Fireclays

in ceramic production

What are Fireclays?

Fireclays are sedimentary mudstones which occur as seatearths or fossil soils that underlie almost all coal seams. Originally valued as refractory raw materials, fireclays are now primarily an essential raw material for the manufacture of buff and pale-bodied bricks, clay pipes and other ceramics.

Where do fireclays come from?

Fireclays are mainly confined to the Coal Measures. Most fireclays are relatively thin and extraction on their own would not be economically viable because of high overburden to mineral ratios. Surface coal mining sites are the main source of supply, currently accounting for some 90 per cent.

Fireclay supply is thus highly dependent on surface mining operations.

What products are made from Fireclay?

Approximately 20 per cent of bricks manufactured in the UK are buff or pale bodied and contain fireclay.

The manufacture of clay pipes for drainage is heavily dependent on fireclay.

Some traditional refractory products for industrial and domestic use are made from fireclay.

Fireclay is used in the production of some sanitaryware.

Some, but not all, stoneware pottery uses fireclay as an essential raw material.

What are the special qualities of fireclays?

The vitrification characteristics of fireclays enable their use in the manufacture of bricks to meet specifications for water absorption and frost resistance. The proportion of fireclay used in the body varies from 50 to 100 per cent, depending on the properties of the fireclays and other clays included in the blend, and the technical and aesthetic properties required in the final product. Fired colour, determined by iron content, and carbon and sulphur content are the main criteria on which the suitability of a fireclay for facing brick manufacture is judged. Pale and buff coloured bricks made using alternative materials have inferior qualities in terms of durability, crushing strength and water absorption which may not satisfy required performance standards.

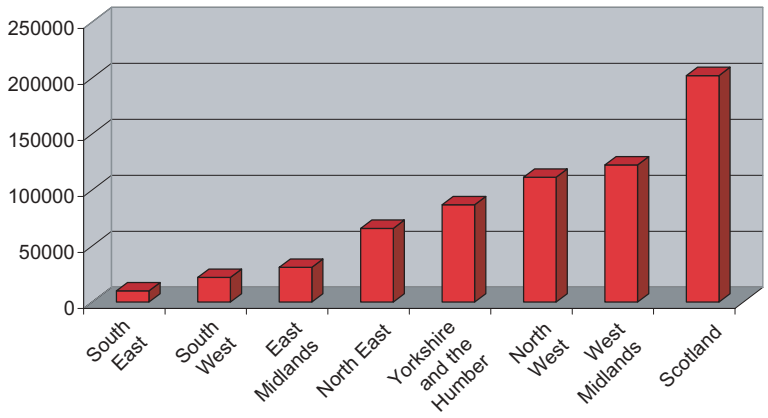
Fireclays are mixed in roughly equal proportions with clays and shales for the manufacture of clay pipes. The fireclay adds plasticity, an important property governing the ease with which the material can be shaped. It also widens the temperature range within which vitrification takes place, thus making firing more manageable. This blending of materials found in association with coal not only provides the required properties for the manufacturing process, but also enables deposits which would otherwise be discarded to be utilised.

The relatively high alumina and low alkalis content of some fireclays also make them suitable for use in the manufacture of certain refractory products.

The fired aesthetic qualities of fireclay are also essential for the manufacture of some stoneware pottery.

Annual consumption of fireclays in the English regions and Scotland

(tonnes: year 2000)



Why are fireclays difficult to source?

The majority of seatearths are unsuitable for use because of the high technical specification required for ceramic manufacture. Only a small proportion of surface mining sites, about 20 per cent, produce fireclay of a suitable specification.

Environmental pressures, and planning guidance which dictates stringent tests for surface mining permissions, can result in reduced opportunities for the winning of essential fireclay supplies.

Planning authorities increasingly require surface mining schemes to embrace quick restoration to gain acceptance. The short duration of surface mining operations and the need for immediate restoration limits stocking facilities. This can lead to wastage, failure to exploit and sterilisation.

What is required to ensure continuing supplies?

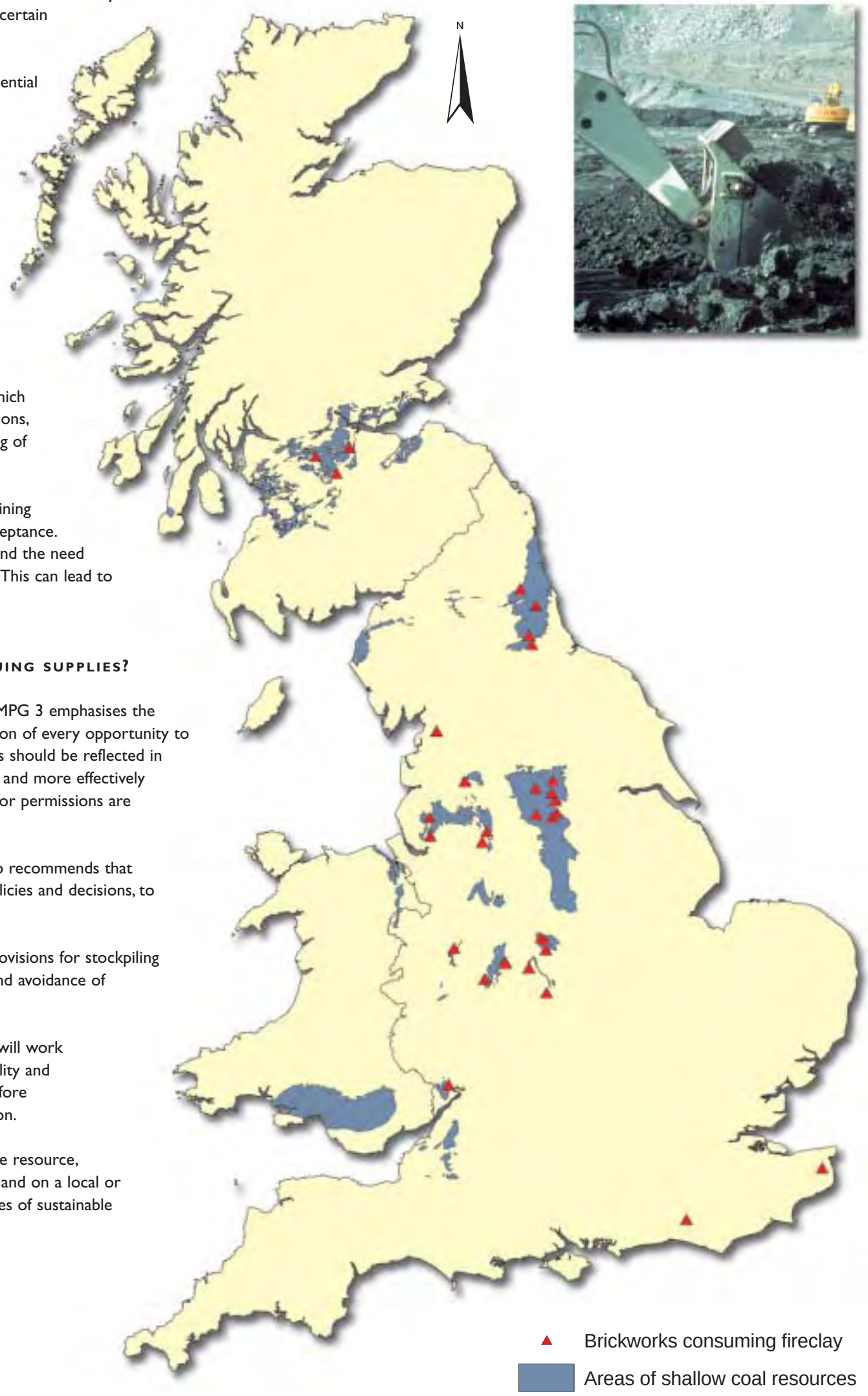
Government planning guidance on coal mining in MPG 3 emphasises the importance of fireclay and urges the full examination of every opportunity to recover it from any proposed site. These principles should be reflected in regional planning guidance and development plans, and more effectively applied by planning authorities when applications for permissions are considered.

The DTLR report *Brick Clay: Issues for Planning* also recommends that planning authorities and industry seek, through policies and decisions, to address the supply of fireclay.

Schemes should thus be encouraged to include provisions for stockpiling or on-site storage to guarantee full exploitation and avoidance of sterilisation.

The heavy clay and surface coal mining industries will work together to ensure a full assessment of the suitability and marketability of fireclays available from any site before submission of an application for planning permission.

Such an approach will avoid sterilisation of a scarce resource, encourage a close match between supply and demand on a local or regional basis, and be compatible with the principles of sustainable development.



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What are the consequences of failure to address this issue?

The heavy clay manufacturing industry requires circa 700 000 tonnes of fireclay per annum delivered to specific local markets. Failure in the supply chain will:

- restrict the availability of particular products specified by planners, architects and engineers for performance, aesthetic and heritage reasons;
- inhibit capital investment in manufacturing plant;
- result in the closure of certain plant;
- jeopardise local employment in the brick and pipe industries;
- possibly lead to displacement by imports.

In addition the manufacture of some pottery and other ceramics may be at risk.

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