

# re:view

## WHY THE REINFORCEMENT SECTOR HAS A GLASS HALF-FULL RATHER THAN HALF-EMPTY ATTITUDE

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BAR MARKETING

HEALTH AND SAFETY AND  
TECHNICAL COMMITTEE REPORTS

BAR MEMBERS DIRECTORY

# CHAIRMAN'S WELCOME

On behalf of the members of the British Association of Reinforcement, I should like to welcome you to this Annual Report.

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For most of our members, 2010/11 was another year of difficult trading conditions against the background of the ongoing recession, where the small uplift in other parts of the economy did not really show through into increased activity in the construction sector. Business continued to decline as projects started before the recession were brought to completion. And, as I write this introduction, the gathering storm clouds of the Euro crisis and risk of a double dip recession dampen hopes of a rapid recovery.

That said, the BAR members in the steel reinforcing sector have met the challenges effectively. They moved rapidly to accommodate the impact of the recession in 2008/9 and have continued to invest in their businesses and processes to improve efficiency and quality. One benefit of this has been to reduce the level of imports in to the UK market over the past year. They are now well placed to take advantage of any upturn and obtain the benefit of increased infrastructure spend.

BAR has supported the construction sector's lobby of government to bring forward major infrastructure spend and was pleased to see the proposals announced in the Chancellor's pre budget statement. However, other concerns remain, particularly that of the government's high energy price strategy and the impact of higher electricity prices on the cost of UK produced reinforcing steel.

More positively, BAR and its members have fully embraced the sustainability agenda, the Association joining the Sustainable Concrete Forum and fully participating in the data provision exercise for the SCF's 2011 annual Concrete Industry Sustainability Report. Many BAR members have joined sustainability accreditation schemes and are either in the process or have obtained accreditation.

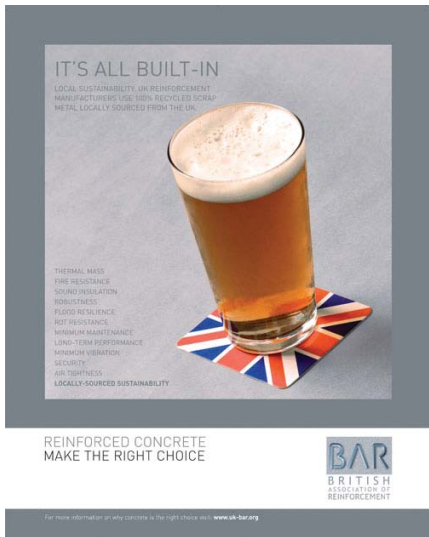
I am, therefore, confident that our members will be able to meet any new challenges that the economy and business environment presents in 2012 and will be able to take full advantage of the upturn when it comes.

Graham Mackenzie  
**Chairman**  
**British Association of Reinforcement**

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# TOUGH ECONOMY CALLS FOR REINFORCED BENEFITS



2011 has been a challenging year for the construction industry. It is predicted to become even more challenging with no real increase in activity until 2013. However, the reinforcement sector is adopting a 'glass half-full' rather than 'glass half-empty' attitude.

The downturn in construction activity has been significant. Despite this, there are some glimmers of light at the end of the tunnel. At first it was in London where a number of major shelved commercial projects have been dusted off, taken off the shelf and given new start dates, this is now slowly but surely, - although erratically - spreading to other parts of the UK. The government has realised the potential of investing in construction as a way forward out of economic decline and is pushing forward with a number of major infrastructure projects and new initiatives to activate the moribund housing market. Money is even being found for school projects, although not at the level of the previous Building for Schools initiative.

To some extent, the increased emphasis on added value, 'more-for-less' champions the use of reinforced concrete. The range of inherent, built-in benefits means that there is no need to pay for additional fire resistance, sound insulation or vibration control. All these come free of charge. Whilst the increased demand for sustainable construction solutions is well suited to the material's unrivalled thermal efficiency, minimum maintenance and long-term robustness. These too come free of charge. Take these free benefits onboard and you have a best value construction product.

The reinforcement sector is developing solutions to deliver even more added value to these inherent benefits. This includes the increased availability of prefabricated reinforcement, such

as pile and columns cages, column bases, ground beams and roll mats, which offer the benefits of factory-quality controlled manufacture with reduced onsite labour, faster programme times and less waste. There is also a growing appreciation and use of post-tensioned concrete floors which epitomises the 'less is more' mantra: less reinforcement and reduced floor thickness providing faster construction times and more floors for the same building height.

In a similar vein, there is increased evidence of the benefits of using reinforcing steels with yield strengths of 100 ksi, primarily for beam-column joints in special moment frames. Currently being actively examined for various projects in the United States, high-strength reinforcing steel is a natural progression of high-strength concrete. Both offer the potential for lighter, more cost effective structures.

Above all, the need for ever greater cost savings and construction efficiencies has resulted in a growing appreciation that rebar is more than just a basic commodity. BAR members have the experience and expertise to show how it can add real value to a project. Many BAR members offer reinforcement detailing and computer-aided 3D modelling of reinforcement to increase design, manufacture and installation efficiency. Early involvement of the reinforcement fabricator will ensure that these efficiency benefits are realised.

# CONCRETE INDUSTRY AT FOREFRONT OF SUSTAINABLE CONSTRUCTION

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The concrete industry continues to lead other construction material sectors in realising its vision to be recognised as being at the forefront in sustainable construction. The reinforcement sector is fully signed-up to the pan-industry objectives and sustainability targets.

The latest annual Concrete Sustainability Performance report sets out the progress made on a wide range of sustainability targets during 2010. This is the fourth report since the 2008 agreement between nine sectors within the concrete industry and their signing-up to a pan-industry sustainability strategy. It reports on 2010 data received from companies that supply an estimated 78% of all concrete used in the UK. For the first time data from the reinforcement sector has been fully integrated into the reported figures to provide information for both concrete and reinforced concrete.

Key findings include the fact that 88% of concrete production is responsibly sourced to the BRE developed responsible sourcing standard BES 6001 – Framework Standard for the Responsible Sourcing of Construction Products. This makes concrete the leading responsibly sourced construction material in the UK. The concrete industry was the first industry to link its sustainable construction strategy to BES 6001 in order to demonstrate its sustainability credentials and allow designers and specifiers the ability to easily source accredited materials and gain maximum credits in sustainability assessment tools such as the Code for Sustainable Homes and BREEAM.

The industry's commitment to sustainability is not only demonstrated by its sign-up to BES 6001. The industry has made good progress towards its 2012 target of 85%

of production sites having UKAS certified Environmental Management Systems (EMS). In 2010, 84.8% of sites were so certified. EMS are the cornerstone of a sustainability strategy and a key element in the certification to responsible sourcing schemes as they help to deliver performance improvements at each site and so drive forward the performance of the industry as a whole.

Major progress has been made by the concrete industry in reducing the amount of waste sent to landfill. The 2010 figures show a 60% reduction compared to the 2008 baseline. This is significantly ahead of the set 15% reduction target. Overall, the concrete industry is a net user of waste and continues to increase its consumption. Currently, it now uses almost 47 times more waste, by-products and secondary materials from other industries than the waste it sends to landfill.

The reinforcement sector is proud to be fully signed-up to this pan-industry initiative that aims to forward the concrete industry as being the construction materials sector best placed to support the government and client aspiration towards achieving sustainable design and construction of the built environment.

To download a copy of The Concrete Industry Sustainability Performance Report visit: [www.sustainableconcrete.org.uk](http://www.sustainableconcrete.org.uk)

# WHOLE LIFE SUSTAINABILITY MUST BE ADDRESSED BY DESIGNERS AND CLIENTS



The concrete sector is making considerable strides with the reduction CO<sub>2</sub> emission associated with manufacturing and production. However, with CO<sub>2</sub> emissions resulting from the operational use of buildings far outweighing the embodied energy of their construction, designers and clients need to address the issue of locally sourced whole life sustainability.

The operation of commercial buildings in the UK accounts for some 27% of the total UK CO<sub>2</sub> emissions. This underlines the importance of increasing energy efficiency, and therefore reducing CO<sub>2</sub>, of their heating, cooling and lighting. It also emphasises the need for designers and clients to not only include, but to look beyond the initial embodied construction CO<sub>2</sub> and consider a building's whole life environmental impact, from construction material sourcing and manufacture through to a building's end-of-life.

Starting at the beginning, reinforced concrete, is locally sourced from within the UK. UK manufactured steel reinforcement is manufactured from 100% UK recycled scrap steel and the average distance to site is only 5 miles for ready-mixed concrete. This is in stark comparison to timber products and for the raw materials for steel structures which have often been imported from many hundreds of miles away.

The inherent benefits of reinforced concrete offer an unrivalled range of in-use sustainability benefits. It is robust and flood resilient, is fire resistant, provides sound insulation and does not need additional finishes and chemical preservatives with all their additional embodied CO<sub>2</sub>. Importantly, reinforced concrete offers high levels of thermal mass which when used as part of a Fabric Energy Storage (FES) design and construction strategy can reduce or even negate the need for energy hungry air conditioning.

The basic FES approach is to expose the soffit of concrete floor slabs which can then absorb heat gains on warm days and so reduce the internal temperature. The introduction of night air ventilates and cools the soffits in readiness for the following day. The UK variation in diurnal temperature rarely drops

below 5°C, ensuring that night cooling is relatively effective. As an alternative, or in addition to night-time ventilation, water cooling may be used which can offer improved flexibility and control of the slab temperature.

Thermal mass can be provided by all structural elements but the bulk of it is provided by concrete floor slabs. This is not only because of the larger surface area available for heat transfer but also because the soffit can be exposed for radiant heat transfer. There is a common misconception that there is no additional thermal mass benefit beyond 100mm concrete thickness, but this fails to take account of weather patterns when hot periods require additional thickness for heat absorption long after the 100mm has become saturated. It also fails to take account of the ability of designers to utilise underfloor ventilation to provide thermal linking on the topside of the slab, thereby significantly increasing the effective thickness that can be exploited. In addition, the middle of the slabs can be linked through the use of active water or air-based systems.

At the end-of-life, reinforced concrete constructed buildings can be easily altered to meet new user demands. Should this not be an option, the concrete and reinforcement can be fully recycled.

Real sustainability is about the whole picture from the responsible sourcing of construction materials through to the operational use of the building to the re-use and end-of-life recycling of materials. The reinforced concrete sector is addressing the embodied CO<sub>2</sub> element of construction. Designers and clients need to address the long-term operational CO<sub>2</sub> by specifying and designing with whole life sustainability in mind.

# BIM FULL STEAM AHEAD

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## The way forward for cost efficient and low carbon construction is BIM (Building Information Modelling and Management)

The use of Building Information Modelling and Management could be made mandatory on almost government construction projects within 5 years rather than only those with a value of over £50 million. This is a departure from the threshold of £50 million proposed in the industry/government Innovation and Growth team report on low carbon construction but is one that could result in substantial cost savings.

BIM involves a managed approach to the generation collection and use of project information using a set of standard processes and 3D modelling that contains all graphical and tabular information about the design, construction and operation of the project. A key element of BIM is harnessing the benefits of supply-chain integration that would be encouraged via the sharing of co-ordinated information. In addition to the design and build benefits, a major advantage is the efficient level of post-construction management for optimum value in terms of space utilisation, running costs and energy/carbon reduction.

BIM is more than just the introduction of compatible software throughout the project team. It calls for a change to the traditional design phases and for greater data sharing than is currently undertaken. It calls for the incorporation and coordination of all relevant information that illustrates the entire building life cycle. This includes all drawings, specifications,

standards, procurement details, costs, environmental criteria and considerations and operational expectations. In this respect BIM provides the total information resource of a building from cradle to grave (or, increasingly, back to cradle as we seek greater resource efficiency).

Significant cost savings would arise from all members of the project team working from the same model, thereby reducing the potential for error and duplication that can arise from the use of inaccurate and uncoordinated information. With all members of the project working from the same model, from design through to completion, changes are automatically coordinated across the project. Everyone is singing, if not from the same hymn sheet, certainly from the same design and construction sheet. The advantages of BIM were forwarded by Paul Morrell, Chief Construction Adviser, at the 2011 BAR Industry Seminar.

In May, the Government Construction Strategy was published. This announced the Government's intention to require collaborative 3D BIM on its projects by 2016. BIM is the way forward for the construction industry. In years to come, the industry may look back and wonder why it took it so long to adopt such an efficiently integrated and coordinated way of working.

# REDUCING THE COST OF HIGH RISE CONSTRUCTION

A consortium of construction heavyweights is developing proposals to significantly reduce the cost of high rise buildings. Realising the potential of reinforced concrete's inherent construction and performance benefits could help them achieve, or even better, their objective.

The consortium, which includes Stanhope, Davis Langdon, Aedas WSP and Hilson Moran, is examining how to create a workable model for a 40-storey, sustainable, efficient commercial building in London with a 60-year life span costing £125/ft<sup>2</sup> shell and core. This is half of the average £250/ft<sup>2</sup> that it costs now. The model is based upon a square floor plate with a central concrete core, double deck lifting strategy and four-pipe fan coil system with a centralised plant.

The proposals seek to move away from iconic bespoke high rise buildings with irregular floor plates to a more standardised approach. Whilst, the shape and form of a high rise building undoubtedly has a significant impact on the cost so does the choice of material for the structural frame. Reinforced concrete has a range of inherent performance benefits that minimise or even negate the need for additional finishes, and therefore capital costs, while its mass means that concrete floors generally meet vibration criteria without the need for extra stiffening. Concrete's mass also provides high thermal efficiency that when utilised as part of a fabric energy storage (FES) approach can reduce plant costs by reducing or eliminating the need for air conditioning.

In addition to these potential savings are those offered by the use of high strength concretes and post-tensioned concrete floors. Studies have shown that the use of C50/60 concrete can reduce the cross section of vertical elements due to the provision of increased strength and stiffness. The same approach when used for reducing slab thickness can result in savings in other building elements, for instance the area of the cladding and the internal partitions, thereby saving materials and reducing the overall building costs. The use of a C60/75 concrete can reduce the volume of the vertical elements still further. This has the additional benefit of increasing the net lettable area.

Cost savings are also possible with the use of post-tensioned (PT) concrete floor slabs. PT floor slabs can be up to 300mm thinner over one-storey than a steel frame. This minimises the building's height to the extent of allowing an extra storey on a ten storey building. PT slabs can economically span further than a reinforced concrete slab. This in turn reduces the required number of columns and foundations and increases flexibility for space planning. The clear flat soffits of PT slabs enable complete flexibility of service layout. There is also flexibility in positioning holes through the slab because tendons are widely spaced and can be positioned around openings. In addition to all the above benefits, PT equals rapid construction as less reinforcement reduces the fixing time and early stressing of the concrete allows the formwork to be struck quickly. Above all, the use of high strength concrete or PT allows thinner structures and the thinner the overall structural frame, the lower the cladding costs. Given that cladding can represent up to 22% of the construction cost, minimising the cladding area represents considerable savings.

Internally, a concrete structural frame can also offer cost savings. A premium is incurred on steel frame for sealing and fire stopping at partition heads against the irregular soffits of the steel decking and around irregularly shaped intersecting frame members. Unless this is considered at the early design stage it can result in expensive and time-consuming remedial work late in the construction programme. Staying with internal savings, mechanical and electrical services represent up to 34% of overall construction costs. The flat soffit of a concrete floor slab provides a clear zone, free of downstand beams. This allows more services to be pre-fabricated off-site and increases the simplification and ease of installation.

The move to increase the construction efficiency of high-rise buildings is to be welcomed. The construction and built-in performance benefits of reinforced concrete can help achieve the considerable cost savings being sought.

# A VISUAL TREAT



The aesthetic and performance potential of visual reinforced concrete was explored at the 2011 Specifying Visual Concrete conference organised by MPA The Concrete Centre. Andrew Minson, executive director of MPA - The Concrete Centre reports on the visual treat that is concrete.

Designers are increasingly intrigued and excited by the aesthetic potential of visual concrete whilst clients are more understanding of its potential programme cost and time savings. Both parties share a growing recognition of the sustainability benefits of exposed concrete's thermal mass.

The conference heard from a number of leading architects who described their appreciation of concrete with Alex Wraight of Allies and Morrison going as far as to describe concrete as being "the Barry White of construction materials. It has real soul and is perpetually funky with lashings of disco glamour".

The range of buildings presented throughout the conference underlined Wraight's Barry White view of concrete. A spectrum of bright strong colours using pigments. Whilst at the other extreme was the white brilliance of reinforced concrete. Case studies including The Angel, London and the Hepworth Gallery in Wakefield demonstrated the worth of the extra effort required to ensure high quality visual concrete. This extra effort is not only repaid by visual excitement and structural panache but also by cost and CO<sub>2</sub> savings.

The Angel, London, is a reinvention of a tired 1980s commercial block using the existing concrete frame. Integral to the building's good looks and energy efficiency is the exposed concrete, particularly of the large atrium, which provides significant thermal mass that minimises the need for heating and air conditioning. The exposure of so much concrete called for a high-quality finish that was achieved after much testing including a structural mock-up and the full and early involvement of the concrete contractor. The result, as Steve Smith of architects Allford Hall Monaghan Morris pointed out is a consistent silk-finish of considerable elegance. The client, David Thurston of Derwent London, explained that the extra effort required for high-quality visual concrete is more than justified as it meets the aspirations of potential tenants and saves money both in capital and operational spend.

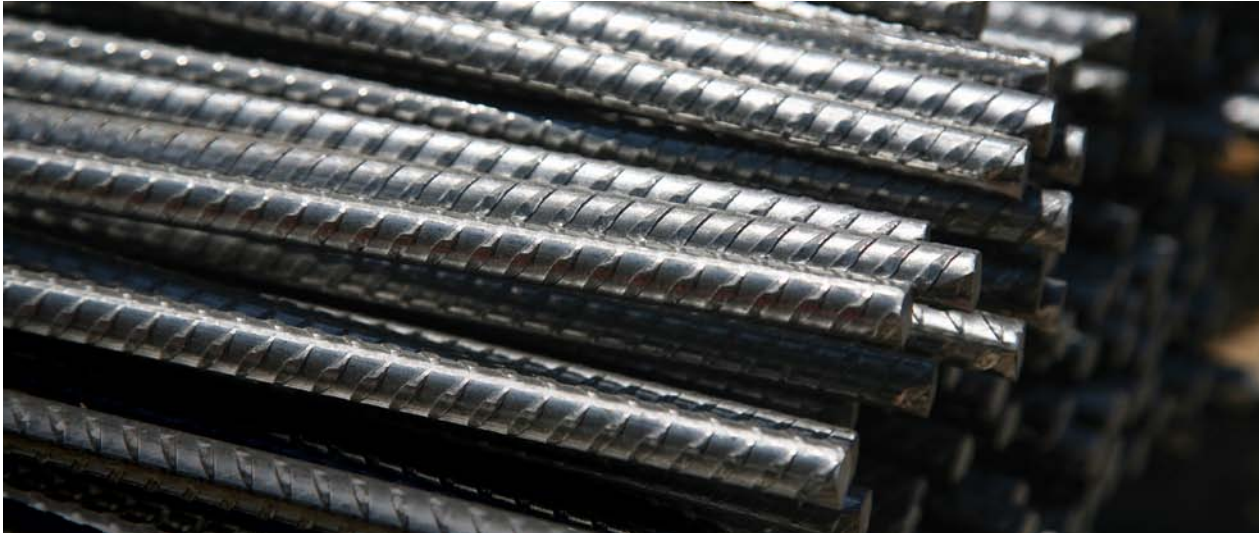
Although the exposed concrete finish of the Angel Building cost £20 sqm<sup>2</sup> more to achieve, its high quality meant that there was no need for additional cladding or finishes. It would have cost an additional 50% to clad the concrete in travertine and 200% in Portland stone. The use of the exposed concrete's thermal mass also meant a reduction in heating and air-conditioning provision.

The need for early involvement of the concrete contractor and supplier was explained by Anton Sawicki from Ramboll presenting David Chipperfield's Hepworth Gallery. The use of self-compacting concrete emphasises the building's strong solidity. It has a shimmering presence thanks to the use of a coloured pigmented concrete developed and supplied by Lafarge. Numerous testing panels and samples were undertaken before the right shade of greyish aubergine was achieved which is best described as being 'Hepworth Brown'. Close collaboration ensured that the vision and drive of the architect was realised by the practical realisation of the project team.

The conference highlighted that when it comes to visual concrete the only limitation is imagination. Reinforced concrete is a material that provides countless aesthetic possibilities that are supported by a range of inherent performance benefits. However there is a proviso. Despite its robustness, visual concrete is a material that must be carefully specified, tested and installed. Appropriately, given the exemplar use of visual concrete for the Hepworth Gallery, the use of visual concrete may be summed up by Barbara Hepworth who once said: "One must be entirely sensitive to the structure of the material that one is handling. One must yield to it in tiny details of execution, perhaps the handling of the surface or grain, and one must master it as a whole".

Copies of 'How to achieve visual concrete' may be downloaded from <http://www.concretecentre.com/publications>

# WHEN THE GOING GETS TOUGH



Kelly Forest, senior economist at the Construction Products Association, reviews the economic outlook for construction sector and predicts a bumpy future.

Having lost 16% of its overall value between 2007 and 2009, construction activity recovered in 2010, with output increasing across all sectors of the industry, except for commercial, which continued to be a casualty of credit market constraints, and non-housing repair and maintenance work. As 2011 has progressed, economic headwinds have strengthened significantly. High inflation and low wage growth suggested that 2011 was always going to be a challenging year for consumers but the added uncertainty caused by the escalation of the euro zone crisis has had a profound effect on business confidence.

Construction activity is set to fall back into recession in 2012 as cuts to public sector budgets outpace anaemic growth in private sector activity. Rising by nearly 5%, to £12.6 billion this year, infrastructure is expected to partially compensate for public sector retrenchment and a further year of contraction in commercial activity, on the back of weak consumer spending and faltering business confidence. Overall, a contraction of around 1% should erode some of the ground regained in 2010.

Currently, it is anticipated that a controlled resolution to the euro zone crisis will be found and the outlook for 2012 crucially hinges on this. Even if the governments of heavily indebted euro zone countries prove successful in their quest to rein

in spending and regain control of their country's finances, economic growth prospects have already been dented. It will be some time before onlookers are convinced that the threat of a default (and all of its ramifications) has truly diminished. For investment this is extremely bad news as many consumers and businesses will opt to wait and see before committing to capital improvements. Private sector construction activity is expected to reach an hiatus in 2012, at a time when the impact of public sector austerity is at its peak and a further 3.6% contraction in output is forecast. Industry output is expected to stabilise at a low level in 2013 before the outlook improves and growth resumes.

Downside risks to this projection, however, have strengthened significantly in recent months. Uncontrolled default by a euro zone member would have serious consequences on confidence, financial markets and trading prospects on this side of the Channel. A double-dip economic recession would be highly likely and the implications for the UK construction industry would be grave.

# BAR COMMITTEE REPORTS

BAR promotes the ongoing development and improvement of the UK reinforcement industry via its industry committees. These committees consist of member representatives working closely with industry partners plus government and regulatory bodies.

## MARKETING COMMITTEE

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**Against a difficult economic background, BAR has continued to extol the benefits of reinforced concrete and the expertise of BAR members.**

As a sign of times, the association changed the format of its annual lunch for a more pragmatic industry seminar. This featured presentations from Paul Morrell OBE, Chief Construction Advisor with the Department of Business Innovation and Skills, Dr Noble Francis, Economics Director of the Construction Products Association and Dr Andrew Minson, Executive Director of MPA-The Concrete Centre. In addition to addressing the key issues affecting the reinforcement sector and the construction industry as a whole, the well attended event provided the opportunity for BAR to forward its objectives and concerns to the speakers. It was not all work however, held at the National Motor Heritage Museum, the seminar gave delegates the chance to tour the prized collection of vintage cars.

2011 saw BAR making a formal complaint to the Advertising Standards Authority over TARMAC's misleading Topforce advertisement that implied that micro fibre can replace steel mesh for all applications including structural reinforcement. This is simply incorrect as Topforce micro fibre can only be used as a replacement for steel wire fabric used for crack control and not as a replacement for structural steel reinforcement. The ASA upheld BAR's complaint, and in order to avoid a formal investigation, TARMAC agreed to amend their advertisement and remove the disingenuous claim.

The BAR website has continued to provide an online focus for the reinforcement sector outlining the benefits of reinforced concrete and providing the contact details of BAR members. This year, for the first time, the BAR Review will be available as a publicly available download, its availability announced via high profile advertisements in key industry media.

## TECHNICAL COMMITTEE

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**During the past year, the BAR Technical Committee has focussed its work primarily on product standards and on sustainability issues.**

BAR members have represented the UK reinforcement industry at British Standards and European levels, working on a number of matters, including drafting a new standard on the welding of reinforcing steels and taking the lead on the drafting of a British Standard for couplers. This has also included work on the revision of EN10080, the European standard for reinforcing steels. The current draft is not acceptable and raises concerns that the need for European harmonisation, driven by the Construction Products Directive, may lead to an unsatisfactory standard being issued. There is also the concern that CE marking of reinforcing steel may lead to the avoidance of CARES accredited materials and to the importation of lower quality reinforcement.

For some time, BAR policy has been to be at the forefront of a sustainable approach to construction.

The Association has encouraged members to join one of the two sustainability accreditation schemes available to companies in the reinforcing sector. To support this, the Association joined the Sustainable concrete Forum (SCF) a couple of years ago, and, after a pilot in 2010, participated fully in preparation of the SCF annual Concrete Industry Sustainability Report. This entailed BAR members making all UK produced reinforcing steel and a majority of the tonnage fabricated in the UK in collecting and reporting 2010 key performance data to BAR for collation and submission to the SCF. This major exercise was successfully overseen by the Technical Committee in the first half of 2011.

## HEALTH & SAFETY COMMITTEE

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The BAR H&S Committee provides a forum for members to exchange ideas and best practice on policy and practical issues affecting the health and safety of their employees. Over the past twelve months, this work has primarily concerned the issues of safe handling, slinging, loading and unloading of steel fabrications, particularly with regard to the safe off loading of material at customers' sites. The committee has worked jointly with the Federation of Piling Specialists to prepare a good practice guide for handling pile cages, which is now in late draft stage.



GIVE YOUR PROJECT A REINFORCED ADVANTAGE  
RAISE THE BAR

FOR REINFORCED SUCCESS CHOOSE A MEMBER OF THE  
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- COMMITMENT TO SUSTAINABILITY
- TECHNICAL EXPERTISE
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REINFORCED CONCRETE: MAKE THE RIGHT CHOICE

[www.uk-bar.org](http://www.uk-bar.org)

## BAR MEMBERS

BAR members are focused on delivering innovative and cost effective solutions that fully support the demands of quality, customer service, health and safety and sustainability. All BAR members are CARES approved.

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