Make sure you order the correct schist that has been agreed with the client. Because of the colour differences it may be hard to replace one type with another and get the same look.

The weight and hardness of schist differs between areas—for example West Coast schist is very hard and heavier compared to the other types. This means transport costs will be higher, and more time and effort will be needed to work that particular schist.

Some types of schist will have special characteristics that will mean you need to allow extra in your order, or more time in preparation. For example

- Crumbly, weak areas that will need to be worked round.
- Wobbly grain, which makes it difficult to cut.
- A lot of quartz in it, which makes the rock brittle.
- Different grains in the one rock each with a different hardness.

Schist suppliers you have not had any experience of before will be able to send you samples and discuss their product with you. Alternatively ask around amongst fellow tradespeople, who may know about and have worked with, a specific type of schist.

Trade Tip

It is more efficient to cut enough stone for a day's work at a time.

Schist can be set in place using:

- dry stacking
- wet-back concrete
- mortar and rake.

It is often left natural so it can age. If it is sealed, the stone will need ongoing maintenance to keep it looking good, which may not suit the client's needs.

Note

After the schist is in place, don't wash it straight away as efflorescence can occur resulting in a white or dark film appearing on the surface of the rock.

Efflorescence is caused by water carrying mineral salts from below the surface of the schist up to the face.

More . . .

You have reached the end of this section. You can read more about *Selecting Stone* here.

Trade Tip

For general internet searches about this topic, we suggest you use the key words at the start of this section.

Finding New Zealand schist suppliers

Carry out an internet search using the words 'NZ Schist Suppliers'. Go in and look at the supplier's websites to see the colour differences between the types of stone for sale.

Understanding more about how limestone is quarried

Search using the words 'limestone quarry' and then look at the images to see how limestone is extracted and cut around the world. Note ground limestone is also used for other purposes, such as garden fertiliser, so some of the websites you find may be about that.