

Fact sheet 3

Physical properties of rocks

The scientific characterization of the rocks is useful for many reasons, but ancient as well as modern quarrymen were not particularly concerned about the geochemistry or origin of the rocks employed. Rather, what did concern them, was the workability and technical properties of the rocks. Hard or soft, brittle or less brittle, etc. Such properties are important to identify in order to understand how the resource itself impacts on the quarrying technology employed. As shown below, we can divide rocks into rather simple groups according to their working/quarrying properties.

Massive stone includes rocks that do not have closely spaced planar planes of weakness along which the rocks easily split into slabs. Thus, they are extracted as blocks of more or less uniform shape. We may subdivide them into *hard rocks* and *soft rocks*; basically, “hard rocks” are

composed of minerals that are harder than steel, such as granite, quartzite and gabbro. “Soft rocks” are consequently composed of minerals softer than steel and/or poorly cemented rocks and include marble, limestone, porous sandstone, soapstone etc. But regarding quarrying and processing, the contrast between hard and soft rocks appears large, and will be displayed by completely different quarrying techniques and/or applications.

Cleavable stone includes a variety of rocks that display closely spaced planar structures along which the rocks split easily. Thus, they are extracted as slabs, not blocks. Examples are roofing slate and flagstones for paving. *Rubble* basically includes any stone that is collected and used for any purpose without being further worked.

Division of rocks according to their physical properties (hardness, brittleness and cleavability)

NATURAL STONE	MASSIVE STONE (quarried as blocks)	“Hard” rocks	Granite, gabbro and most other igneous rocks Quartzite Chert Silica-cemented sandstone
		“Soft” rocks	Limestone Travertine Marble Calcite-cemented sandstone Gypsum (alabaster) Serpentinite Soapstone (steatite)
	CLEAVABLE STONE (quarried as slabs)	Slate	True slate or any other thin-layered low grade metamorphic rock
		Schist	Phyllite, schist, green schist or any other layered metamorphic rock displaying a spaced cleavage
		Flagstone	Thin bedded sedimentary rock or thick-layered metamorphic
	RUBBLE (collected)		Any available