

# Bulk minerals, Geology and man, Midland Valley of Scotland

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## Bulk minerals

### Igneous rock

Igneous rock is quarried in the Midland Valley at a current annual rate of about 9 million tonnes. The rock is used principally for roadstone, concrete aggregate and other constructional uses. The majority of quarries are in basic sills or plugs of Carboniferous age, mainly quartz-dolerite, but Devonian and Carboniferous lavas are also worked and felsites in Lanarkshire give the characteristic reddish brown aggregate.

### Sand and gravel

Most sand and gravel produced in the Midland Valley comes from fluvioglacial deposits, but a proportion also comes from raised beach deposits and river alluvium. Sandstone and conglomerate of Carboniferous age are also crushed for high-specification aggregates and to produce sand for moulding or glass-making. Production overall is currently in the range of about 6 to 7 million tonnes per annum.

Resources are scattered throughout the Midland Valley but since transport costs form a considerable proportion of the cost of production, workings tend to be within easy access of the main centres of population.

The gravels consist of a mixture of those rock types present in the area of origin which were sufficiently durable to withstand transport by ice and/or water. Greywacke and lava pebbles are

common in the southern part of the area, but pebbles of Highland origin are more abundant in the northern part.

## **Fireclay**

The Carboniferous rocks of the Midland Valley contain some of the most valuable fireclays in the United Kingdom. The main sources are in the Passage Group and in the Lower Coal Measures. The fireclays in the Passage Group of the Central Coalfield have been worked underground and opencast, and those in the Lower Coal Measures have been worked by opencast methods in conjunction with coal.

Most of the current production comes from works on the east side of the Central Coalfield between Linlithgow and Fauldhouse, but there are also workings near Bonnybridge.

Fireclays were also formerly worked in Ayrshire above and below the Passage Group lavas. The Ayrshire Bauxitic Clay overlying the lavas was used mainly for the manufacture of aluminium sulphate.

Large reserves of fireclay have been proved in the Passage Group in the Douglas Coalfield, but they have yet to be exploited.

## **Bedded iron ores**

Clayband and blackband ironstones, which occur mainly in the Limestone Coal Group and the Coal Measures, were the principle source of ore during the rapid growth of the iron and steel industry in Scotland. Ironstone mining reached its maximum in the latter half of last century but declined rapidly in the early part of this century and has now ceased.

## **Limestone**

Limestone in the Midland Valley occurs in relatively thin seams in the Carboniferous and locally in the Upper Devonian. It was worked extensively in the past, both opencast and underground, for agricultural lime, metallurgical flux, stone dust in coal mines and as aggregate and for cement manufacture. Present day production is mainly for agricultural lime and filler powders.

At the present time, the Dockra Limestone in north Ayrshire, the Charlestown Main Limestone in Fife and the North Greens Limestone in Midlothian are being worked.

Large resources adequate for cement manufacture are probably present in only two areas. There are substantial resources of the Dockra and Broadstone limestones in the Beith-Lugton area of north Ayrshire and the Upper Longcraig and Skateraw limestones at East Saltoun in East Lothian.

Many abandoned limestone mines are potentially of use for underground storage or any other purpose for which an underground location would be advantageous. Several mines are of considerable volume extending over several hectares and in some cases have 3 to 4 m of headroom.

## **Building stone**

The use of stone in buildings has declined to a very low level and many of the former sources of supply have been filled in or built over. From time to time, quarries are reopened for supplies of a particular stone for a special requirement or for repair work, but freestone quarrying on a regular

basis has virtually ceased.

In the Glasgow area, the best known freestones are the Giffnock and Bishopbriggs Sandstones of the Upper Limestone Group in the Carboniferous and the Ballochmyle Sandstone of the Permian at Mauchline. In Edinburgh most building stones came from the Calciferous Sandstone Measures and include the Binny, Dalmeny, Hermand, Hailes, Dunnet, Granton and Craigleith sandstones. The Craigmillar Sandstone of the Upper Devonian was also used. In the Tay area Lower Devonian Sandstone was used for building and flagstones were formerly quarried in the Forfar district for paving.

## **Clay and shale**

There is very little exploitation of shale and clay in the Midland Valley. Almost 80 per cent of the brick production uses waste material from coal-mining although, in Fife, bricks are made from a mixture of Carboniferous mudstone and boulder clay.

Formerly numerous small brick and tile works thrived using Quaternary clays, till and Carboniferous mudstone.

## **Peat**

Extensive patches of hill peat remain on the higher ground in Ayrshire, on the Campsie and Ochil Hills and to the north-east of Callander. Areas of basin peat occur at Flanders Moss in the upper Forth valley and at several sites in West Lothian, Midlothian and Lanarkshire.

Peat is dug commercially at several sites for horticultural purposes and for use as fuel.

## **Water supply**

Most water supply comes from surface reservoirs at considerable distances from the main areas of demand, but locally groundwater is used for industrial and domestic supply or to augment the public supply.

The aquifers can be broadly subdivided into either rock formations in which groundwater flows mainly through joints or fissures in the rock or unconsolidated granular deposits of Quaternary age in which the groundwater moves through the intergranular voids.

Useful contributions to the public supply and industry are obtained by drilling rock and abstracting water from sedimentary rocks. The Knox Pulpit and Glenvale Formations of the Upper Devonian in Fife give good yields and breweries in Edinburgh obtain water from Upper Devonian and Lower Carboniferous rocks. Elsewhere water is drawn from rocks of Devonian age and from Calciferous Sandstone Measures. The Permian sandstones of the Dumfries area give high yields of groundwater and it is possible that good yields could be obtained from the Mauchline Sandstone in Ayrshire which is of the same age.

Abstraction from unconsolidated deposits is often sufficient for domestic or small industrial needs.

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