

Forty years of UK cement manufacture – 1966 to 2006

The most significant developments for the UK Portland cement industry for the last forty years – that is, since the formation of The Concrete Society in 1966 – are the continuing improvements in environmental performance, productivity, product performance, product consistency and cost-effectiveness.

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A young Chris Clear.

The Portland cement industry in 1966

In order to determine developments since 1966, it is necessary to have an idea of the extent of the cement industry at that time. There are some useful records to draw on, including CEMBUREAU's *World cement directories* for 1959⁽¹⁾ and 1970⁽²⁾. The edition for 1959 lists 50 UK cement works producing Portland cement clinker with 130 kilns at a total capacity of 12.9 million tonnes per year, whereas the edition for 1970 lists 47 cement works with 117 kilns and a total annual capacity of 19.5 million tonnes. Comprehensive details for particular works and companies are set out by Jackson⁽³⁾ for the period 1914–1994 and a list of cement companies and their works was included in the 1966 *Concrete Year Book*⁽⁴⁾. In addition, Pugh⁽⁵⁾ covers the history of Blue Circle, where in 1966 'Blue Circle' was a brand name and a marketing group working for a number of cement manufacturing companies.

Table 1 shows a listing of cement companies, works, kilns and capacities for 1966, as determined from the various sources. Within this Table are the closure dates of each of the 30 works where operation has ceased. Missing from the Table are cement works without kilns – that is, works with grinding facilities only – or those that produced non-Portland cements. These include the Frodingham Cement Company works at Scunthorpe in Lincolnshire that manufactured super-sulphated cement now known as supersulphated cement, and Lafarge Aluminates at Purfleet in Essex, who made high-alumina cement, now known as calcium aluminate cement.



Figure 1 right: Tunnel's cement kiln at Pitstone 1974, closed in 1991.

Figure 2 far right: Graph depicting cement consumption from 1965 to 2005.

Cement consumption

As shown in Table 1, the capacity in 1966 was around 18 million tonnes of cement per year available from 121 kilns – an average of 146,000 tonnes per kiln. Even at that time, it was realised that improvements in productivity were required and in the optimistic 60s the necessary investment was forthcoming due to an anticipated, inexorable increase in demand. Indeed, during the early 70s sales reached their all-time high of 20 million tonnes. Figure 1 shows the Tunnel Pitstone works in 1974. However, the oil crisis of 1973 saw the post war period of unremitting growth come to an end and consumption fell to a low of 13 million tonnes in 1984. It was during this period of declining sales that the majority of operational rationalisations occurred and the number of works dropped to 24. Although cement sales recovered from 1984 to 1989, this could be attributed to a combination of a number of massive infrastructure projects, such as the Sizewell B power station, the Channel Tunnel and its Terminal at Ashford and the Queen Elizabeth II Bridge at Dartford, all coincident with unprecedented development around the City of London and the creation of the new business district around Canary Wharf. From this second peak until the early 90s, consumption dropped and thereafter has remained steady at around 13 million tonnes per year, giving the overall situation as shown in Figure 2.

Consolidation

During this forty-year period, as well as rationalisation of works, there has been much consolidation of companies and acquisitions by multinational players. The Aberthaw and Bristol Channel Cement Company became part of the Blue Circle Group, which then became Blue Circle Industries, which was, in turn, acquired by Lafarge Cement. Tunnel Cement, Ribblesdale Cement and Ketton Cement were first merged as part of RTZ and then became Castle Cement, now owned by Heidelberger Zement. ICI Tunstead was bought by Minorco, a subsidiary of Anglo American, which continued to make cement under the name Buxton Lime Industries. Buxton Lime is now part of Anglo American Group. Rugby Cement was acquired by the RMC Group, which was then purchased by CEMEX in 2005.

Improvements in efficiency and environmental performance

An important works listed in Table 1 is the ICI (then BLI) works at Tunstead, near Buxton in Derbyshire.

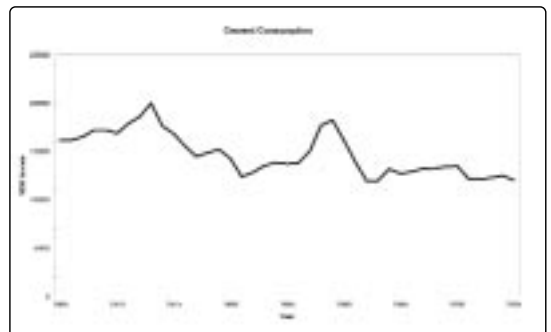


Table 1: Cement companies, works, kilns and capacities in 1996

Company	Works 1966	Kilns	Capacity 1000 t/yr	Date closed
Aberthaw and Bristol Channel Portland Cement Co Ltd	Aberthaw, Glamorgan	4	363	
	Rhoose, Glamorgan	2	163	1979
The Blue Circle Group	Barnstone ^A , Notts	2	104	
	Cauldon ^B , Staffs	1	182	
	Cambridge ^B , (Norman),	1	113	1984
	Claydon ^A , (Masons) Suffolk	4	195	1999
	Dunbar ^A , Scotland	3	790	
	Dunstable ^A , Beds	3	319	1971
	Eastgate ^A , Weardale Co. Durham	3	790	1994
The Cement Marketing Company Ltd, the selling organisation of:	Grays ^B , Wouldham, Essex	3	424	1976
	Greenhithe ^A , Kent	2	290	1972
A-Associated Portland Cement Manufacturers Ltd	Harbury ^A , (L. Spa) Warwickshire	3	240	1971
	Holborough ^A , Kent	4	368	1984
	Hope ^D , Derbyshire	2	1270	
	Kirton Lindsey ^C , Lincs	3	300	1976
B - The British Portland Cement Manufacturers Ltd	Magheramorne ^B , NI	3	320	1980
	Melton ^D , North Ferriby, Yorks	3	290	1981
C - Alpha Cement Ltd	Northfleet ^A	3	1880	
	Plymstock ^A , Plymouth	2	560	1999
Part of the Blue Circle Group but with separate marketing: D - Earle G&T Ltd	Rodmell ^C , Lewes, Sussex	1	110	1975
	Sittingbourne ^A	2	157	1970
	Shipton-on-Cherwell ^C , Oxford	3	320	1986
	Shoreham ^B , Sussex	3	489	1991
	Stone ^B , Kent	4	105	1971
	Sundon ^B , (Luton), Beds	2	126	1976
	Swanscombe ^A , Kent	3	370	1981
	Westbury ^A	2	640	
	West Thurrock ^C , Metropolitan	2	246	1970
	Widnes ^A , Lancs	2	140	1972
Imperial Chemicals Industries Ltd (ICI)	Billingham, Co Durham.	5	350	1972
	Tunstead, near Buxton	1	200	2004
Ketton Portland Cement Co Ltd	Ketton, Rutland	4	333	
Ribblesdale Cement Ltd	Clitheroe, Ribblesdale	3	312	
	Barrington, Cambs	4	479	
	Chinnor, Oxon	3	240	1998
	Rochester, Kent	3	364	2000
Rugby Portland Cement Co Ltd	Lewes, Sussex	1	77	1981
	Southam, Warks	4	508	2000
	Rugby, Warks	3	565	
	South Ferriby, Lincs	2	166	
	Tunnel Cement Ltd	Padeswood, Mold, Flintshire	2	536
Total	Pitstone, Leighton Buzzard, Beds	4	859	1991
	West Thurrock Grays, Essex	6	1002	1977
			121	17,655

Traditionally, the primary function of the whole site was the production of various forms of limestone and lime for the environmental, chemical, iron and steel industries. The construction of the cement works, completed in 1965, was to use clay recovered from cleaning the limestone. This cement works had a 134m-long kiln and a 76m-tall chimney stack, as shown in Figure 3. Having served for 40 years it was replaced by a totally new works in 2004. It is noticeable (see Figure 4) that the up-to-date design giving a 40% energy efficiency improvement comes with a very much shorter kiln, as the initial heating of the raw materials takes place in the precalciner tower.

During 2000, Rugby Cement brought a new kiln into operation at Rugby (see Figure 5), not only replacing the previous kiln, at Rugby but also increasing capacity sufficiently to enable closure of the works at Southam and Rochester. In 2005, Castle Cement brought a new kiln at Padeswood into operation where this new kiln was actually built using much of the old Pitstone kiln that closed in 1991. The increased capacity on the new kiln has enabled closure of three existing kilns at Padeswood and two wet

kilns at their Ribblesdale works in Lancashire. The new kiln is 65m long with a 95m-tall preheater tower, as shown in the background of Figure 6.

As well as improvements to kilns there have been developments in kiln dust filters, resulting in an industry-wide reduction of dust emissions. Most recently, Castle Ribblesdale became the first cement works in the UK to install a gas cleaning system, also known as a wet scrubber, attached to the dry process kiln. This reduces the amount of sulfur dioxide in exit gases by 90% and also halves the already small levels of dust and ammonia.

Increasingly, and for more than a decade, the cement industry has selected wastes that are safe and compatible with the cement manufacturing process to substitute for traditional fuel, such as coal. These alternative fuels include: residues of solvent recycling, scrap tyres, waste oils and paper, and plastics not otherwise recyclable.

There have also been many other improvements in making cement, where downstream of the kiln the most energy-intensive process is grinding the cement clinker down to a fine powder. As with kilns, cement milling has



Figure 3: Imperial Chemical Industries' cement works at Tunstead, constructed 1968.



Figure 4: Buxton Lime Industries' cement works at Tunstead, constructed 2004.



Figure 5: CEMEX cement works at Rugby, constructed 2000.

Table 2: Cement companies, works, kilns and capacities in 2006.

Company	Works	Kilns	Capacity 1000 t/yr
Lafarge Cement UK	Aberthaw, Glamorgan	1	550
	Cauldon, Staffs	1	930
	Cookstown, NI (Open 1968)	1	500
	Dunbar, Scotland	1	1000
	Hope, Derbyshire	2	1300
	Northfleet	2	1000
	Westbury	2	700
Buxton Lime Industries	Tunstead, near Buxton (open 2004)	1	800
CEMEX UK Cement Ltd	Barrington, Cambs	1	300
	Rugby, Warks	1	1250
	South Ferriby, Lincs	2	750
Castle Cement Ltd	Clitheroe, Ribblesdale	1	1300
	Ketton, Rutland	2	1400
	Padeswood, Mold, Flintshire	1	900
Quinn Cement	Derrylin, Co. Fermanagh, NI (open 1989)	1	500
Total		20	15,100

also undergone progressive development over the last 40 years and is a subject sufficiently wide-ranging to put it beyond the scope of this article.

Cement industry in 2006

In 2006, as a result of various mergers, acquisitions, works modernisations and rationalisations, the UK cement industry is now very much more compact and efficient than it was in 1966. Table 2 lists the current companies, works, kilns and capacities. This Table omits non-Portland cement operations so that the Lafarge works at Barnstone, Nottinghamshire is not included as it only produces non-Portland cements. This means being that there are now 15

works with a total of 19 kilns capable of producing around 15 million tonnes of cement per year – an average of 800,000 tonnes per kiln – a figure nearly five times that of 1966.

Concluding remarks

Despite the inevitable streamlining of the UK cement industry over the last 40 years, change continues with the industry committing itself to the sustainable development agenda, adopting the ambitious targets in the Environment Agency Cement Sector Plan and the Health and Safety Executive's Revitalising Health and Safety initiative. All of this should ensure that cement will remain an essential material to help fulfil the continuing demand for sustainable development for the next 40 years and beyond. ■



Figure 6: Measuring environmental impacts at Castle Padeswood, works constructed 2005.

References:

1. CEMBUREAU. *World cement directory*. The European Cement Association. Malmö, Sweden. 1961.
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