

An Introduction to Aggregate Lay-down:

Materials:

Aggregate in laymen's terms is gravel and the placement and compaction of gravel is often referred to as base-work. Proper base preparation is essential prior to any asphalt paving. The principles in base-work for roads are universal and apply to all areas of construction.

The same principles seen above in the design of asphalt are also used for gravel. Rock size and sand content dictate the application of any type of aggregate. Larger gravels such as pit-run and 63mm recycled concrete are used in thick layers up to 500mm (20") to provide a very strong structure under our roads. The very common 20mm road crush is used for top-lifts as it is easiest to finish grade to perfection. The measured size referred to when naming an aggregate is the average size of the larger rocks found throughout. All gravel designs, however, also include a spectrum of medium-sized rocks and sand.

Most gravel used today is manufactured using rock-crushing equipment and a wide range of screens and conveyors to attain the proper mixture. This process is very similar to baking at home. Aggregate is tested as it is crushed to ensure the proper amounts of rock and sand are in place. Some gravel is still dug out of river banks and require less processing. These gravels are often cheaper to purchase, but can have significant down-sides. High clay content in natural gravels will help them to bind together, but later can cause problems with moisture levels as you compact them. The fracture found in manufacture gravel also helps the material bind together. Ideally an average rock found in gravel will have at least 3 faces of fracture. Riverbed material that has not been crushed usually has rounded stones and will not bind well.

Typical lay down:

When placing gravel there are a number of considerations. The first is the thickness of the gravel. A basic rule is that you do not want to put in gravel lifts of more than 150-200mm (6-8") at a time. The reason for this is moisture. As you place aggregate you need to apply water along with your compaction to attain the necessary density. Ideal levels of moisture are tested regularly prior to paving and typically need to be between 5-7 %. This can often be a problem as the sun and wind dry out gravel over time, making it necessary to pave quickly after the gravel is placed.

Gravel also needs to be laid with as little displacement as possible. The more you work gravel, the more the rocks and sand separate causing the rocks to rise to the surface. Rocky patches are the sign of either an inexperienced operator or poor materials.

The equipment used to place aggregate varies, but the principles remain the same. A typical gravel crew will operate with a grader, loader, skidsteer, and a

variety of rollers. The grader-person's job is to finish the gravel to final grade. A loader or skidsteer often is used to place or "rough-in" materials, as well as to get into corners and edges where the grader is unable to fit. The principles for compacting a base course are the same as with asphalt paving. A rubber-tired roller (pneumatic/wob) packs the gravel eliminating air voids while a steel-drummed roller finishes the surface flat.

Base crews often also need to address sub-grade conditions. Prior to gravelling an area, the clay base needs to be shaped and rolled. This type of work is often called "dirt work". While performing dirt work different equipment is often used. The rollers used are "pad-foots or block packers" which apply a significant amount of forces to the small pads found all over the roller drum. Another machine often used is a stabilizer. This machine is essentially a large roto-tiller which mixes the ground. A stabilizer will usually mix in cement powder to the clay base which along with moisture and compaction creates a solid platform to build from.