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Quarrying in Malta

Within a European context, the Maltese quarrying industry represents a special set of problems. The islands' size is a mere 316km², where 30 aggregate quarries and some 60 dimension stone quarries presently supply the local burgeoning construction industry with quarry products. The major constraints preventing the quarrying industry from expanding to its full potential in Malta are the lack of territory and the limited rock resources. This is aggravated by an insularity which has retarded modernization and restructuring within the context of global competition. The environmental impacts of quarrying are also more readily perceived in a very densely populated country such as Malta.

Statistics on quarrying in Malta are inaccurate, although annual production of aggregates may exceed 939,000m³ (Central Office of Statistics 1994), with about half this figure for diminishing levels of dimension stone production. This trend will continue as traditional construction methods using dimension stone won from local limestone quarries are replaced by concrete structures requiring aggregate materials.

The local geological resource base

The Maltese quarrying industry is hindered by the limited geological resource base of the islands. The local geology is mostly Tertiary limestone, which can be poorly compacted and insufficiently indurated by cementation. The quality of crushed limestone aggregate is also inconsistent because of the stratified nature of the rock, consisting of thick, discrete beds of bioclastic red algae, rhodolitic beds or dense foraminiferal strata.

Areas affected by tectonic faulting usually show higher levels of diagenetic cementation

and recrystallization, which results in better-quality limestone¹. Many aggregate quarries are located in these areas (fig. 1), although the decision to locate a quarry is generally not based on an expert knowledge of the geology of the site or of the Maltese islands' system of tectonic faults. This approach greatly reduces the potential of selecting those areas with optimal rock quality, and the main problem for the industry remains the relatively low strength of the rock.

The geology of Malta also includes clay, chalk, phosphate and chert (in order of abundance). The quarrying of clay deposits is prohibited, while the other minerals remain

untapped by the local quarrying industry, mainly because their existence remains largely unrecognized.

Quarrying techniques

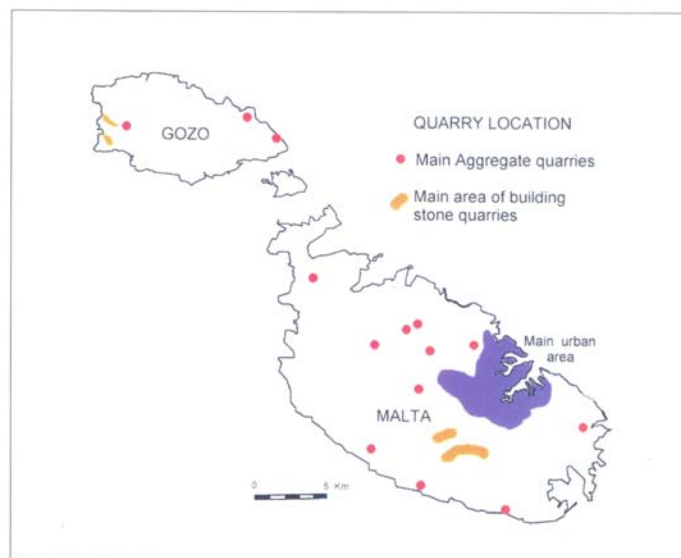
The two main quarrying techniques used in Malta are related to the compressive strength of the rock:

1. The low-strength Globigerina limestone is cut by rotary cutters to produce dimension stone for the islands' traditional masonry buildings. This process results in significant wastage of stone because the rock is not entirely a freestone (it includes many 'defective' components) and may

have intensely bioturbated sections which have to be discarded because they weather rapidly when used for masonry.

2. The moderately strong Coralline limestone formations are processed into aggregate by blasting and crushing. Maltese aggregate quarries commonly show significant vertical variation in rock quality because of the strongly stratified nature of the rock. Quarrying techniques are not selective and do not rely on any scientific classification of the rock. Often, poor-quality rock is crushed with good-quality material. This can result in an aggregate that may fail to have sufficient ➤

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geotechnical qualities as required by British standards or CEN for construction materials.

Environmental impacts

Environmental groups and a number of public-funded institutions are preoccupied with the increase in quarrying in Malta, which has more than doubled over the last decade². The impact of limestone quarrying on the Maltese environment is mainly associated with increases in noise, vibration, lime dust and the destruction of the ecology in the quarried areas. Such problems are found universally, but due to the inadequate or unorthodox environmental assessment techniques used in Malta, cases where environmental impacts are insignificant are actually given disproportionate importance. This prejudiced approach has led to exceptional regulations which were supposedly enacted to protect the environment. For example:

- Malta bans the export of quarried stone, thereby restricting further expansion of stone quarries
- Maltese quarries are restricted from excavating anywhere close to the water table, since quarrying is presumed to harm the water table
- Malta has a moratorium on the opening of new quarries
- Permits for quarry extensions are bureaucratic and processed very slowly³.

Surprisingly, none of these restrictions are applied to activities which are far more environmentally dangerous than quarrying, such as landfilling of hazardous wastes and

industries producing toxic wastes.

The more persistent environmental problems are linked to the low price of Maltese quarry products, which has resulted in an inefficient and unsustainable use of the locally quarried rock. Malta generates significant quantities of rock waste from quarrying and construction and demolition, but this problem has not been adequately addressed by recycling, which remains poorly developed on the islands. Landfilling of construction and demolition waste is at the same levels as in Mediterranean EU states, where over 90% of this waste is landfilled⁴, although in Malta this waste stream is landfilled along with hazardous waste, which makes recycling an unfavourable option.

Planning for quarries

Malta has similar problems to other small territories where the availability of land for quarrying is restricted. Many quarries have nearly exhausted the rock resources within their permitted boundaries, and new quarrying sites are not permitted.

Land-use planning in Malta is the responsibility of the Planning Authority, which also requires that any quarry development should be supported by an environmental impact assessment report. The Planning Authority has recently published a Minerals Subject Plan⁵ which formulates policies for quarrying. However, the plan places a number of misguided regulations and restrictions that damage the quarrying industry, the environment and the construction industry which is seeking good-quality quarry products (table 1).

Table 1.

Restrictions proposed in minerals subject plan	Main effect	Predicted negative effects
Quarry depth: ban on deepening of present quarries (average depth of 50m a.s.l.)	Environment	Quarries will have to expand laterally which destroys surface ecology and habitats
Ban on new quarrying sites	Quality of aggregate (good quality rock is nearly exhausted in many quarries)	Construction industry will not find aggregate suited to its requirements
Imposition of hefty bonds and other expenses connected to EIA and issue of permit	Economic performance of quarries	Lengthy bureaucratic procedures and high costs result in unpredictable conditions impairing capital investment in new quarrying technology

Reactions to this plan by the quarrying industry have, in general, been negative, primarily because it does not offer new prospects for the restructuring and development of quarrying. Not surprisingly, more than half of the quarries in the Maltese islands do not conform to the Planning Authority's regulations or the policies found within the Minerals Subject Plan.

Problems of restructuring

Many Maltese quarrying companies are family-run businesses that have accumulated experience and knowledge from earlier generations rather than relying on scientific innovations. These relatively small-scale enterprises are not organized in consortia and capital investment in state-of-the-art machinery tends to be low, although labour costs are also relatively low compared to much of western Europe. A major challenge for the Maltese quarrying industry is the restructuring of the industry in order to bring about the modernization of management and streamlining of products.

The restructuring and economic viability of the Maltese quarrying industry will be difficult to achieve, however, for two primary reasons:

1. Malta lacks the technical institutions which can train quarry managers and help introduce scientific know-how to the quarrying industry.

2. The country lacks a geological survey department which could be instrumental in assessing the mineral resources of the country, some of which remain virtually unknown. A geological survey department could also advise on the classification of limestone resources and their potential industrial uses.

Regrettably, the Minerals Subject Plan makes no mention of the need for these new structures which are crucial for the modernization of the quarrying industry. There is now some concern regarding the impact that Malta's possible accession to the European Union will have on the Maltese quarrying industry. It is still not clear whether Maltese quarrying companies are in a position to compete with the more efficient European quarries.

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