mpa
essential materials
sustainable solutions

Performance 2008

A sector plan report from the UK cement industry

Performance 2008

A sector plan report from the UK cement industry

MPA Cement comprises four member companies, CEMEX Cement UK, Hanson Cement UK, Lafarge Cement UK and Tarmac Buxton Lime and Cement. It was previously known as the British Cement Association, which now forms part of the Mineral Products Association, a new representative body for the aggregates, asphalt, cement, concrete, lime, mortar and silica sand industries.

Page

Introduction

MPA Cement members have collectively reported on their environmental performance for the last five years. The first two years' reviews were set against draft sector plans being discussed with the Environment Agency but, since 2005, each has reported against objectives in an agreed sector plan.

This edition presents data for 2008 against objectives first outlined in *Performance 2007* and which have been subsequently agreed with and adopted by the Environment Agency.

The industry has made great progress since it began to publish *Performance* so we include our baseline 1998 figures as well as showing our agreed targets for 2010 and 2015. As with previous editions of *Performance*, data from MPA Cement member company plants in England, Wales, Scotland and Northern Ireland are included in this report, despite the Environment Agency remit covering only England and Wales.

MPA Cement also has an agreed 2020 vision for future performance against each objective and this is included on page eight, along with notes to the performance indicators.

Performance indicators

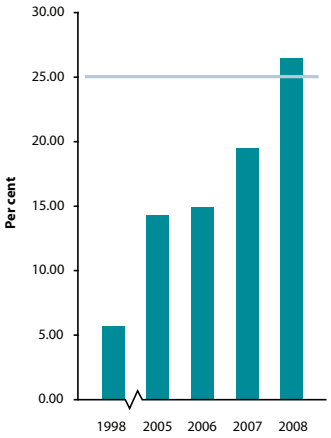
1.1 Use of natural raw materials per tonne manufactured
1.2 Use of fossil fuels (coal, petcoke, oil, gas) for primary energy
1.3 Mass of waste recovered as fuel per tonne manufactured
1.4 Mass of waste recovered as raw materials per tonne manufactured
1.5 Proportion of fuel comprising waste material
1.6 Proportion of raw materials comprising waste material

		Base	Actual	Targets	
	units	1998	2008	2010	2015
1.1	kg/t	1498	1426	1420	1400
1.2	% thermal	94.3	73.5	75.0	70.0
1.3	kg/t	9.6	43.5	45.0	60.0
1.4	kg/t	63.1	94.1	115.0	135.0
1.5	% thermal	5.7	26.5	25.0	30.0
1.6	% mass	4.0	6.2	7.0	11.0

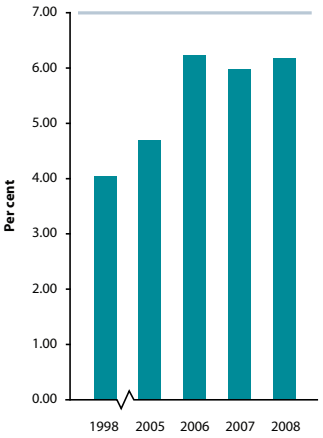
Key

2010 target

Proportion of fuel comprising waste material



Proportion of raw materials comprising waste material



Objective one

To increase the use of waste used as raw materials or fuel in cement works (resource efficiency)

Waste-derived materials are actively sought by the UK cement industry as replacements for natural raw materials and fossil fuels. It does this provided these materials can be used safely, are of suitable technical and quality levels and meet all environmental and regulatory considerations. This lifts these materials up the waste hierarchy to recycling rather than disposal by incineration or to landfill.

The industry now productively uses over 1.4 million tonnes of waste in this way and hence is a major contributor to helping UK government meet its recycling targets.

In terms of replacement raw materials, pulverised fuel ash from power generation remains the principal product, although the industry is keen to invest in identifying other sources. Hanson Cement (formerly Castle Cement), through its sister company Mineral Resource Management, has opened a factory near Liverpool to recycle inorganic waste for use in the cement industry. Its first product, gypsum, is used to adjust the setting time of cement and is recycled from scrap plasterboard from the building and construction industries.

The industry has now achieved an overall 26.5 per cent replacement of virgin fossil fuels by waste-derived materials and has an impressive list of wastes that it employs. The list includes solvents, chipped and whole tyres, meat and bone meal, sewage sludge, paper and plastics.

The UK cement industry has used waste-derived fuels since the early 1990s. However in January 2008, Lafarge Cement UK was the first manufacturer to apply for permission to trial a waste derived fuel – solid recovered fuel – under a new code of practice agreed with the Environment Agency. Permission was granted in April 2008 and the fuel – produced from paper and plastics and some domestic refuse – was successfully trialled. The material has the added benefit of having a biomass content, additionally helping the industry's carbon dioxide performance.

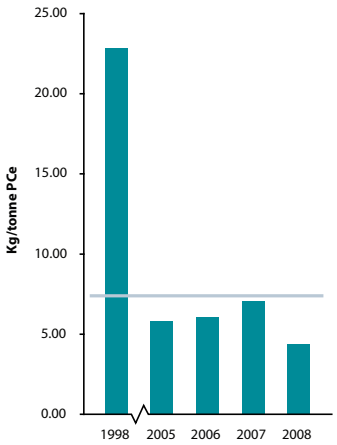
Tarmac Buxton Lime and Cement successfully trialled a 100 per cent biomass fuel, meat and bone meal (MBM), at its Tunstead works and now has permission to burn it permanently. This not only replaced fossil fuels but also contributed overall to reduced emissions of carbon dioxide and oxides of nitrogen.

CEMEX completed two solid recovered fuel trials and secured the permit to use this fuel permanently at all of its UK cement plants. In each trial, more than 10,000 tonnes of waste that would otherwise go to landfill were used to make cement, saving nearly 13,000 tonnes of carbon dioxide. CEMEX also announced plans to build a plant in Warwickshire to receive residual household and commercial waste and transform it into a solid recovered fuel.

Taken together, these initiatives take the industry towards its 2020 target of 50 per cent replacement.

The industry seeks to recycle CKD through its manufacturing process

CKD disposed of per tonne manufactured



Objective two

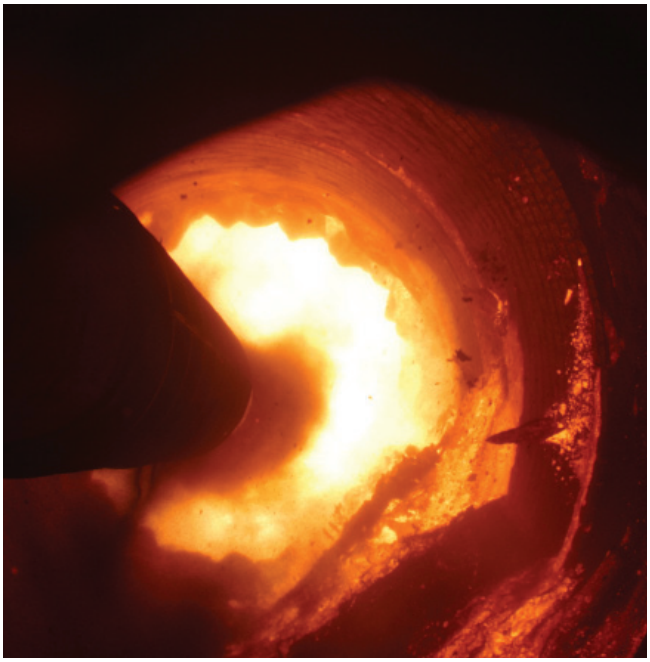
To reduce waste disposal from cement manufacturing

The UK cement industry remains a net consumer of waste, disposing of less than 46,000 tonnes compared to the 1.4 million tonnes of waste used by the industry as replacement raw materials and fuel.

Cement kiln dust (CKD) represents the largest contributor to process waste although the industry has made great strides forward in recycling the dust through its manufacturing process. Indeed, an additional 5,000 tonnes of CKD was returned to manufacture in 2008 compared to 2007. Recycling CKD in production is, however, only possible within certain technical and quality constraints, so manufacturers are examining other possible uses of the material.

Pre-2007, CKD could be used for agricultural purposes. Mixed with sewage sludge, it could be used to create fertile soil in land reclamation projects but changes to legislation now preclude this route.

Nevertheless, the total annual tonnage of CKD disposed of has fallen significantly since 1998. In that year some 289,207 tonnes went to landfill while ten years later, the quantity fell to 45,456 tonnes.



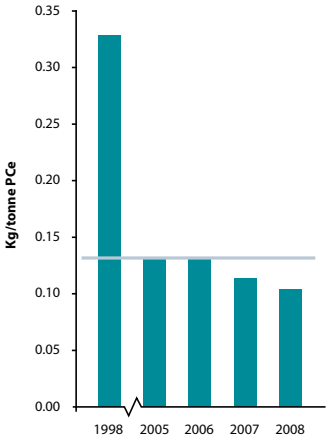
Where technically possible, cement manufacturers recycle CKD through the production process

Performance indicators

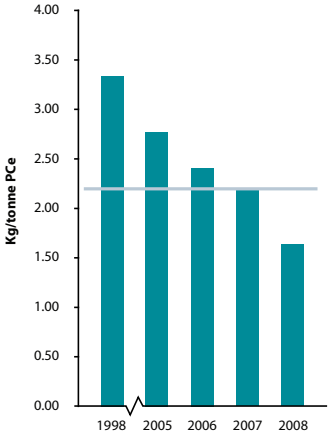
2.1 CKD disposal of per tonne manufactured

		Base	Actual	Targets	
	units	1998	2008	2010	2015
2.1	kg/t	22.9	4.4	7.5	7.0

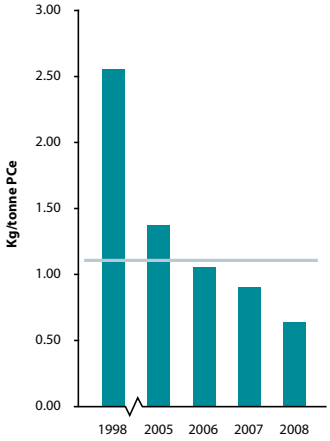
Dust emissions to air per tonne manufactured



NO_x emissions to air per tonne manufactured



SO_x emissions to air per tonne manufactured



Key

2010 target

Objective three

To reduce air pollution from cement manufacturing

Dust, oxides of nitrogen (NO_x) and sulphur dioxide (SO_2), along with carbon dioxide (covered in the next objective) are the principal emissions from cement manufacturing.

Dust emissions have fallen significantly across the industry since 1998, from 0.33 to 0.10 kilogrammes per tonne of Portland cement equivalent (kg/tonne PCe) in 2008. Levels of NO_x and SO_2 have also reduced radically over the same period: NO_x emissions have halved – from 3.34 to 1.63 kg/tonne PCe – while SO_2 emissions are now at a quarter of what they were, reducing from 2.56 to 0.64 kg/tonne PCe.

In future, the industry has agreed to review SO_2 targets annually.

Investment by Lafarge Cement UK at its Dunbar works in Scotland showed its first full year improvements in 2008. The sulphur dioxide scrubber installed resulted in a 74 per cent reduction in SO_2 and contributed to a 48 per cent drop in dust emissions.

Waste-derived fuels certainly play their part in improving environmental performance. At CEMEX UK's Rugby plant, the company was granted Environment Agency permission to trial the increase of its use of chipped tyres as a fuel from three to six tonnes per hour. The result – as well as reducing the work's use of fossil fuels by 24 per cent – was a 26 per cent reduction in NO_x emissions.

Tarmac Buxton Lime and Cement also demonstrated emissions improvements when using a waste-derived fuel, in this case, MBM. In a permitted trial, use of the material led to a nine per cent reduction in NO_x emissions and the company was given permission for the permanent use of the biomass fuel.

Use of waste tyres as fuel can reduce NO_x emissions

Further improvements continue to be made in the reduction of dust emissions. For example, at Hanson Cement's Padeswood works, the company has carried out a survey of all venting points for its dust collection systems and transfer points for its conveyors. Following this, the works' dust-to-air emissions have fallen by some 25 per cent by ensuring, where possible, that all venting points are now within buildings rather than outside and by fitting small de-dusting filters on transfer points where needed.

Performance indicators

3.1 Dust emissions to air per tonne manufactured
3.2 NO_x emissions to air per tonne manufactured
3.3 SO_2 emissions to air per tonne manufactured

		Base	Actual	Targets	
	units	1998	2008	2010	2015
3.1	kg/t	0.33	0.10	0.13	0.10
3.2	kg/t	3.34	1.63	2.20	2.00
3.3	kg/t	2.56	0.64	1.10	1.1

Performance indicators

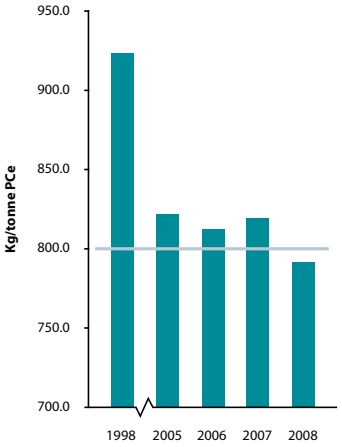
4.1 Emissions of CO_2 directly from cement plants per tonne manufactured
4.2 Emissions of CO_2 from combustion of fossil fuel (coal petcoke, oil, gas) at cement plants manufactured
4.3 Emissions of CO_2 from calcination of raw materials per tonne manufactured

		Base	Actual	Targets	
	units	1998	2008	2010	2015
4.1	kg/t	924	776.8	800.0	775.0
4.2	kg/t	387	242.2	244.0	225.0
4.3	kg/t	520	488.2	500.0	490.0

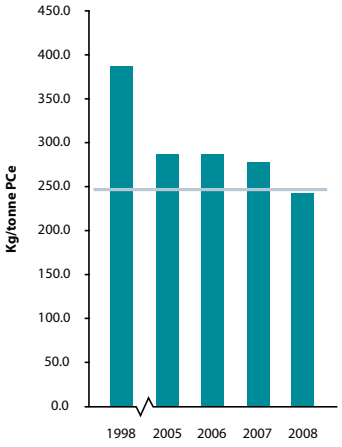
Key

2010 target

Emissions of CO_2 directly from cement plants per tonne manufactured



Emissions of CO_2 from combustion of fossil fuel at cement plants manufactured



Objective four

To reduce emissions of greenhouse gases per tonne of cement

Sixty per cent of CO_2 arising directly from cement manufacturing comes from the decomposition of limestone, the remaining 40 per cent coming from the kiln fuel used. Smaller amounts are produced by transport and distribution and the generation of electricity used by the industry.

The UK cement industry continues to work hard to reduce its emissions of CO_2, the most abundant greenhouse gas. Indeed, during the last decade it has lowered CO_2 emissions, comparing 1998 figures to 2008, from 924.00 to 776.8 kilogrammes per tonne produced. This means that in absolute terms the CO_2 emission in 2008 was 3.7 million tonnes lower than the 1998 baseline year. This has been achieved through heavy investment in new plant and technology and use of waste-derived fuels.

The industry continues to expand its use of waste-derived fuels, especially in terms of biomass fuels. However, increased fuel efficiency and introduction of further waste-derived fuels will only ever provide a partial solution to CO_2 reduction.

The industry has looked at how it can help the government achieve its carbon targets and has developed a carbon strategy to 2050.

Further reductions are likely to come about in three phases:

- short to medium term: energy efficiency improvements and increasing use of biomass waste-derived fuels
- medium term: use of greater quantities of pre-calcined, waste-derived materials with cement clinker
- long term: carbon capture and storage (CCS)

In theory, CCS could lead to net-zero CO_2 emissions when employed in conjunction with extensive use of biomass and waste-derived fuels but there is a long way to go before the principle can be efficiently and cost-effectively introduced. Government investment in large-scale projects needs to be implemented to demonstrate the effectiveness of the various CCS technologies, initially in power generation. Cost will certainly be a big factor as will access to a CO_2 transport infrastructure. A stable carbon price, established via international agreement on emissions trading that contains absolute emissions caps, will be essential.

The UK cement industry welcomed the EU agreement on the Energy and Climate Change package at the end of 2008.

This acknowledged the need to recognise the potential economic effects on energy critical sectors such as cement and hence not expose them to unfair international competition leading to carbon leakage – where manufacturing is moved to less carbon-restrained countries.

The industry holds open days to explain its operations to its neighbours

Objective five

To improve regulatory compliance and stakeholder perception of sites

The industry's manufacturing operations are covered by the Pollution Prevention and Control regulations by the Environment Agency in England and Wales, the Scottish Environment Protection Agency and in Northern Ireland, the Industrial Pollution and Radiochemical Inspectorate.

In 2008, all of the industry's works retained accreditation to ISO 14001 and/or EMAS.

No prosecutions were taken out against industry members in 2008 although the Environment Agency issued one enforcement notice.

This was received by Hanson Cement and related to construction details for a new landfill within its Padeswood works in north Wales not corresponding with the formal application. The landfill was not operational and there was no environmental damage.

The company reviewed the incident and re-submitted the information required by the Environment Agency in the form of a variation application.

Performance indicators

5.1 Proportion of substitute fuels proposals communicated, to local communities, in accordance with the MPA Code of Practice
5.2 Number of justified complaint free days[3]
5.3 Number (and proportion) of sites with ISO 14001 and/or EMAS certification or equivalent
5.4 Number of enforcement notices, formal cautions and successful prosecutions[4]
5.5 Number of category 3 incidents and breaches[5]
5.6 Number (and proportion) of PPC permit or variation applications where public participation is required, or deemed appropriate, determined within target time of four months (this target relates to Environment Agency performance)[6]
5.7 Number (and proportion) of other variations and applications determined (this target relates to Environment Agency performance)[7]

		Base	Actual	Targets	
	units	1998	2008	2010	2015
5.1	%/number	68 (15)	100 (2)	100	100
5.2	average per works	year 2000 = 255	337.1	to be reported	to be reported
5.3	%/number	91 (20)	100 (14)	100	100
5.4	number in each category[7]		1	0	0
5.5	number in each category		30	to be reported	to be reported
5.6	%/number		25 (4)	100	100
5.7	%/number[8]		40 (5)	100	100

All of the data in this table relates only to Environment Agency sites in England and Wales

2020 vision

When the industry and the Environment Agency agreed the new objectives covered in this sector plan report, they also set out a vision for 2020. This vision is included below.

1 To increase the use of waste used as raw materials or fuel in cement works (resource efficiency)

1.1 The industry will continue to replace natural raw materials with waste-derived alternatives subject to technical, quality, commercial availability, environmental and regulatory considerations. No 2020 target has been set due to uncertainty outside the control of the cement industry, such as the commercial waste management infrastructure.

1.2 The industry will aim for 50% replacement of fossil fuel energy by 2020 subject to technical, quality, commercial availability, environmental and regulatory considerations.

1.3 The industry will aim for 50% replacement of fossil fuel energy by 2020 subject to technical, quality, commercial availability, environmental and regulator.

1.4 The industry will continue to replace natural raw materials with waste-derived alternatives subject to technical, quality, commercial availability, environmental and regulatory considerations. No 2020 target has been set due to uncertainty outside the control of the cement industry, such as the commercial waste management infrastructure.

1.5 The industry will aim for 50% replacement of fossil fuel energy by 2020 subject to technical, quality, commercial availability, environmental and regulatory considerations.

1.6 The industry will continue to replace natural raw materials with waste-derived alternatives subject to technical, quality, commercial availability, environmental and regulatory considerations. No 2020 target has been set due to uncertainty outside the control of the cement industry, such as the commercial waste management infrastructure.

2 To reduce waste disposal from cement manufacturing

2.1 The industry will work with the Environment Agency to investigate technical and regulatory solutions for CKD recovery.

3 To reduce air pollution from cement manufacturing

3.1 The industry will maintain its good performance on dust emission reduction and will review techniques and technology to reduce dust emissions further beyond 2015. No 2020 target has been set due to the uncertainty of predicting future dust abatement equipment performance.

3.2 The industry will maintain its good performance on NO_x emission reduction and will review techniques and technology to reduce emissions further, aiming for 1.8kg/t.

3.3 The industry will maintain its good performance on SO_2 control and will review techniques and technology to reduce emissions further whilst recognising the influence of raw material variability. No 2020 target has been set due to the uncertainty surrounding the geological characteristics of natural raw material reserves.

4 To reduce emissions of greenhouse gases per tonne of cement

4.1 The industry aims to further minimise direct emissions of CO_2 by investigating new technologies and implementing these where they are technically, environmentally and financially justified.

4.2 The industry aims to replace as much fossil fuel with waste-derived alternatives to the greatest extent subject to technical, quality, commercial availability, environmental and regulatory considerations.

4.3 The industry aims to further minimise direct emissions of CO_2 by investigating new technologies and implementing these where they are technically, environmentally and financially justified.

5 To improve regulatory compliance and stakeholder perception of sites

5.1 The industry is committed to involving stakeholders in its communications according to its Code of Practice.

5.2 The industry aim is 365 complaint free days per year (366 days in 2020).

5.3 The industry aim is to maintain and continuously improve its environmental management systems.

5.4 The industry aim is zero Category 1 and Category 2 incidents which may lead to enforcement action. The Environment Agency will work to ensure that categorisation of incidents and breaches is undertaken in a consistent manner across the sector sites.

5.5 The industry aim is zero Category 3 incidents and breaches. The Environment Agency will work to ensure that categorisation of incidents and breaches is undertaken in a consistent manner across the sector sites.

5.6 The Environment Agency will work with industry to ensure that determinations do not delay environmental improvements or commercial progress, where this does not have a negative impact on the environment. This target relates to Environment Agency performance.

5.7 The Environment Agency will work with industry to ensure that determinations do not delay environmental improvements or commercial progress, where this does not have a negative impact on the environment. This target relates to Environment Agency performance.

Notes to the performance indicators

1 All objectives are per tonne of cement manufactured (calculated as Portland Cement Equivalent) unless otherwise stated. Portland Cement Equivalent (PCe) is a normalising factor related to cement output often used by the cement industry, which enables a comparison of impacts such as environmental between sites whilst taking into consideration differing production methods.

2 The 2015 targets for SO_2 will be reviewed annually.

3 Complaint free day = 24hr period starting at midnight that the IPPC installation (including associated quarries but excluding landfills) carried out its operations without receiving a justified complaint. 'Justified means where a complaint is related to an occurrence that can be directly attributable to site activities'. Base year: 2000.

4 Refer to the Environment Agency Enforcement and Prosecution Policy. This indicator excludes prosecutions under appeal.

5 Refer to the Environment Agency Common Incident Classifications Scheme. CICS Categories 1, 2 and 3 are major, significant and minor incidents respectively.

6 The determination periods quoted can lengthen where: (i) decisions are required as to whether information is sensitive due to commercial or industrial confidentiality and/or national security; and/or (ii) further information is required to determine the application. The 'clock stops' on the determination period where the regulator has served a notice requiring further information (Schedule 5 paragraph 16(3)(a) of the EP regulations). The clock starts again once the regulator has received all notice information required.

7 A second enforcement notice was issued to Lafarge Cement UK by the Scottish Environment Protection Agency for an incident at its Dunbar works of odour beyond the site boundary.

8 The target for the number and proportion of variation applications determined within target time will be reviewed annually.

mpa
essential materials
sustainable solutions

MPA Cement is part of the Mineral Products Association, the trade association for the aggregates, asphalt, cement, concrete, lime, mortar and silica sand industries

MPA Cement
Riverside House
4 Meadows Business Park
Station Approach
Blackwater, Camberley
Surrey, GU17 9AB

Tel +44 (0)1276 608700
Fax +44 (0)1276 608701
mpacement@mineralproducts.org
www.cementindustry.co.uk

Designed and produced by
French Jones, Henley on Thames