



## Extraction and use of building and roofing stone - some sustainability issues

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The public often opposes quarrying proposals. But supplies of suitable building and roofing stone are essential for repair and maintenance of the cultural heritage and new buildings including those which preserve local character. Planning policies and applications are widely tested in terms of sustainability.

Building and roofing stones have rather precise properties and limited geographical and stratigraphical occurrences. Options for selecting sites are restricted. These must be safeguarded from sterilisation by other types of development.

Extractive operations create jobs in countryside areas where other employment is scarce and support a wide heritage skills base that, if lost, would make it impossible to maintain the cultural heritage. Some communities have been willing to accept stone quarrying to undertake repair of historic structures but have opposed the use of material for new buildings. That is unwise because heritage orders tend to be occasional and for small quantities of stone. Sites need regular orders for use in new building to smooth out sales. Planning conditions sometimes prevent waste rock from being used as aggregate even though the economic viability of the operation may depend on it. It makes sense to put all extracted materials to good use.

Extraction, processing and transport of stone causes environmental impacts but many sites are small compared with other mineral workings so impacts such as noise, dust and traffic are generally limited and mitigated through good site management. Restored sites also contribute positively to local biodiversity and geodiversity strategies. Much natural stone can be recovered following use. But caution is needed because instances have occurred where old structures have been demolished so that stone can be used elsewhere. Less embodied energy is required in recycling stone than in re-use of bricks, metals and plastics.

A key issue is the performance of stone compared with other materials in sustainability terms. Stone is strong, durable and has good thermal characteristics. It has been estimated that at least 40% of the world's materials and energy are used in buildings. Reduction of energy inputs could significantly improve sustainability. These can be considered in terms of: "embodied energy" consumed in directly and indirectly in the production of the materials, "operational energy" during the use of the building, and energy used in transporting products. Depending on the mode of transport, the use of local stone appears more sustainable than bring it from further away, but the trade now has major international components.

Imports have led to a debate as to whether stone secured from some sources is cheap because of lower health, safety, environmental protection and employment standards. Many importers now check whether material is supplied with due social responsibility.

Natural stone can be sourced with due regard to sustainability. There is some evidence that it performs well compared with other types of building materials but additional research on its comparative performance is needed.