



# Concrete Industry Sustainability Performance Report

4th report: 2010 performance data

*Our vision is that, by 2012, the UK concrete industry will be recognised as the leader in sustainable construction, by taking a dynamic role in delivering a sustainable built environment in a manner that is profitable, socially responsible and functions within environmental limits.*

## A changing background



In 2008, when the concrete industry first agreed on its sustainable construction strategy, we knew that sustainability would change the design, construction and supply chains within our built environment - the exact journey, however, was more complex to forecast.

Despite the general economic downturn and lack of growth within the construction sector, our commitment to delivering a sustainable built environment is undiminished. This report, and the performance data it contains, shows a transparent framework of measurement as well as demonstrating our commitment to support those making design decisions.

The regulatory backdrop in the UK goes way beyond the EU in terms of policy commitments. The UK Government has set its own targets for sustainability [1,2] and in response to its carbon budgets (a reduction target of 34% by 2022 and 50% by 2027- based on a 1990 baseline [3]) has also published a Low Carbon Construction Action Plan [4]. A key message from these government reports is the need for partnership with business in order to transition to a green economy. Our industry is proactively engaged and committed to this challenging agenda, whilst working hard to ensure we can maintain UK competitiveness as a result.

We are proud of our progress to date and are already developing our strategy and working practices even further so that they represent continuous improvement. We believe that our industry is best placed to support government and client frameworks - helping to facilitate the sustainable design and construction of the built environment.

**Andy Spencer,**  
Chairman, Sustainable Concrete Forum

## Our progress

Performance improvements towards our vision is demonstrated by:

- **Supporting the government target on responsible sourcing** 88% of concrete production is responsibly sourced to BES 6001. This makes concrete the leading construction material for responsible sourcing.
- **Reducing CO<sub>2</sub> emissions** CO<sub>2</sub> emissions for a standardised concrete mix has reduced by 16.3% compared to the 1990 baseline and is on track to meet the 2012 target.
- **Extending coverage of environmental and quality management systems** These systems underpin any sustainability strategy and our performance shows that their use continues to increase in our industry and supply chain.
- **Reducing creation and increasing usage of waste** The concrete industry is a net consumer of waste, using almost 47 times more than it produces.
- **Continuous improvement** The industry is proud of its progress since our initial strategy was agreed in 2008. The strategy is being developed to ensure that it will drive continuous improvement.

**Front cover:** Construction of the Shard commenced in 2010. On completion, the 310m building will be the tallest in Western Europe.





© Iwan Baan

Completed in 2010, the award-winning Hepworth Gallery is constructed using self-compacting pigmented concrete.

# Introduction

Concrete is our most widely used construction material and is essential for the construction of our housing, schools, hospitals, transport networks, water and energy infrastructure. Concrete is a fundamental part of our sustainable built environment.

In 2008 the majority of the UK concrete industry committed to the Concrete Industry Sustainable Construction Strategy. Since the pledge was made construction activity, and the use of concrete and other materials, has declined significantly due to the recession. However, the industry’s commitment to sustainability continues to strengthen and the integration of the British Association of Reinforcement (BAR) in 2010 reflects development in the scope of the strategy.

This is the fourth period of annual reporting and the performance trends towards our targets are forming. We are very pleased that progress has been maintained against very difficult market conditions in the construction sector. The reduced production levels lowers operational efficiency, off-setting some of the improvements achieved. Despite this we remain focused on delivery of the performance targets.

We recognise that industry-wide data collection is still in its early stages and our work to develop the metrics used is ongoing. The strategy continues to develop and work is already well underway on future targets and commitments. Thus, demonstrating the concrete industry’s commitment to a sustainable built environment.

The full strategy, as well as previous industry reports and links to sector and company performance reports, is available at [www.sustainableconcrete.org.uk](http://www.sustainableconcrete.org.uk).

## Our fourth report

This report presents the concrete industry’s sustainability performance in 2010. The data covers the manufacture of concrete and its constituent materials. The information is collected through survey responses from companies supplying an estimated 78% of concrete used in the UK.

A table illustrating the sectors that contribute to data collection is below. The scope of activities included in the strategy has also increased. BAR provided initial data for the 2009 report which was included as separate data. In this report BAR has provided data against the majority of relevant indicators and this has been integrated into the reported figures. This means that for 2009 and 2010 there is a reported figure for both concrete and reinforced concrete (concrete + reinforced concrete data). There is increased coverage of the steel mills and fabricators in the 2010 data.

It should be noted that the 2012 targets were only established against concrete but new targets will be developed in the updated strategy which will include BAR performance. A more detailed analysis of the specific performance data for reinforcement as a sector against the sustainability indicators is available on the BAR website ([www.uk-bar.org](http://www.uk-bar.org)).

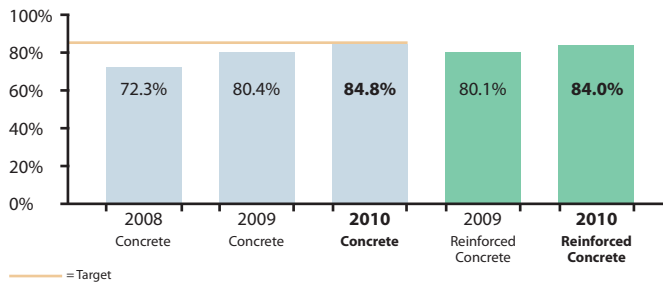
Concrete industry sectors contributing data	Data: concrete	Data: reinforced concrete
Aggregate	✓	✓
Cement	✓	✓
GGBS	✓	✓
Fly ash	✓	✓
Admixtures	✓	✓
Ready-mixed concrete	✓	✓
Precast concrete	✓	✓
Reinforcement steel		✓

# Sustainable Consumption and Production

88% of concrete production is responsibly sourced to BES 6001

## Environmental Management

Percentage of production sites covered by a 'UKAS' certified EMS



The industry has made very good progress towards its 2012 target, achieving 84.8% of production sites with 'UKAS' certified EMS in 2010 against our 2012 target of 85%.

Environmental Management Systems (EMS) are the cornerstone of a sustainability strategy and a key element in the certification to responsible sourcing schemes. EMS help to deliver performance improvements at each individual site; a powerful, rigorous tool for driving the ongoing performance of the industry.

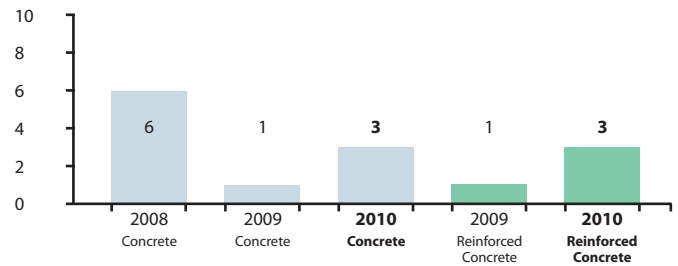
Sites across the industry vary in their size and complexity from cement works to concrete batching plants. Industry coverage of 'UKAS' certified systems has increased year on year against a background of a reduction in the total number of sites. Based on the current number of production sites, the industry needs to certify 15 more sites to achieve its 2012 target. The inclusion of the reinforcement mills and fabricators increased the total of concrete industry sites by just over 2%.



The concrete industry has invested in plant to improve environmental performance. For example in the cement sector the majority of dust from the kiln is collected and recycled.

## Emissions (excluding CO<sub>2</sub>)

Number of convictions for air and water emissions per annum



Emissions vary significantly across the different sectors of the industry and are actively monitored by regulatory bodies. Continuing investment across the industry has led to significant improvements in the overall levels of emissions.

Due to the diversity of emissions the indicator selected for monitoring performance is the convictions for non-compliance that have occurred in each year. Each sector trade body is active in promoting best practice in order to achieve emission reductions. The target for all the sectors of the concrete industry is to achieve an annual level of zero convictions.

The cement sector has invested significantly to deliver environmental improvements and reduce its emissions. The level of performance in 2010 compared to 1998 from cement kiln sites demonstrated NOx emissions were reduced by over 59%, SOx emissions were over 87% lower and dust emissions were over 83% lower. For more information, see <http://cement.mineralproducts.org/>.

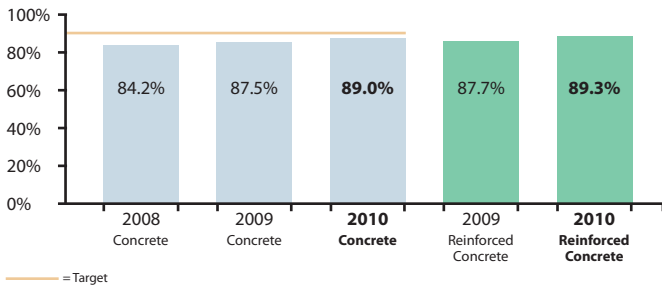
## Stakeholder Engagement

The type of 'stakeholder' varies within each of the production sectors that make up the concrete industry supply chain. There is already significant engagement with local, national and international stakeholders to improve the sustainability of concrete and the built environment.

Further to this, the work to develop the strategy through to 2020 has involved an extensive programme of stakeholder engagement. An online survey was also carried out in 2010. The feedback from these consultations, together with the direction from Government policy and market drivers will inform the majority of the development of our commitments and targets.

## Quality and Performance

Percentage of production sites covered by a 'UKAS' certified ISO 9001 quality management system

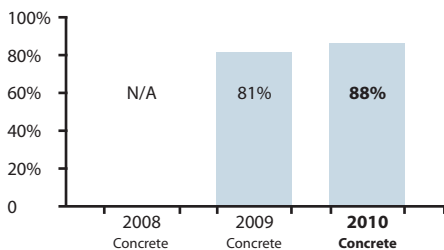


Certified Quality Management Systems form the basis for delivering product consistency and performance.

Since the 2008 performance benchmark was set, the sector has continued to make strong progress towards its 2012 target. The percentage of certified sites has increased from 84% to 89%. This is against a background of a reduced number of sites operating in the period. The target is to increase the number of sites certified to 90% which, based on the current number of sites, equates to 20 additional sites.

## Responsible Sourcing

Percentage of production certified to BES 6001 responsible sourcing standard



With over 88% of concrete independently certified to BES 6001 Standard for the Responsible Sourcing of Construction Products, the concrete industry leads other construction materials in demonstrating responsible sourcing throughout the supply chain. Within just over 12 months of the standard becoming available (in October 2008) 81.0% of the production of concrete was certified to the BRE responsible sourcing standard BES 6001.

Concrete is a locally sourced material so its constituents are both traceable and subject to the comprehensive EU regulatory framework. Reinforcement supplied by BAR members can also be certified to responsible sourcing standards. In 2010, 55% of the reinforcement from fabricators was certified to BES 6001 through the Eco-Reinforcement sector scheme.

The concrete industry is committed to extending leadership in this area. This supports the Government's Sustainable Construction Strategy target for 2012, which requires that "at least 25% of construction materials should be supplied from suppliers with responsible sourcing certification by 2012" and provides customers with the certified responsibly sourced products that are being increasingly specified.

BES 6001 provides a common benchmark for all construction products to demonstrate their responsible sourcing credentials.

The concrete industry supports the BES 6001 responsible sourcing standard as it currently represents the most comprehensive standard available. This has been recognised in the comparative scoring of the different schemes in BREEAM 2011 [5]. In this scheme the highest level of performance currently achievable, can only be gained through certification to the BES 6001 standard.

The concrete industry was the first industry to link its sustainable construction strategy to BES 6001 and has produced a guidance document that supports the implementation of the standard.

Designers can now easily source certified materials to help gain maximum credits in sustainability assessment tools such as the Code for Sustainable Homes and BREEAM. The ability to specify products certified to a responsible sourcing scheme is also an increasingly important aspect of CEEQUAL, the assessment and award scheme for improving sustainability in civil engineering and the public realm.

### Specifying Sustainable Concrete

Concrete's flexibility offers many opportunities for designers to influence the environmental, economic and social credentials of their projects, including performance credentials such as fire, durability, acoustics and adaptability. This publication is intended to assist designers in optimising the sustainable credentials of concrete through specification.

Download free from [www.concretecentre.com/publications](http://www.concretecentre.com/publications)



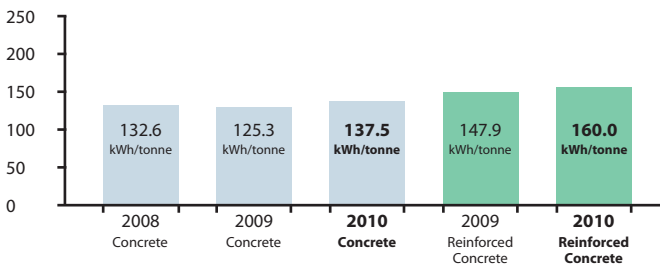


# Climate Change and Energy

*CO<sub>2</sub> from comparable concrete mixes is 16.3% less than the 1990 baseline*

## Energy Efficiency

Energy used in production as a proportion of production output



Improving energy efficiency is a key objective for the concrete industry in order to reduce the embodied energy of its products. It must also be recognised that concrete products can play a significant role in optimising operational energy efficiency during the lifetime of the building.

Following a previous reduction from 2008 to 2009, 2010 data shows an increase from 2009, which represents a 3% increase on the baseline year of 2008. However, the total energy used by the industry in 2010 has fallen significantly from the baseline year and is on par with the figure for 2009. The continued reduction in production volume over 2009, which has continued into 2010, has resulted in a fixed energy use from production sites being allocated to a lower volume of concrete.

The energy requirements vary across the different sectors of the concrete industry. The sector with the largest energy requirement is the cement sector, which is responsible for almost 74% of the energy used in concrete manufacture. The cement sector and ground granulated blast furnace slag sectors have committed to voluntary climate change agreements (CCA). These agreements with government commit the sectors to energy reduction programmes which carry financial penalties if not achieved.

The cement sector has improved its CCA performance by 44.8% between 1990 and 2010 which exceeds the agreed target of 30%. The ground granulated blast furnace slag sector achieved a 16% energy reduction between 1999 and 2010.

The energy efficiency data for reinforced concrete includes steel mills and fabricators. The integration of this data has increased the energy efficiency indicator by around 17%.

### Carbon reduction guidance

As part of the continued move to improve energy efficiency, MPA in association with the Carbon Trust, has launched its carbon reduction portal which provides energy saving tools, good practice guides, training tools and sector energy benchmarks.

[www.aggregatescarbonreduction.com/index.html](http://www.aggregatescarbonreduction.com/index.html)

### Operational energy

It is clear that, while the embodied carbon content of construction materials is important, it is their impact over the full life cycle of the building which will determine the performance of the built environment for future generations.

The inherent thermal mass of concrete can provide considerable energy savings in terms of reduced heating and cooling requirements over the lifetime of a building. Thermal mass relates to the ability of construction materials to absorb heat. On hot days this helps to cool the internal temperature and prevent overheating problems without recourse to energy-intensive fans or air conditioning. Night time natural ventilation removes the stored heat. During the winter, the absorbed heat is kept within the building to help maintain a constant warm ambient temperature that reduces the need for heating. Utilising thermal mass as part of an overall passive sustainability design strategy can significantly reduce operational energy requirements.

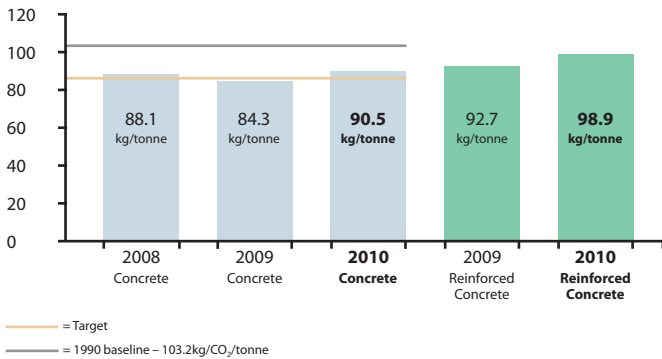
For more information see [www.concretecentre.com](http://www.concretecentre.com).



The Informatics Forum at Edinburgh University, designed by Bennetts Associates, has exposed concrete offering high thermal mass and has achieved a BREEAM rating of 'Excellent'.

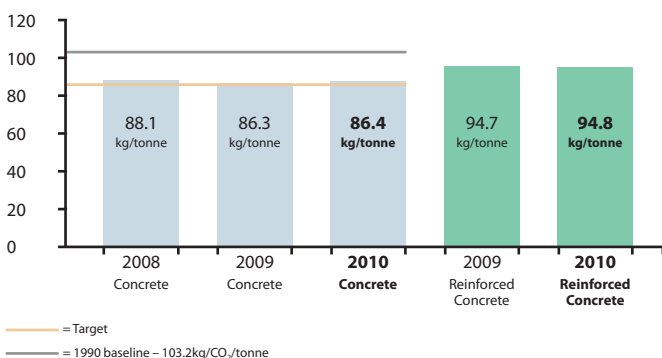
# CO<sub>2</sub> Emissions - Production

CO<sub>2</sub> emissions – Production (Rolling mix)



The CO<sub>2</sub> emissions per tonne of concrete shown above, are based on the average composition of concrete in 2010. This average composition changes from year-to-year ('a rolling concrete mix') and reflects changes in the concrete mix used by the market. Based on the rolling concrete mix, there has been an increase of 7% for 2010, compared to 2009, which still represents a reduction of 12.3% under the 1990 baseline. The increase from 2009 is the result of a higher average cement content of the rolling concrete mix. Using the same calculation, but with a standardised (fixed) concrete mix, the CO<sub>2</sub> emissions have not changed significantly between 2009 and 2010. Compared to the 1990 baseline the 2010 data shows a 16.3% reduction. The CO<sub>2</sub> emissions – Production (standardised mix) indicator measures improvements in the production of concrete and based on this indicator we are on track to meet our 2012 target.

CO<sub>2</sub> emissions – Production (Standardised mix)



Approximately half of the carbon emissions in the UK's Carbon Budget are covered by the European Union Emission Trading Scheme (EU ETS). In the case of concrete, the majority of emissions are from cement, which is covered by the EU ETS and is actively managed in order to meet the EU carbon reduction targets.

The continuing investment in new technology and use of biomass fuels has enabled further reductions in the CO<sub>2</sub> emissions from the production of cement. In most of the other sectors slight increases in the CO<sub>2</sub> emissions per tonne have been observed. Consistent with the energy efficiency indicator, whilst the industry has continued to invest in energy and carbon efficiency measures, the fixed energy requirement of the manufacturing assets being allocated over a reduced volume of production during the market downturn has largely off-set the gains made.

The inclusion of the UK average reinforcement content to the concrete has increased the CO<sub>2</sub> emissions by around 9%. The emissions associated with the production and fabrication of steel reinforcement indicate a slight reduction in 2010 compared to 2009. All of the steel produced by BAR members is produced using Electric Arc Furnace which uses scrap material as its main raw material. As a consequence steel reinforcement bar has approximately a third of the embodied energy and a fifth of the carbon impact of primary steel production.

For more information and specific embodied data for carbon calculators, visit [www.sustainableconcrete.org.uk](http://www.sustainableconcrete.org.uk)



Lightweight and dense precast concrete blocks contain recycled content including fly ash and crushed demolition waste.

## Climate Change and Energy *continued*

### CO<sub>2</sub> Transport

The local supply network for concrete means that delivery distances are short and therefore the fuel used during haulage (and the associated CO<sub>2</sub> emissions) is minimised. The average delivery distance of ready-mixed concrete to the construction site in 2010 is 10.5 km, and 119 km for precast concrete products. The average delivery distance for all concrete is 36 km.

#### CO<sub>2</sub> emissions of the total delivery transport through the industry supply chain

	Kg CO <sub>2</sub> /tonne
2009 Concrete	7.2
2010 Concrete	7.8

The development of common data collection and reporting methodologies continues to improve although there are still challenges in collecting data from third party freight organisations. These improvements have resulted in the value of 7.0 kg CO<sub>2</sub> /tonne, reported in 2009, being corrected to 7.2 kg CO<sub>2</sub> /tonne.

A comparable figure of 7.8 kg CO<sub>2</sub>/tonne is reported for 2010. There has been a rationalisation of production sites within the concrete supply chain which has led to an increase in the average distance for raw materials from 43 to 47 km in 2010. This accounts for the increase in the transport indicator.

A number of concrete production sites are located within the quarry which minimises delivery transport. This benefit is not currently captured in these figures.

The average transport load for precast concrete is 22.5 tonnes, and for ready-mixed concrete it is 13.1 tonnes. The transport within the concrete supply chain in 2010 has the following modal distribution: 91% road; 8% rail; 1% water. This indicates an increase in rail transport compared to 2009.

The concrete industry and supply chain is looking at ways of improving the efficiency of its transport operations and reducing the carbon dioxide emissions associated with delivery transport. This includes looking for opportunities to maximise the use of non-road modes of transport, optimising vehicle loads, alternative vehicle fuels and working with contractors and clients to ensure efficient delivery scheduling. The introduction of larger ready-mixed concrete truckmixers carrying 19 tonnes of concrete is one example of a development which has reduced the embodied transport carbon dioxide emissions associated with concrete supply.



The majority of raw materials and concrete products are transported by road.

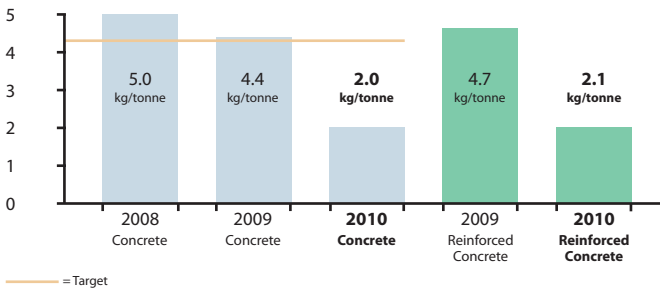


# Natural Resource Protection and Enhancing the Environment

*The concrete industry uses almost 47 times more waste than it produces*

## Waste Minimisation

Waste to landfill as a proportion of production output



Major progress has been made by the concrete industry in reducing the amount of waste sent to landfill. The results show a greater than 60% reduction compared to the 2008 baseline. This is significantly ahead of the target which was set at achieving a 15% reduction.

A good example of the progress in this area is demonstrated by the precast sector. As part of its sector sustainability charter, members are provided with best practice in waste management. Particularly in small and medium sized manufacturers, mapping and segregating of waste has led to increased confidence in legal compliance as well as lower costs for waste disposal. As a direct result of this sector's improvement, waste sent to landfill by the precast concrete industry in 2008 was 5.61 kg per tonne, this reduced to 3.56 kg/tonne in 2009 and to 2.00 kg/tonne in 2010.

The overall concrete industry achievement in reducing waste has more than doubled the net waste ratio. The concrete industry is a net user of waste and continues to increase its consumption such that it now uses almost 47 times more waste, by-products and secondary materials from other industries than the waste it sends to landfill.

### Net waste consumption ratio

	Waste and by-products used divided by waste generated during production
2008	<b>19:1</b>
2009	<b>18:1</b>
2010	<b>47:1</b>

To put it into context, the amount of waste used by the concrete industry is equivalent to over 40% of the construction, demolition and excavation (CD&E) waste sent to landfill in England based on 2008 data.

Waste comparison	Tonnes
2008 concrete industry waste to landfill	<b>275,085</b>
2008 material used in the concrete industry diverted from external waste streams	<b>5,089,426</b>
2008 baseline for CD&E waste to landfill in England [6]	<b>12,550,000</b>

The inclusion of the waste data from the reinforcement sector created a small increase of around 5%. In 2010, over 95% of the waste generated at the mills and fabricators was re-used as a raw material.

### Material Efficiency

To support waste reduction in the design and construction stages MPA - The Concrete Centre published guidance to support the efficient use of concrete.

- *Material Efficiency - optimising performance with low waste design solutions in concrete*

This free publication is available online from [www.concretecentre.com/publications](http://www.concretecentre.com/publications)



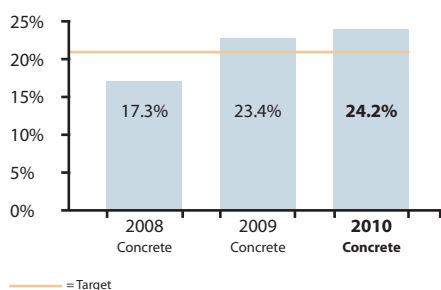
## Materials Efficiency

The concrete industry, as well as recycling its own process waste, is very active in the use of by-products, secondary materials and material diverted from the waste stream to reduce its demands on primary raw materials.

### Replacement of fossil fuels

The cement sector is able to employ the high temperature of a cement kiln to safely use combustible waste materials as a replacement for fossil fuels. The use of carbon neutral biomass also helps to reduce CO<sub>2</sub> emissions.

### Material diverted from the waste-stream for use as a fuel source, as a percentage of total energy use

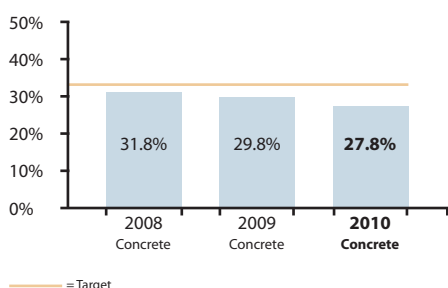


In 2010 almost a quarter of the energy used in the concrete industry came from material derived from the waste stream. This also reduces the energy demands which would have been required for conventional methods of disposal for these wastes. The 2012 target was achieved in 2009, and 2010 sees a further improvement. As part of the work to extend the current targets, constraints, such as the future availability of suitable fuel alternatives, are being investigated.

### Additional cementitious materials

Concrete manufacture uses by-products from other industries, such as fly ash from power stations and ground granulated blast-furnace slag (GGBS) from the steel industry. These materials are used extensively in concrete to reduce demand for primary materials and lower the embodied CO<sub>2</sub> of concrete when used as an additional cementitious material. More details on their use are provided in *Specifying Sustainable Concrete* (see page 5).

### The amount of additional cementitious materials as a proportion of total cementitious materials

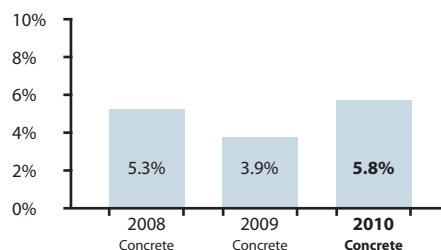


In 2010 the concrete industry has used almost 28% of additional cementitious materials and overall there has been a gradual reduction from the 2008 baseline. In 2010 this reduction is primarily due to the reduction in the amount of GGBS used in the ready-mixed sector. As data collection continues to improve it appears that the 2009 figure of 35.7% was overstated and this has been updated in this report.

### Recycled/secondary aggregates

It is difficult to answer the question of whether the diversion of larger volumes of recycled and secondary materials into concrete manufacture would produce a more sustainable outcome, taking into account transport, production and emissions implications. In simple terms it depends upon the circumstances of individual contracts for supply. Generally, when transported by road, the use of recycled aggregates is only a lower carbon option than virgin aggregates when used within 10 miles (or 15km) of their source.

### The use of recycled/secondary aggregates as a proportion of total aggregates used



In 2010, the use of recycled and secondary aggregates accounted for 5.8% of the aggregates used in concrete. The manufacture of precast concrete provides greater opportunities for the use of recycled aggregates and in this sector the figure is over 20%.

In total the recycled and secondary materials accounts for 28% of the GB aggregates market. This aggregates market share is the highest in Europe and over three times higher than the European average. Most 'hard' construction and demolition waste currently generated is reprocessed for use in the aggregates markets and the future supply of these materials will depend largely on the rate of demolition and type of waste generated in this process.

Guidance for the use of these recycled and secondary materials is provided for in material codes and is influenced by performance, quality and consistency.

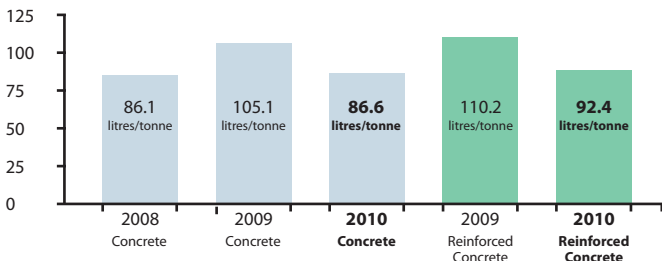
For more information download *Specifying Sustainable Concrete* from [www.concretecentre.com/publications](http://www.concretecentre.com/publications)

### Recycled steel reinforcement

Reinforcing steel from BAR members typically has a recycled content of approximately 98% by constituent raw material volume.

## Water

### Mains water consumption as a proportion of production output

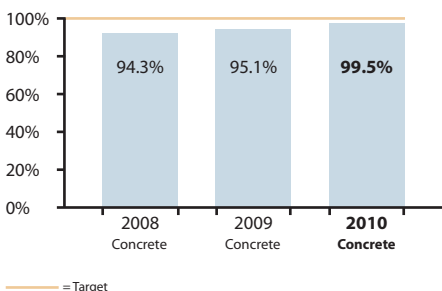


Water is undoubtedly an important resource. The concrete industry aims to reduce its demand for mains water and already utilises rainwater harvesting and water recycling. Water is an ingredient of concrete and a tonne of fresh concrete contains 60 to 80 litres of water. The use of admixtures can reduce the water content by up to 13 litres per tonne. 90% of ready-mixed concrete already includes water reducing admixtures.

The figure of 86.6 litres of mains water usage per tonne of concrete in 2010 is comparable with the 2008 baseline figure. It does however show a reduction from the 2009 figure. This indicates a level of inconsistency in the reported data and work to improve the accuracy of this indicator and include data on the use of controlled water is ongoing in order to provide more consistent terminology and measuring practices for this indicator.

## Site Stewardship and Biodiversity

### Percentage of relevant production sites that have site specific action plans



The indicator shows that the concrete industry is making good progress in extending the coverage under its biodiversity action plans and is on track to meet the 2012 target of 100%.

Based on the data collected by MPA the area of land restored in 2009 exceeded the area prepared for new extraction. Although the recession and consequent reduction in demand for aggregates and other minerals is likely to have had the effect of slowing up development and restoration, high quality restoration of sites remains an industry priority.

The way in which quarries are restored following mineral extraction is a decision taken by the mineral planning authority, taking account of the views and interests of the local community, representative groups, government agencies, landowner, mineral operators and others. Site stewardship is a key responsibility for mineral operators and in recent years quarry restoration has increasingly been focused on the creation of wildlife habitats and nature conservation. The Nature After Minerals project has highlighted the significant contribution the minerals industry can and does make to the creation of biodiversity and the industry is currently working with a wide range of interested parties to consider how best it can support requirements emerging from the Government's Natural Environment White Paper and Biodiversity 2020 Strategy.

### Industry efforts

Within the Mineral Products Association (MPA), restoration over the last 40 years has provided at least two national nature reserves, 22 local nature reserves, 15 field study and education centres and 13 nature trails. The extraction industry, part of the concrete supply chain, has control of an area of land over 115 square miles; this is equivalent to an area the size of the Norfolk Broads.

For more information visit [www.mineralproducts.org/showcase-ra.htm](http://www.mineralproducts.org/showcase-ra.htm)



Bestwall Quarry in Dorset has been restored and now supports nature conservation and agriculture.

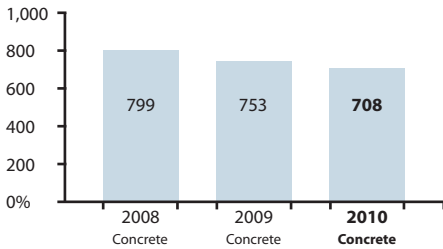


# Creating Sustainable Communities

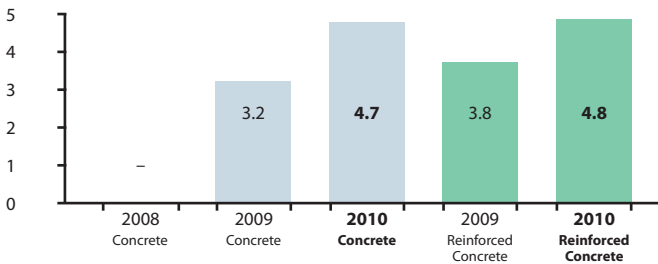
In 2010 the cement and aggregates sectors welcomed over 20,500 visitors to its sites.

## Health and Safety

Reportable Injuries per 100,000 direct employees per annum



Lost Time Injuries (LTI) for direct employee per 1,000,000 hours worked



When the health and safety (H&S) indicator was defined in 2008 the common H&S measure was reportable injuries. This emphasis, and consequently our indicator, has evolved to Lost Time Injuries (LTIs), with the ultimate objective of 'Zero Harm'. In order to maintain continuity, both indicators are shown in this report.

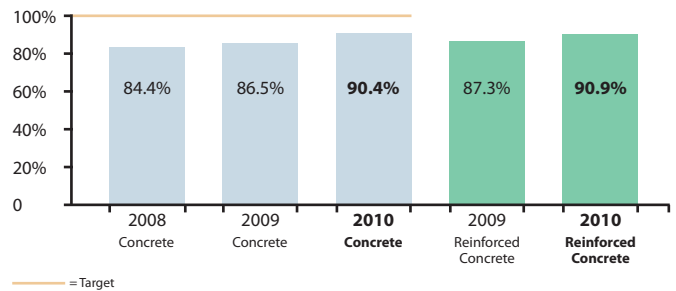
The 2009-2014 timeframe for the concrete industry target is aligned with the Mineral Products Association's interim health and safety performance targets. Lost time injuries (LTI) are a more sensitive measure, demonstrating a more refined target that is made possible by significant improvements already made by the concrete industry.

All of the sectors, except for reinforcement (BAR), provided data for the reportable injuries indicator. Comparison with the 2008 shows a reduction of 11% has been achieved.

The collection of LTI data is in the early stages. Data from the precast sector was included in 2010, but was not available in 2009. Consequently the increase observed in both the concrete and reinforced concrete data sets in 2010 is caused by this change in baseline data. This increase does not reflect a decrease in performance, as corroborated by the original H&S indicator.

## Employment Skills

Percentage of employees covered by 'UKAS' certified training and evaluation processes



The concrete industry is a significant employer and supports rural communities that have limited employment opportunities.

The current indicator of performance in workforce skills is based on the Training & Competence section of certified Quality and Environmental Standards. This requires that: relevant skills gaps are identified for all employees, a plan is created to address these, and the auditing and certification of this process ensures the training is delivered and that it is effective.

Steady progress has been made towards the target. This is despite the current market conditions and the resulting rationalisation within the industry.

### Sustainable Development Microsite

[www.mineralproducts.org/sustainability](http://www.mineralproducts.org/sustainability) provides a useful hub of information on:

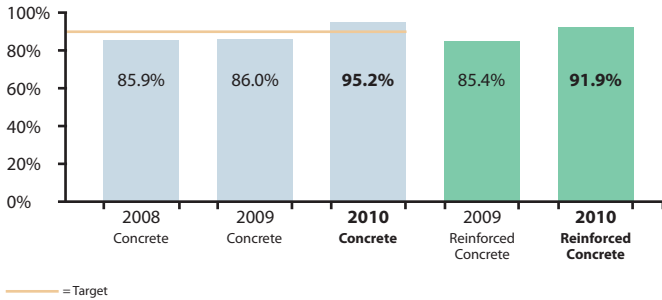
- All of MPA's Sustainability Reports
- The MPA biodiversity strategy
- A range of SD case studies
- Stay Safe and Cycle Safe information resources
- In depth data.

The site will be extended as further MPA materials and resources are produced.

[www.mineralproducts.org/sustainability](http://www.mineralproducts.org/sustainability)

## Local Community

Percentage of relevant sites that have community liaison activities



The sectors within the concrete industry are active in local communities to maintain positive relations, through formal liaison groups and community initiatives.

Many production sites in the concrete supply chain are situated on industrial parks or are physically shielded (by geography) from local communities, the industry recognises the importance of mitigating any potentially adverse affects from, for example, transport movements and noise.

The industry sectors regularly engage with local schools to support teachers with initiatives that encourage engagement with local wildlife, health and safety issues and support science and geography classes. This activity is intended to create an understanding of the importance of local industries and the role the products play in their own lives.

In addition, the cement and aggregates sectors welcomed over 20,500 visitors to its sites in 2010.

The industry continues to promote best practice and explore additional indicators to reflect local community engagement.



The MPA Cycle Safe campaign provides information to cyclists and drivers to prevent collisions between cyclists and lorries.

## References

- 1) **Strategy for Sustainable Construction, HM Government, June 2008.**  
Download from [www.bis.gov.uk](http://www.bis.gov.uk)
- 2) **Government Construction Strategy, Cabinet Office, May 2011.**  
Download from [www.cabinetoffice.gov.uk](http://www.cabinetoffice.gov.uk)
- 3) **Implementing the Climate Change Act 2008, HM Government, May 2011.**  
Download from [www.decc.gov.uk](http://www.decc.gov.uk)
- 4) **Low Carbon Construction Action Plan, HM Government, June 2011.**
- 5) **BREEAM New Construction - non-domestic buildings, Building Research Establishment, July 2011.**  
Download from [www.breeam.org](http://www.breeam.org)
- 6) **CD&E waste: Halving Construction, Demolition and Excavation Waste to Landfill by 2012 compared to 2008, Construction Products Association, 2010.**  
Download from [www.strategicforum.org.uk](http://www.strategicforum.org.uk)

## Glossary

Glossary of data presented in this report.

### Concrete:

This includes contributions from the aggregate, cement, ggbs, fly ash and admixtures raw material sectors as well as the contributions from the ready-mixed and precast concrete manufacturing sites (i.e. unreinforced concrete).

### Reinforced concrete:

This includes all of the sectors included in 'concrete' with the addition of the steel reinforcement sector.

# Concrete Industry Sustainable Construction Targets

## Sustainable Consumption and Production

Sustainability Principle	Performance Indicator	Performance					Target
		2008 Concrete	2009 Concrete	2010 Concrete	2009 Reinforced Concrete	2010 Reinforced Concrete	2012
Environmental Management	Percentage of production sites covered by a 'UKAS' Environmental Management System (EMS)	72.3%	80.4%	84.8%	80.1%	84.0%	85%
Emissions (excluding CO <sub>2</sub> )	Number of convictions for air and water emissions per annum	6	1	3	1	3	0
Stakeholder Engagement	The industry sectors have successful and wide ranging stakeholder schemes in place. An industry wide measure is being developed to aid future industry reporting.						
Quality and Performance	Percentage of production sites covered by a 'UKAS' certified ISO 9001 quality management system	84.2%	87.5%	89.0%	87.7%	89.3%	90%
Responsible Sourcing	Percentage of production certified to BES 6001 responsible sourcing standard	BES 6001 was published in October 2008	81%	88%	–	–	The aim is to support the government target of 25% responsibly sourced products in construction projects

## Climate Change and Energy

Energy Efficiency	Kilowatt hours of energy used in production as a proportion of production output	132.6 kWh/tonne	125.3 kWh/tonne	137.5 kWh/tonne	147.9 kWh/tonne	160.0 kWh/tonne	Deliver the industry CO <sub>2</sub> target and achieve sector climate change agreement targets
CO <sub>2</sub> Emissions – production	Kilogram of CO <sub>2</sub> emissions as a proportion of production output (1990 baseline is 103.2 kg CO <sub>2</sub> /tonne) Rolling Mix	88.1 kg CO <sub>2</sub> /tonne	84.3 kg CO <sub>2</sub> /tonne	90.5 kg CO <sub>2</sub> /tonne	92.7 kg CO <sub>2</sub> /tonne	98.9 kg CO <sub>2</sub> /tonne	17% reduction from 1990 baseline. (85.4 kg/CO <sub>2</sub> /tonne)
	Kilogram of CO <sub>2</sub> emissions as a proportion of production output (1990 baseline is 103.2 kg CO <sub>2</sub> /tonne) Standardised Mix	88.1 kg CO <sub>2</sub> /tonne	86.3 kg CO <sub>2</sub> /tonne	86.4 kg CO <sub>2</sub> /tonne	94.7 kg CO <sub>2</sub> /tonne	94.8 kg CO <sub>2</sub> /tonne	17% reduction from 1990 baseline. (85.4 kg/CO <sub>2</sub> /tonne)
CO <sub>2</sub> Emissions – transport	CO <sub>2</sub> emissions of delivery transport through the industry supply chain as a proportion of production output	Not reported	7.2 kg CO <sub>2</sub> /tonne	7.8 kg CO <sub>2</sub> /tonne	–	–	Target to be set



## Natural Resource Protection and Enhancing the Environment

Sustainability Principle	Performance Indicator	Performance					Target
		2008 Concrete	2009 Concrete	2010 Concrete	2009 Reinforced Concrete	2010 Reinforced Concrete	2012
Waste Minimisation	Kilogram of waste to landfill as a proportion of production output (in tonnes)	5.0 kg/tonne	4.4 kg/tonne	2.0 kg/tonne	4.7 kg/tonne	2.1 kg/tonne	Reduce by 15% (4.3 kg/tonne)
Materials Efficiency	Material diverted from the waste-stream for use as a fuel source as a percentage of total energy use	17.3%	23.4%	24.2%	–	–	21%
	Percentage of additional cementitious materials (GGBS, fly ash, etc) as a proportion of total cementitious materials used	31.8%	29.8%	27.8%	–	–	33%
	Recycled/secondary aggregates as a proportion of total concrete aggregates	5.3%	3.9%	5.8%	–	–	The implications of setting a target are currently being evaluated
Water	Mains water consumption (in litres) as a proportion of production output (in tonnes)	86.1 litres/tonne	105.1 litres/tonne	86.6 litres/tonne	110.2 litres/tonne	92.4 litres/tonne	This indicator is to be refined before a target is set
Site Stewardship and Biodiversity	Percentage of relevant production sites that have site specific action plans	94.3%	95.1%	99.5%	–	–	100%

## Creating Sustainable Communities

Health & Safety	Reportable injuries per 100,000 direct employees per annum	799	753	708	–	–	From 2009-2014, reduce lost time incidents by 50% with an aim of zero harm
	Lost Time Injuries (LTI) for direct employee per 1,000,000 hours worked	–	3.2	4.7	3.8	4.8	From 2009-2014, reduce lost time incidents by 50% with an aim of zero harm
Employment and Skills	Percentage of employees covered by 'UKAS' certified training and evaluation process	84.4%	86.5%	90.4%	87.3%	90.9%	100%
Local Community	Percentage of relevant sites that have community liaison activities	85.9%	86.0%	95.2%	85.4%	91.9%	90%

*To ensure the successful implementation of the Concrete Industry Sustainable Construction Strategy the industry established the Sustainable Concrete Forum and associated Task Groups*

The Sustainable Concrete Forum and its member Associations maintain records of which member companies have supplied data. In order that the process is transparent, records are kept of which members companies have supplied data for each performance indicator.

**[www.sustainableconcrete.org.uk](http://www.sustainableconcrete.org.uk)**

**Founder members of the Forum:**

- Aggregate Industries
- British Precast **[www.britishprecast.org](http://www.britishprecast.org)**
- British Ready-Mixed Concrete Association **[www.brmca.org.uk](http://www.brmca.org.uk)**
- Brett Group
- Cement Admixtures Association **[www.admixtures.org.uk](http://www.admixtures.org.uk)**
- CEMEX
- Cementitious Slag Makers Association **[www.ukcsma.co.uk](http://www.ukcsma.co.uk)**
- Hanson UK
- Mineral Products Association **[www.mineralproducts.org](http://www.mineralproducts.org)**
- MPA - Cement **<http://cement.mineralproducts.org>**
- Lafarge Aggregates
- UK Quality Ash Association **[www.ukqaa.org.uk](http://www.ukqaa.org.uk)**
- Lafarge Cement
- Marshalls plc
- Tarmac

**Associations that have joined the Forum:**

- British Association of Reinforcement (BAR) **[www.uk-bar.org](http://www.uk-bar.org)**

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Published by The Concrete Centre, part of the Mineral Products Association, on behalf of the Sustainable Concrete Forum

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