Fact sheet 7

Spoil characterization

Spoil (or rock waste) may be defined as the lithological leftovers from the quarrying. Each of the steps in the process of quarrying leaves behind spoil material characteristic of that specific process. Ideally, a quarry that displays many steps of production involving changes of techniques will have a variegated "construction" of spoil heaps, while quarries with few steps and/or a single technique of working will have a uniform composition. Also, if all steps in the production are carried out in one place, the spoil will be mixed and perhaps display a cyclic vertical stratigraphy. Likewise, if movement from one step to the other involves physical movement of the blocks or cores, we may see a lateral separation of characteristic types of spoil – i.e. "extraction spoil" with large fragments and "work areas" containing fine debitage. Such perspectives have an important impact on the interpretation of the social organization of quarrying.

Characterizing the *spoil fragments* includes describing fragment size, size distribution, shape and tool marks on them. In the ideal Roman limestone quarry, exploiting a massive resource with few natural fractures, carving would be the dominating rock-removing technique, leaving small fragments of spoil from all the steps involved. Likewise, a Roman granite quarry involving splitting in the extraction and block reduction and thereafter carving, will display extremely variegated spoil from the first two steps (including large block fragments) and fine debitage from the last.

Characterization of the horizontal and vertical *spoil stratigraphy* is important for interpreting the evolution of a quarry and relative dating of events in it. When horizontal movement is a strong aspect of a quarry (for instance when quarrying a layer of valuable stone) the quarrying will leave behind a trail of spoil heaps, the oldest (beginning of quarrying) farthest away from the remaining quarry face. If the quarrying involves an overall downwards movement (level by level) the spoil heaps surrounding the quarry will display a cyclic vertical stratigraphy.

Spoil heap shapes and their relationship with the quarry faces are important to characterise. They can give important information about the number of people and teams working simultaneously in a quarry.

The spoil heaps in quarries are excellent places for the preservation of material culture; in an active quarry the deposition rate is much higher than any non-catastrophic geological process, which leads to capture and preservation of charcoal, ceramics, tools etc. However, since removal and re-deposition of spoil heaps often is necessary during quarrying for getting access to rock outcrops, care must be taken in the interpretation.

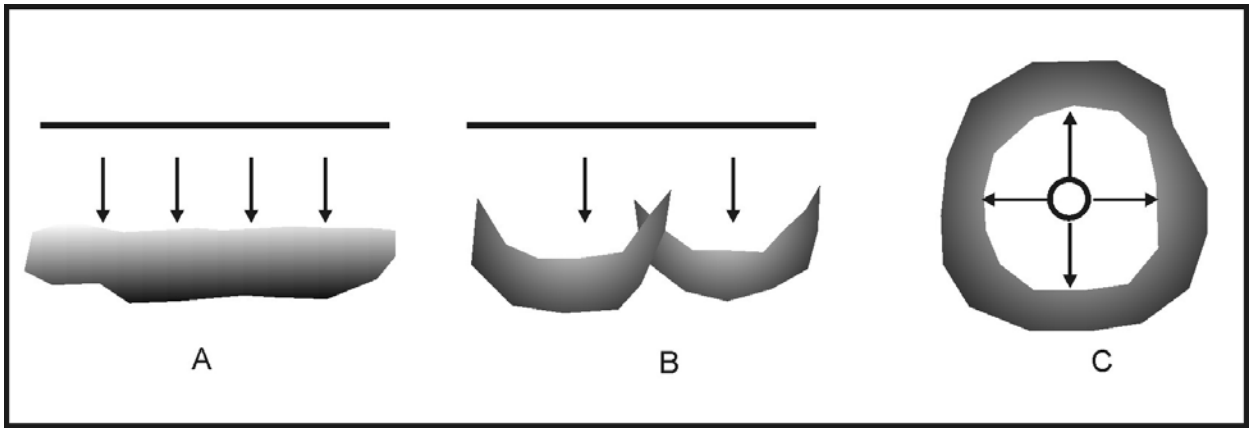
Huge spoil heaps in fron of sandstone quarries at Gebel el Silsila, Egypt.

Uniform distribution of spoil fragment size indicate mass production of small product, in this case grinding stones. Aswan, Egypt.

Fine sand mixed with tool fragments, deposited from grinding of obelisks in a Dynastic silicified sandstone quarry, Aswan, Egypt.

Roman work area in silicified sandstone, Aswan, displaying a variegated composition of the spoil material, from blocks (waste from splitting) to fine chips (from carving).

Spoil heaps in limestone quarry, Sagalassos, Turkey. Quarry face in the foreground, transport exit in between the heaps.



Three situations of spoil heap development. a) simultaneous extraction along the full length of a quarry face, b) progressive extraction from a quarry face (first right side then the left), c) spoil heap around a central point of extraction.