

Sustainable Steel Construction – *Building a Better Future*

First annual report on progress

The year at a glance:

- December 2002 *Building a Better Future* launched in London by Corus, SCI and BCSA
- February 2003 Corus Rail wins the Rail Excellence Award for modular steel-framed platforms
- March 2003 Corus launches *Surefast* – a new, fast-track way to build high security, explosion-resistant buildings
- April 2003 The British Stainless Steel Association hold their annual conference *Stainless Solutions for a Sustainable Future* at the Magna Science Adventure Centre in Rotherham
- May 2003 Corus launches *Living Solutions* – a £4m investment that uses advanced, automated, off-site production to help solve the UK's affordable housing problem
- Corus *Hydrobarrier* wins the Business Commitment to the Environment award for the supply and installation of a steel contamination barrier on a brownfield site in Cambridge
- June/July 2003 The *Structural Steel Design Awards 2003* and the *Steel Design Undergraduate Awards* held in London. These awards encourage innovation in sustainable steel construction
- August 2003 MCRMA publish a guide on sustainable composite flooring systems
- September 2003 Corus and Liquid Plastics launch Isoclad PCM a water-based paint for refurbishing pre-coated metal cladding
- SCI undertakes a sustainability survey of its members
- October 2003 The Better Buildings Summit takes place in London
- November 2003 BCSA host the *Steel Buildings Conference* in London
- Corus undertakes a sustainability survey of UK architects



The new Met Office buildings in Exeter incorporate thermally efficient steel framing solutions to help achieve a BREEAM 'excellence' rating

1 Executive summary

This document is the first annual review of progress achieved in the delivery of the Steel Construction Sector's Sustainable Development Strategy following its launch in December 2002.

The Strategy is set out in a report (*Building a Better Future*) that describes a number of key initiatives and targets to help the Sector to become more sustainable. Progress has been measured by reviewing the status of these initiatives at the end of 2003 with reference to the evolving sustainable development agenda and, in particular, the priorities of Government.



Key findings from this review include:

The 'health' of the Sector:

1. The value of new construction in 2003 was £37 billion (at 2000 value), a 3% increase on 2002. UK consumption of construction steelwork fell by 3% in 2003 to 1.15 million tonnes. The total use of steel in UK construction in 2003 is estimated to have been 3.2 million tonnes.
2. Two of the poorest performing sectors in 2003 were the steel-intensive private industrial and commercial sectors. Industrial growth was hindered by weak global demand. The commercial sector, in particular offices, was affected by low demand in the key central London market.
3. The public non-residential sector grew by 20% in 2003 driven by the Government's commitment to education and health care.
4. Steel's market share as a structural framing material for multi-storey non-residential buildings increased to an all time high of over 69% in 2003. Within single storey structures steel is estimated to have maintained a share of over 95% in the key industrial buildings sector, and of over 75% for all other non-residential single storey buildings.

Progress achieved by the Sector in 2003:

1. Significant progress has been achieved in delivering the 25 key ongoing initiatives outlined in the Strategy document. More detail on the status of these at the end of 2003 is given in Appendix A.
2. Progress with the 12 new priorities for the Sector is good although more remains to be done. The 'year at a glance' (on the previous page) sets out some of 2003's highlights for the Sector and full details are provided in Appendix B.
3. For many parts of the supply chain, health and safety issues have become the dominant aspect of sustainability within construction. Not only is good health and safety important for the well being and effectiveness of the workforce, it is seen as a measure of company quality and ability, is

demanded by clients, is extremely cost effective and is essential for companies to achieve viable employers liability insurance.

4. Supply chain engagement – progress has been made by the BCSA on environmental reporting and by Corus on supply chain initiatives.
5. Informed decision-making – the Sector has well-developed technical support channels and devotes much time and effort to the provision of guidance, information and advice to all parts of the construction industry. Work is underway to develop environmental decision-support tools but more information is required by designers and specifiers. This was borne out by findings from the surveys of designers undertaken in 2003 (see Appendix B).
6. Aligning solutions with priorities – many new steel construction solutions have come to the market or been further developed in 2003. Many of these contribute to more sustainable development. Examples include Quicon, Living Solutions, innovative coatings, modular rail system, Surefast and Hydrobarrier.
7. The signatories to the Strategy continue to engage in dialogue with government and other stakeholders on sustainable development issues.
8. Encouraging greater reuse of steel construction products remains a high priority for the Sector. A mechanism to exploit this potential has still to be put in place.
9. Measuring progress – the Steel Construction Sector Sustainability Committee (SCSSC) remains the proactive body responsible for monitoring and delivering the Strategy.
10. Two surveys of clients and designers' attitudes to sustainable steel construction were undertaken in 2003. The findings reveal the growing importance of sustainability issues in construction but indicate that such issues only influence decision-making on around one third of construction projects.
11. Both surveys found that steel is viewed favourably when assessed against a range of different environmental credentials.
12. Respondents to the survey were asked about their information needs to enable them to design and deliver more sustainable buildings. Their replies will be used to help develop future goals under the Strategy.
13. Progress was made by Corus in the development of KPIs for steel producers. Some progress has also been made by the BCSA but more remains to be done.
14. Many other relevant initiatives are ongoing in the sector. These include skills development, awards programs to promote innovative steel construction design and some new research initiatives that got underway in 2003. These are reported further in Section 4.3.2.

The agenda for the future

The SCSSC remains committed to implementing the Strategy in 2004. The future agenda for implementation includes:

- continuation and completion of the ongoing initiatives reported in Appendix A
- working towards delivery of the new actions set out in Appendix B
- ongoing engagement in dialogue with government and other stakeholders

- ongoing encouragement and promotion of innovation in steel construction
- engagement of the steel construction supply chain on sustainable construction issues
- regular review and reporting of progress
- dissemination of high quality information in support of more sustainable construction.



Leeds Nuffield Hospital - one of the most technically advanced independent hospitals in Europe

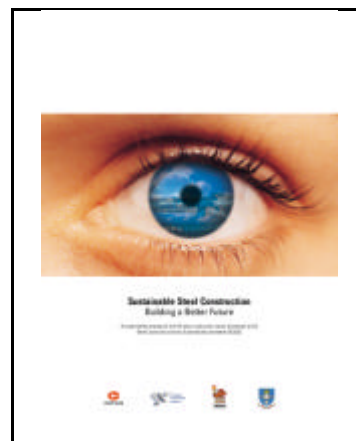
2 Introduction

2.1 Background

In line with Government's aspirations to develop and implement sectoral sustainable development strategies, the Steel Construction Sector launched its Strategy in December 2002. The Strategy is set down in the document *Sustainable Steel Construction: Building a Better Future*.

The Strategy was developed during 2002 under the aegis of the Steel Construction Sector Sustainability Committee (SCSSC) and led by a consortium representing Corus Group, the Steel Construction Institute (SCI) and the British Constructional Steelwork Association (BCSA) in consultation with a wider group

representing users of steel in construction. Implementation of the Strategy remains the responsibility of the SCSSC.



Development of the Strategy involved a strategic review of how the sustainable development agenda is being addressed by the UK Steel Construction Sector. The review investigated the sector's performance in terms of the four principal sustainable development objectives defined by the UK Government. These are:

- Maintenance of high and stable levels of economic growth and employment
- Social progress which recognises the needs of everyone
- Effective protection of the environment
- Prudent use of resources.

Based upon the findings of this review and Government's priorities, the Strategy sets out a number of new initiatives to actively promote and demonstrate practical progress towards a more sustainable future for steel construction. These steps address the need to engage the supply chain, to inform decision-makers about what is important for sustainable steel construction, to align commercial and national priorities and to establish the means to measure and report progress.

2.2 This document

This document describes the progress achieved in the delivery of the Strategy during 2003, i.e. over the first 12 months following its launch.

Building a Better Future set out a number of ongoing, new and longer-term initiatives and targets. These have been used to measure progress by the Sector and, as such, this report summarises the status of all relevant initiatives at the end of 2003.

Section 3 provides an overview of the performance of the steel construction sector in the different construction market sectors in 2003. Section 4, supported by the Appendices, is the heart of the document, summarising the substantial progress made by the Sector during 2003. Section 5 sets out 'where next' for the future delivery of the strategy.

3 The UK steel construction sector in 2003

The latest estimates of the value of construction output in the UK in 2003 show headline growth of 3% over 2002 for all new work, to over £37bn (in 2000 value of money). This represents 50% of the total value of construction output in the UK. However, within this overall pattern of growth, evident since 1996, there have been significant variations in the performance of the individual sectors.

Two of the poorest performing sectors in 2003 were the steel-intensive private industrial and private commercial sectors. The weakness of the private industrial sector reflects weak global demand that has placed UK manufacturing profitability under pressure. Capital expenditure was focused on plant and machinery investment to improve efficiency rather than more construction-intensive capacity increases. The earlier boost to warehouse construction from retail distribution and IT-led facilities, e.g. e-commerce, has also abated. The value of output is estimated to have fallen by 3% in 2003.

Offices are the dominant sub-sector in the private commercial sector and were one of the main drivers of sector growth until early 2002. Since then office space take-up in the key central London market has fallen and the availability of space to let has increased. This led to a progressive weakening of new orders in 2002, translating into a fall in output of around 15% in 2003. The entertainment sector also declined as uncertainties increased about the growth in consumer spending. Offsetting these falls there has been continued growth in the private education and private health sub-sectors underpinned by further PFI schemes, and in the retail sector. Planning restrictions on out-of-town retail development has meant that 90% of shopping developments are now in-town, with new stores and refurbishments by the large food retailers continuing to drive growth.

The star-performing sector in 2003 was the public non-residential sector, where output grew by around 20%, driven by the Government's commitment to increase expenditure in Education and Health, the two largest sub-sectors. Output also increased significantly in the public offices sector, a consequence of a number of large schemes, and in the miscellaneous sub-sector boosted by Defence Estates expenditure.

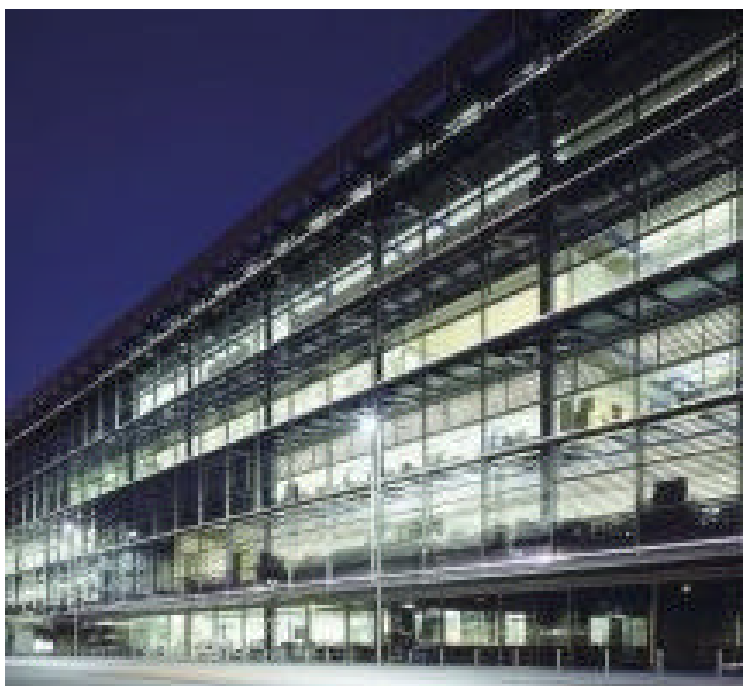
Despite earlier forecasts of continuing growth in the infrastructure sector, the value of output fell in this sector in 2003 with all the sub-sectors except gas, air and communications (boosted by the developments at Heathrow Terminal 5) shrinking.

Housing has traditionally been the least steel-intensive sector, but steel usage increased in 2003 as a result of the increasing share taken by multi-storey apartments of the total number of residential units, and steel taking a higher share of frames for this type of dwelling.

Despite the headline increase in the value of construction output, the different performances of the individual sectors mean that the estimated UK consumption of constructional steelwork fell by 3% in 2003, but remained at an historically buoyant 1.15 million tonnes. The total use of steel in the construction sector, including applications other than framing is estimated to have totalled over 3.2 m tonnes in 2003.

Steel's market share as a framing material for UK multi-storey non-residential buildings increased in 2003 to an all time high of over 69%, gaining share compared with 2002 in both the offices and other building categories. Within single storey structures steel is estimated to have maintained a share of over 95% in the key industrial buildings sector, and of over 75% for all other non-residential single storey buildings.

Turning to the future, public sector investment (including Private Finance Initiative projects) will continue to be the primary source of growth over the next couple of years, but the pace of increase will progressively slacken. In contrast, overall private sector activity is forecast to deteriorate over the same period. This weakening of private sector activity is forecast to limit the increase in the total value of construction output on new work in 2004 and 2005 to not more than 2% per annum; however this growth will be in the less steel-intensive sectors.



Birmingham's Millennium Point was the winner of the Engineering Innovation Award, part of the 2003 Structural Steel Design Awards. Designed by Nicholas Grimshaw and Partners, this landmark project incorporates the fit-out and servicing advantages of traditional flat slabs coupled to the flexibility and adaptability of a structural steel frame. The frame of the building was designed to maximise the use of prefabricated components enabling distinct modular sections to be bolted together on site. The slender steel columns were fully primed off-site and filled with reinforced concrete eliminating the need for additional fire protection.
Photograph copyright: Buro Happold/Mandy Roberts

4 Progress achieved in 2003

This section reports progress made by the UK steel construction sector in the delivery of its Sustainability Strategy since its launch in December 2002.

4.1 Ongoing initiatives

In *A better quality of life – a strategy for more sustainable development for the UK*, Government has set out the following key objective areas for achieving more sustainable development:

- maintenance of high and stable levels of economic growth and employment
- social progress which recognises the needs of everyone
- effective protection of the environment
- prudent use of resources.

These key objectives have been adopted by the steel construction sector in its sustainability strategy.

Under these principal objectives, *Building a Better Future* outlined 25 key initiatives that were already underway (at the time of the launch of the Strategy) to help deliver more sustainable steel construction. They comprise:

- research and development projects undertaken by the sector
- best practice initiatives for steelwork contractors and product manufacturers
- dissemination of design guidance through education and continuing professional development.

Significant progress has been made during the last 12 months under many of these initiatives and the status of each initiative at the end of 2003 has been reviewed and is summarised in Appendix A.

4.2 New initiatives

Building a Better Future set out a number of new targets for the sector to deliver more sustainable construction. These *New initiatives* were not goals to be achieved in 2003 but rather priorities to guide the development and delivery of the Sector's sustainability strategy. The new initiatives identified were:

1. To engage the whole supply chain in delivery of the Strategy
2. To inform decision makers about what is important for sustainable steel construction
3. To ensure that new initiatives align market solutions with national priorities
4. To establish the means to measure and report progress.

Progress achieved against these initiatives is summarised in Appendix B.

Hydrobarrier – Sustainable piling solutions

Corus Hydrobarrier has received recognition for its outstanding commitment to the environment with a commendation in the Business Commitment to the Environment (BCE) Awards for providing a sustainable solution that allows developers to maximise building land space and to remediate brownfield sites permanently, even when surrounding land remains contaminated. Hydrobarrier attracted the attention of the Awards judges for the design, supply and installation of a steel contamination barrier on a brownfield site in Cambridge.



Hydrobarrier provides a single point of responsibility for the design, supply and installation of sheet piling for sealed retaining and containment structures. It has a short lead time, can meet time constraints and the installation can be virtually noise and vibration free when necessary for working in residential areas and within close proximity to surrounding structures. Hydrobarrier is also dependable where safety, strength and water tightness are vital to the project.

See www.hydrobarrier.com

4.2.1 Supply chain engagement

It is clear that no industrial sector, or part of a sector, can expect to advance the sustainability agenda in isolation. Economic growth, community involvement, environmental protection and resource use all involve commercial organisations in interaction with others.

Steel construction supply chains are long and comprise many diverse organisations many of which are SMEs. It is recognised that the parties involved in the development of this strategy and pioneers within the sector, need to engage all of the steel construction supply chain to improve the sustainability credentials of the sector.

Specific steps identified for action are:

- adoption of environmental reporting
- establishment of an internal sector sustainability pioneers group
- supply chain reporting.

Progress achieved by the Sector in 2003 has included:

- the introduction of Steel Construction Certification Schemes for environment and health and safety management for steelwork contractors
- the development and introduction of an internet-based suppliers assessment system by Corus.

More information is provided in Appendix B.1.

4.2.2 Informed decision-making

Clients and their professional advisors develop their design solutions based on the knowledge and experience they have acquired and information that is available from publications, the internet, advisory services and discussions with potential suppliers. It is imperative therefore that the information provided on sustainable development is objective and of the highest quality.

Specific steps identified for action are:

- provision of accurate information for more sustainable design
- increased appreciation of recyclability
- improved selection of responsible contractors.

Progress achieved by the Sector in 2003 has included:

- ongoing development of a comprehensive LCA model of buildings (to be completed in 2004)
- detailed LCA and whole life costing studies of organic-coated steel roofing and cladding products
- completion of two major projects investigating the flow of iron and steel through the UK economy.

More information is provided in Appendix B.2.

4.2.3 Aligning solutions with priorities

The secret of success of mixed economies is to ensure that beneficial market mechanisms are mobilised in a way that supports wider national priorities. The objectives of commerce and government need to be aligned. Commercial organisations in the sector need to develop market solutions that address sustainability issues. Government agencies need to be kept informed of what regulatory objectives industry can realistically meet.

Specific steps identified for action are:

- sustainable market solutions
- practicalities for greater reuse
- dialogue with government and stakeholders.

Progress achieved by the Sector in 2003 has included:

- the launch of several new steel construction solutions that contribute to more sustainable construction
- ongoing dialogue with government and other, relevant stakeholders.

More information is provided in Appendix B.3.

Extending building lifetimes through refurbishment

Reflecting the importance of refurbishment in extending the life of buildings Corus has established a specialist refurbishment business.

By refurbishing and renovating buildings, greater value is extracted from the resources invested in them. In many instances, the poor aesthetic appearance of building envelopes results in demolition. Refurbishing the envelope extends the life of the building and, in many cases, creates the opportunity to improve the operational energy efficiency of the building.

Corus Refurbishment Solutions (CRS) is a building envelope refurbishment design company, offering a full design and specification service on a wide range of refurbishment system solutions. CRS offers technical expertise in all refurbishment solutions including:

1. Through fix metal profile, insulated over roof system
2. Single ply membrane for flat and pitch roofs
3. Metal standing seam pitched over roof
4. Flat profile and trapezoidal profile over cladding for walls
5. Composite panels for both roofs and walls
6. Flat panel system with 4 edge jointing
7. Flat to pitch framed roof systems
8. Brick facade systems.



Refurbishment of Sterling House, Potters Bar

Sterling House, situated in Potters Bar, Hertfordshire, was a typical 1960's style office block externally clad with a colour particle clad system which was now failing and did not reflect the image associated with building owner, a retirement home building specialist (see inset).

After carrying out a detailed inspection of the building, Corus Refurbishment Solutions recommended the building be reclad with Stratabord – a high specification cladding panel system.

For the Sterling House project, over 500m² of Stratabord with a Celestia® coating in metallic silver with a 70mm board insulation, backed with a standard white enamel lining panel, was installed by CRS approved contractors, over the existing steel framework. New steel window frames together with high specification glazing units were also installed as part of the contract.

To complement the design, light steel infill panels were also integrated into the building envelope to produce a remarkable transformation.

4.2.4 Measuring progress

The Steel Construction Sector Sustainability Committee has the role of coordinating the activities of the various organisations active in the provision of steel construction products and services with respect to this strategy. The Committee also undertakes to engage with relevant NGOs to seek their input to the development and delivery of the strategy. As the body responsible for implementing the strategy, the Committee will continue to review its constitution and terms of reference to meet the needs of the Sector and the evolving sustainability agenda and has undertaken to review and report the progress towards the agreed sustainability objectives of the sector on an annual basis.

Three specific steps identified for action are:

- review of ongoing initiatives
- measurement of awareness
- development of measurable targets.

Progress achieved by the Sector in 2003 has included:

- regular review of progress by the SCSSC
- two construction industry surveys of attitudes to sustainable construction and steel
- (ongoing) development of two sets of key performance indicators, one for steel producers and one for steelwork contractors.

More information is provided in Appendix B.4. Conclusions from the surveys are reported below.

Conclusions from the surveys of construction designers and specifiers

Overall the surveys found that although respondents felt that sustainability will become a major issue in building design in the future, today it is not a major factor influencing decision-making on most construction projects.

Against most sustainability credentials steel is regarded by respondents to the surveys as significantly better relative to other materials. However it is noted that steel is perceived to be less good, compared to other materials, when the operational energy efficiency of buildings are concerned.

Steel's most positive sustainable construction credentials are its recyclability, its structural efficiency and its demountability. Steel's most negative credentials relate to energy consumption, both embodied and operational, and the overall environmental impact of the material. Given the importance attached to global warming and carbon reduction, these negative credentials could be significant factors that could influence future construction material selection.

4.3 Other, relevant, rolling initiatives

In addition to the progress reported above and in the Appendices, there are many other, ongoing activities supported by the sector that help to promote more sustainable construction. Some of these are summarised below.

4.3.1 Skills development

Education

The sector recognises the importance of education and training for skills development of both direct employees in the sector and those who specify and design steel construction. 2003 saw a continued commitment of the sector to skills development. Highlights of the year are summarised below.

In 2003, SCI's Education Group ran 54 courses throughout the UK and Ireland for over 1100 delegates.

In addition, SCI's Sustainability Group ran a series of in-house CPD seminars for architects and engineers specifically on sustainable steel construction. In 2003 some 25 seminars were delivered to practices across the UK.

SCI has supported the appointment of a new Professor of Building Systems at the University of Surrey. This is in addition to existing, Corus-sponsored professorships at Sheffield and Oxford Brookes Universities.

Corus Colors offers RIBA-accredited and bespoke CPD seminars. In 2003, in association with the Architects Journal, they organised a successful and well-attended series of 10 seminars on sustainable steel envelope solutions.

Corus Construction and Industrial also organise and host a series of seminars on topical construction issues. In 2004, 18 events and course are planned throughout the UK, including three sustainability seminars.

Conferences

The sector organises and participates in many construction and sustainability conferences. Two highlights of the year were:

In April, the British Stainless Steel Association (BSSA) hosted their annual conference *Stainless Solutions for a Sustainable Future* at the Magna Science Adventure Centre in Rotherham. The two-day conference attracted 145 delegates from the UK and Europe and addressed a broad range of issues including energy, human and environmental health and sustainable policy in action.



Delegates exploring the Magna Centre at the BSSA 2003 conference

The *Steel Buildings Conference* and exhibition was held in London in November 2003. The event covered all aspects of steel construction including design, fabrication, erection, health & safety, etc.

In addition, the BCSA has committed to holding an annual health and safety conference or seminar to encourage improvement and the maintenance of high standards of health and safety among steelwork contractors.

Sector award schemes

The sector continues to sponsor a number of prizes, bursaries and award schemes designed to encourage innovation in steel construction.

The *Structural Steel Design Awards* were introduced in 1969 and are co-sponsored by Corus, The British Constructional Steelwork Association and The Steel Construction Institute. The awards 'recognise the high standards of structural and architectural design attainable in the use of steel and its potential in terms of efficiency, cost effectiveness, aesthetics and innovation.'

The *Structural Steel Design Awards 2003* were held in June. Awards were given to:

- The City of Manchester Stadium
- The TAG Hangars at Farnborough Airport
- Millennium Point, Birmingham.



The city of Manchester Stadium – 2003 SSDA award winner

The *Colorcoat Building awards* competition is sponsored by Corus, maker of Colorcoat. More than 100 schemes, each featuring paint-coated steel in the building envelope, were submitted to the latest competition. The overall winner is shown below.



The overall award winner of the 12th Colorcoat Building Awards was Warwickshire County Cricket Club Indoor Cricket Centre, Edgbaston by David Morley Architects and Bryant Priest Newman Ltd

The Corus-sponsored *Steel Design Undergraduate Awards* were held in July 2003. Prizes were awarded to teams from 14 universities under the categories of structural steelwork, piling and bridge design and architectural design.



Steel Design Undergraduate Awards 2003

4.3.2 Other activities

The sector is actively engaged in a range of research activities aimed at improving the sustainability of steel construction. Progress on many of these initiatives, that were set down in *Building a Better Future*, is reported in Appendix A. Here we highlight some new, additional research initiatives that the sector has been involved in over the last year.

The SCI and Corus, in partnership with other European organisations, have recently started a European Coal & Steel Community project that has the objective of developing systems, components and assessment tools that will assist in the design and construction of more energy efficient buildings.

The SCI has also been awarded two large European projects, STEEL and SEFIE. STEEL stands for *A Supranational Tool for Enhancing the Eurocodes on-Line* and is a 4 million Euro project being funded under the EU eContent Programme.

SEFIE stands for 'Steelbiz as an e-Forum for Implementation of the Eurocodes for Steel Construction'. It is a Eureka-funded project primarily concerned with the extension of Steelbiz, SCI's online technical information system, to create, demonstrate and deploy an effective IT system for Eurocode implementation.

The SCI is increasingly involved in R&D projects involving the waste management of composite steel products. Funding for these projects has come from landfill tax credits and the Waste and Resources Action Programme (WRAP). Notable examples of projects either completed or underway in 2003 include:

- A DTI and Biffaward-sponsored project investigating the barriers to recycling composite roof and cladding panels.
- A Biffaward project into cryogenic tyre recycling for steel and rubber recovery.
- A WRAP-funded project to encourage recycling of architectural (flat) glass, especially where composited with steel, aluminium and other materials in frames and other components.
- A WRAP-funded project with the aim of promoting recycled paper (cellulose) insulants in metallic/modular construction products.

Full details about these projects are available from SCI's Sustainability Group.



The Kingston Upon Hull Community Stadium is the centrepiece of Hull's massive urban regeneration programme. The stadium was a 2003 finalist for the Prime Minister's Better Public Building Award.

5 The Sector's agenda for 2004

Section 4 of this report demonstrates the significant progress already made by the Sector during 2003 in implementing its sustainable development Strategy. More remains to be done however and it is recognised that a long-term commitment is required to deliver the objectives of the Strategy throughout the entire supply chain.

This commitment exists, particularly in the signatory organisations to the Strategy and leaders within the Sector, however the challenge remains to engage more, and in time, all of the supply chain. As with many sustainable development aspirations, delivery of the objectives takes time and is frequently resource constrained.

Many organisations within the Sector, particularly steelwork contractors, remain committed to implementing the Strategy however in relatively difficult trading conditions, attention is naturally focussed on economic survival rather than sustainable development. Furthermore, many organisations are reporting that health and safety is the dominant sustainability issue leaving few resources to invest in new initiatives, such as environmental reporting, which are not seen as high priority by their customers.

Many existing initiatives described in *Building a Better Future* are ongoing and will continue, subject to a regular review for relevance by the SCSSC. Examples include:

- skills development both for direct employees in the sector and for those who specify and design steel construction including education and CPD
- award schemes to promote the innovative and effective use of steel in construction
- development and implementation of best practice on the design and safe manufacture and erection of steel construction
- research and development into key sustainability issues of relevance to the Sector
- development and dissemination of information and decision-support tools for designers of steel construction
- development of innovative products and solutions to meet specific sustainability challenges.

The SCSSC will continue to be the body responsible for leading the implementation of the Sector Strategy. The Committee will continue to meet regularly to review and report progress, to represent the Sector on relevant issues in dialogue with Government and other stakeholders and to set the agenda on behalf, and in collaboration, with the Sector.

Building a Better Future set out a number of new targets for the sector. These initiatives were not goals to be achieved in 2003 but rather priorities to guide the development and delivery of the Sector's sustainability strategy. The initiatives identified were:

1. To engage the whole supply chain in delivery of the Strategy.
2. To inform decision makers about what is important for sustainable steel construction.
3. To ensure that new initiatives align market solutions with national priorities.

4. To establish the means to measure and report progress.

Progress has been achieved on many of these initiatives during 2003 and they remain important, long-term goals for the Sector.

The SCSSC remains committed to implementing the Strategy in 2004. The future agenda for implementation includes:

- continuation and completion of the ongoing initiatives reported in Appendix A
- working towards delivery of the new actions set out in Appendix B
- ongoing engagement in dialogue with government and other stakeholders
- ongoing encouragement and promotion of innovation in steel construction
- engagement of the steel construction supply chain on sustainable construction issues
- regular review and reporting of progress
- dissemination of high quality information in support of more sustainable construction.



Installing photovoltaic panels on Newcastle University's new, six-storey flagship Devonshire building. Home to the Environmental and E-science Research Centre, the design of the steel-framed building incorporates many sustainable design features and is the first University laboratory in the country to achieve the BREEAM 'Excellent' rating.

Appendix A - Progress achieved with ongoing initiatives

Building a Better Future outlined 25 key initiatives that were already underway (in December 2002) to help deliver more sustainable steel construction. They comprise:

- research and development projects undertaken by the sector
- best practice initiatives for steelwork contractors and product manufacturers
- dissemination of design guidance through education and CPD.

Here we summarise progress achieved with these initiatives in 2003.

Key objective: Maintenance of high and stable levels of economic growth and employment

Initiative: Improved use of e-working (BRE/BCSA METIS Project)

Objective: To develop software to interrogate a 3-D product model of a steel structure for compliance with the expanded requirements of the National Structural Steelwork Specification for data exchange from scheme designer to detail designer, and to generate a list of non-compliances as the basis for the issue of an automated list of Requests for Information [RFIs].

Progress: After a period of some turbulence, greater urgency has been injected into the software production. There has been substantial progress towards the provision of a complete system to demonstrate data transmission at the Steel Buildings Conference in Nov 03. The system will undergo test cycles until the end of the year, and then 'tweaking' in 1Q04 to meet the users requirements and observations.

Initiative: Economic implementation of Eurocodes

Objective: To provide information to engineers on the changes to structural steelwork engineering design resulting from the introduction of Eurocodes in 2004 in order to:

- minimise the resources needed in engineering offices
- produce durable designs which employ the most economic use of materials.

Progress: The new codes will be introduced in 2004. Proposals have been accepted by DTI in the UK and the European Commission for the SEFIE/STEEL projects to derive guidance information and provide an electronically accessed resource. The project started in Autumn 2003.

Initiative: Better long term efficiencies from product re-use: SCI/Corus Landfill Tax Credit project: Market Transformation for Adaptable Re-usable Buildings and Components.

Objective: To explore the technical and economic feasibility of reusing steel construction products.

Progress: This project involved in-depth interviews with a number of organisations within the construction industry to establish the barriers to the wider adoption of adaptable reusable buildings. In parallel to this, limited environmental and economic assessments of different frame and floor systems were undertaken to quantify the benefits and disbenefits of systems which are inherently more reusable. The draft final report has been prepared and ways of further extending reuse of steel construction products are being explored.

Initiative: Efficiency gains from more accurate assessment of fire risks (European joint research programme into fire risk assessment and natural fires)

Objective: To investigate how risk is created in fire, the contributory causes and put forward proposals to reduce fire protection where it is not necessary (and increase it where necessary). It is aimed predominantly at low-rise buildings.

Progress: In 2003, initial work has been done. Computational fluid dynamics has been identified as a powerful tool and is being used to assess fire risks. Both Corus Research and the Steel Construction Institute are working closely together.

Programme: It is hoped to put the first proposals forward in 2004 with completion in 2005.

Initiative: Financial best practice for SMEs (BCSA Financial Handbook for Steelwork Contractors)

Objective: To produce and distribute a financial handbook tailored to the needs of management within the steelwork construction industry. The project output would provide a vital *vade mecum* to guide management towards greater financial understanding and improved company profitability.

Progress: The handbook has been completed and published. A copy was sent to every member of the BCSA, with the recommendation that additional copies be purchased to meet the needs of the member companies. The handbook is available for purchase, by members and non-members alike, from BCSA Publications.

Initiative: Standard reference document for steel construction in fire (dti Partners in Innovation project)

Objective: To protect the work done to develop resource efficient methods of achieving structural fire protection in the face of onerous European standards.

Progress: Broad principles of how to take the project forward have been agreed. Steering committees have been set up and industry support has been widespread.

Programme: It is hoped to complete the project in 2005.

Key objective: Social progress which recognises the needs of everyone

Initiative: 'City of Tomorrow' review of the future prospects for steel in housing, urban redevelopment, transport, water supply, renewable energy sources, etc.

Progress: Corus is developing its City of Tomorrow programme as the vehicle for engaging with stakeholders to explore solutions that will help customers deliver sustainable urban development worldwide. Following an initial review of opportunities, during 2003 Corus has worked with partners on two UK projects to address the key issues of water efficiency and construction waste.

Water efficiency

To understand the potential for water demand management better, Corus has worked with Mandix consultancy on a project focused on Water Efficiency in Hotels based on a sample of hotels in Wales.

The project has added to water industry knowledge about the opportunities and economics of integrating water efficiency products into built environments as an alternative to the financial, social and environmental impact of supply infrastructure.

In addition to promoting the supply and installation of water efficiency devices by SMEs in construction the project has identified benchmarks for performance, best practices and a decision tool for hoteliers, their professional advisers, water suppliers and water industry regulators.

Following peer review the project was accepted as a case study for dissemination as part of the best practice scheme forming part of the UK Constructing Excellence initiative. A number of guides and case studies have now been made available through the Environment Agency.

Construction Waste Reduction

In addition to the potential for steel to help improve materials productivity through offsite manufacture of construction components and modular buildings, steel solutions provide options for minimising waste from, and integrating recycled materials into, construction supply chains to urban developments worldwide.

To improve understanding of the opportunities, during 2003 Corus has joined Biffaward, ICE, Royal Bank of Scotland and NHBC in sponsoring a CIRIA construction waste reduction project with Viridis.

The project is to provide practical and realistic guidance to the construction industry – both at the design and site level – on how they can minimise the depletion of natural resources through use of recycled materials.

Initiative: Development of a Sector Skills Council [SSC] leading to a fully qualified workforce (Metals Forum/Metskill Joint Proposal for Sector Skills Council)

Objective: To establish a Government-recognised body to represent and support the skills and performance development needs of employers within steelwork construction.

Progress: In 2002, the Government brought to an end its recognition of the National training Organizations. However, though a few SSCs have been approved, the requirement that they represent very large numbers of workers has demanded significant 'horse trading' between sectors to agree representative SSCs.

Until April 2002, MetSkill was officially recognized as the National Training Organization for the metals sector. Though no SSC has yet been established for this sector, BCSA has backed Metskill continuing to represent and support the skills and performance development needs of employers in the steel construction sector. From April 2004, it is expected that MetSkill will operate as part of the SEMTA SSC. It has been agreed with SSSA that under this arrangement skills activity including Standards development specific to the metals industries will continue to be undertaken by MetSkill.

Initiative: Expansion of the work of the BCSA H&S Group on best practice guidance on Erection of steel-framed buildings

Objective: To provide best practice guidance for clients, planners, principal contractors and steelwork contractors to understand the methods that should be adopted, the possible risks and the precautions that should be taken to eliminate or control those risks, in the erection of steel-framed buildings.

Progress: In July 2002, the BCSA Health and Safety Group, in conjunction with the National Steelwork Contractors Group, identified several elements of the sector's activities that would benefit from the establishment of best practice guidance. Later that year, work began on the preparation of five best practice guides [BPGs] to cover the erection of low rise buildings, high rise buildings, bridges and metal decking, and the preparation of task specific method statements [TSMSs].

The standard TSMS proforma was launched nationally in July 2003. The remaining four publications are all in preparation, and it is anticipated that two, and possibly all four will be completed by the end of 2003.

Initiative: In-house, CPD sustainability seminars for architects and engineers.

Objective: To disseminate state-of-the-art knowledge on sustainable steel construction and to obtain feedback from practitioners.

Progress: In 2003, more than 25 seminars and events have been held at which sustainability experts from SCI have delivered presentations on a range of topics including:

- an introduction to sustainability and environmental issues
- steel and sustainability
- life cycle assessment
- recycling and reuse within the construction industry
- thermal mass and its application in commercial buildings
- the environmental performance of light gauge steel frame housing.
- the affect of the amendments to parts L & E of the Building Regulations on light gauge steel frame housing
- modular construction
- water-cooled slabs.

Programme: This initiative is an ongoing, rolling programme of seminars. The target is to deliver between 20 and 30 seminars and presentations each year. It is hoped that these seminars will be RIBA CPD-accredited in 2004.

Initiative: Steelbiz technical website

Objective: To provide an easy access facility for guidance and advisory services on the uses of steel in construction.

Progress: All of SCI's information in its formal publications are now available through Steelbiz and new publications are added when they become available. In addition, advisory desk articles from New Steel Construction are held and are searchable. Four CPD PowerPoint lectures with voiceover are available.

The Steelbiz system continues to be updated and further resources added.

Initiative: Establishment of a BCSA annual health and safety conference or seminar.

Objective: To encourage improvement and the maintenance of high standards of health and safety among steelwork contractors.

Progress: Health and safety has become the dominant aspect of sustainability within construction, and particularly steelwork construction. Not only is good health and safety important for the well being and effectiveness of the workforce, it is seen as a measure of company quality and ability, is demanded by clients, is extremely cost effective and is essential for companies to achieve viable employers liability insurance.

In addition to the five best practice guidance being developed by the health and safety group, direct discussions have been established with the Health and Safety Executive to produce effective means of safely loading and unloading steelwork. Likewise, the BCSA is taking an active part in helping to shape the new HSE Work at Height Regulations and national regulations implementing the EC Physical Agents [Noise] Directive and the Physical Agents [Vibration] Directive.

These and other health and safety matters are in the forefront of the discussions and presentations at the annual health and safety conference/seminar.

Initiative: Establishment of CSCS Steel Erector and Steel Fabricator Skills Cards

Objective: To help achieve a fully trained and assessed on-site workforce in steel construction.

Progress: After prolonged negotiation with the Engineering Construction Industry Training Board [ECITB], the Construction Industry Training Board [CITB] and the Construction Skills Certification Scheme [CSCS], on 6 Jan 03, CSCS/BCSA skills cards were established for steelwork erectors at NVQ3 level and for steelwork fabricators at NVQ levels 2 & 3. Work is continuing to set up the appropriate Level 2 NVQ qualification for steel erectors. In addition, discussions are taking place with tertiary education authorities with a view to greatly increasing the availability of training facilities for steelwork erection. This initiative could go a long way to solving the sector's long-term problem in recruiting and retaining skilled steelwork erectors.

Key objective: Effective protection of the environment

Initiative: Environmentally Friendly Coatings

Objective: To develop alternatives to chromate pre-treatments for strip products.

Progress: Corus is actively working towards the production of chromium-free organically coated strip (OCS) products for the construction, domestic appliance and electronics markets. Over the past year, extensive laboratory trials have been performed on a range of Cr-free pre-treatments, using various combinations of primers and topcoats, with encouraging results.

In the early part of 2003, pilot line trials were undertaken at Myriad, France, to gain experience of the production and performance of these products under more realistic conditions. Full-scale line trials were also performed at Tafarnaubach and samples were obtained for durability testing. As a result of this work, in early 2004, it is hoped to switch at least some of the production at Tafarnaubach to Chromium-free pre-treatments.

Programme: Work will continue into 2004 to provide Cr-free solutions for all of Corus Colors Strip Products. This will include more pilot and line trials and long-term durability testing where appropriate.

Additional Information on Environmentally Friendly Coatings

A number of Corus Business Units are working on technologies to reduce VOC emissions from their own coating processes or to provide data that will encourage Industry to move towards low VOC coatings. For example, Corus Colors are researching low or zero VOC application technologies whilst Corus Construction and Industrial is collaborating on an ECSC project, with ProfilArbed, to provide performance data on water-borne or high solids coatings for general steel construction applications.

Initiative: Development of life cycle assessment decision support tools for designers

Objective: To develop a full, transparent cradle-to-grave LCA decision-support tool for designers, within the construction industry. The model will include information on raw material extraction, manufacturing, assembly, use of building, and various end-of-life scenarios.

Results will be available in a recognisable form, to allow designers to assess the overall environmental impact of buildings.

Progress: A joint European project is being undertaken to produce a generic LCA model. A skeleton model has been constructed in Ecobilan Team software, which will allow the development of a generic building model to take place. Data have been collected which is being used to flesh out the skeleton model.

Programme: The initiative is ongoing. Further data collection is continuing, as well as data conversion from various sources into the Team data format.

Initiative: Development of innovative products and construction technologies including integrated services and structural flooring systems, prefabricated offsite systems and light steel framing.

Objectives: To provide the resources and manufacturing and construction capacity needed to meet the national needs for sustainable construction systems.

Progress: The number of companies working in the area of off-site manufactured systems for domestic, hotel, educational and health markets is growing steadily. The number and impact of the companies was demonstrated by their presence and the range of exhibits at the BRE Offsite 03 exhibition and conference.

The developments have been assisted by the dissemination of the following case studies and publications: Rapid dry envelope; Better value in steel: hospitals and health buildings; Multi-storey residential buildings using *Slimdek*; Energy efficient housing using light steel framing etc.

This sector of work continues to grow and is essential if government targets for more and better affordable housing are to be met.

Initiative: Greater use of prefabrication to move work off-site to more controllable conditions

Objectives: To extend the high levels of off-site work in structural steel construction for commercial and industrial markets to the traditionally site-based operations in the domestic market.

Progress: This work is complementary to the previous initiative. Guidance and awareness material showing the benefits for clients and specifiers has been disseminated in publications such as: Better value in steel: light steel framing in renovation; Modular construction using light steel framing: Residential buildings; Building design using cold formed sections: Light steel formed sections: Light steel framing in residential construction.

Initiative: Practical input on the development of the EPA Regulations (BCSA EPA Group Liaison with Regulators)

Objective: To provide practical input by the steelwork construction sector into the outline and detail of environmental protection regulation and guidance, to ensure that the interests of the community and the sector are both taken into account in the management of the environment.

Progress: BCSA continues to provide representatives at the working group that is re-developing the regulations and guidance for the coating of steelwork. However, progress has been spasmodic, with the Environment Agency having to withdraw a much-worked on draft in the face of requirements from more commonality of style, substance and detail with other environmental protection guidance and regulation.

Initiative: Guidance on economic solutions to meet Part L of the Building Regulations

Objective: To provide designers and specifiers with the necessary information to design cladding and light steel walling systems to fully comply with the energy saving regulations in Part L of the Building Regulations.

Progress: Technical guidance publications have been produced setting out the methods to be used to complement the BRE Information Papers. These publications cover: Energy efficient housing using light steel framing; Design of twin-skin metal cladding and Metal cladding: U value calculations.

Initiative: Extension of good practice design guides to encompass eco-design ideas.

Objectives: To bring new ideas forward to assist specifiers in understanding how steel structures and systems can contribute to energy conserving designs.

Progress: SCI and Corus RD&T in partnership with European organisations have commenced a European Coal and Steel Community project known as Energy Efficient Buildings in Steel. SCI, Corus and BCSA, with funding assistance from the DTI, have researched how the sustainability agenda is influencing clients' decisions on the design and procurement of buildings. The findings of the study are summarised in the booklet 'Achieving Sustainable Construction – A guide for clients and their professional advisers'.

Key objective: Prudent use of resources

Initiative: Technologies for cost-effective recycling of steels coated with zinc, organics or panels filled with organics.

Objective: To develop technologies for cost-effective recycling of steels coated with zinc & organics and panels filled with organics.

Progress: With an increase in pre-painted steel cladding for buildings since the 1970's, it is expected that increasing amounts of pre-painted steel will enter the scrap chain and become available for recycling as buildings reach the end of their life.

Studies have shown that coating removal is feasible, using a combination of shredder and wet-chemical de-coating stages, but these would require capital investment, consume energy and generate waste streams that would require further treatment.

Recycling of coated steels, via the BOS furnace, offers a cost-effective solution for recovery of the steel. Trials have been carried out to determine if the presence of PVC, within the plastisol coating, could increase the formation of undesirable volatile products (e.g. dioxins). Measurements have shown that the addition of pre-painted steel to the BOS furnace (in amounts up to 9.5 tonnes) does not have any significant effect upon these emissions and they are well below the tight limits set by the European Waste Incineration Directive.

Programme: Similar evaluation trials are planned for steels produced by the EAF steelmaking route.

Additional Information on Composite Panels

Whole composite panels are not suitable for charging directly to the BOS furnace and, therefore, the coated steel outer sheets would need to be mechanically removed from the panels, before they can be charged to the furnace.

Initiative: Encouragement of solutions using less applied fire protection (European joint research programme into the behaviour of multi-storey steel framed buildings in fire)

Objective: To develop and disseminate methods of design of steel-framed buildings that reduce or remove the need for passive fire protection.

Progress: Initially slow but accelerating as designers become more familiar with the process. Very widely used by large fire engineering consultancies. Also beginning to be used abroad. Initial discussions have taken place with European fire committees to encourage its use in major European markets.

Programme: Ongoing dissemination and promotional programme.

Initiative: Less resource use in structure and foundations from light steel and modular construction solutions.

Objectives: To encourage clients and specifiers to adopt more resource efficient solutions and for suppliers to adopt best practice.

Progress: Continued working with the SCI Light Steel and Modular Framing Group. Participation in ECSC project – Steel in Residential Buildings for Adaptable and Sustainable Construction. Publication in paper format of case studies and website www.steel-sci.org/lightsteel.

Initiative: Encouragement of market mechanisms to facilitate the re-use of steel.

Objectives: To maximise the opportunities for resource conservation from the potential for re-using steel components.

Progress: Building on the current position of 84% recycled and 11% re-used of steel from demolition sites through representation on Steering Groups for projects with BRE, CIRIA and the University of Surrey.

Reductions in Use of Resources for Corrosion Protection

Better specifications and work by paint manufacturers towards increased coating durability to reduce whole life cycle costs have contributed towards reducing consumption of resources by the construction industry.

Modern coating specifications for steel structures, especially bridges, now include fewer coats of high performance paints in compliance with current environmental legislation than in systems previously specified. These reduce the need for subsequent maintenance painting. Additionally the increase in the use of weathering steels, as well as guidance recommending that no corrosion protection is required at all in certain internal environments, has saved resources by removing the need for any form of coating.

Corus is also undertaking substantial Research and Development work to promote the use of environmentally friendly coating technologies. It is currently funding two major European Collaborative projects into the durability of environmentally friendly coatings and the effect of soluble salt contamination on the performance of corrosion protection systems. Additionally, it is funding work on application technologies for low solvent coatings to reduce the environmental impact of its coating processes.

Appendix B - Progress achieved on new initiatives

Building a Better Future set out a number of new targets for the sector to deliver more sustainable construction. These *New initiatives* were not goals to be achieved in 2003 but rather priorities to guide the development and delivery of the Sector's sustainability strategy. The new initiatives identified are:

1. To engage the whole supply chain in delivery of the Strategy
2. To inform decision makers about what is important for sustainable steel construction
3. To ensure that new initiatives align market solutions with national priorities
4. To establish the means to measure and report progress.

Here we summarise progress achieved with these initiatives in 2003.

B.1 Supply chain engagement

Progress has been made through the ***Adoption of Environmental and Health and Safety Reporting*** by steelwork contractor members of the BCSA. The objective of this initiative is to provide independently audited assessments of environment and health & safety performance in steelwork construction.

Progress: The Steel Construction Certification Scheme [SCCS] has instituted schemes covering sector-based environment and health & safety management. These two schemes can be embraced individually or in conjunction with each other and/or the SCCS quality assurance scheme. The SCCS health and safety initiative was launched in mid-2003, and has certified a small number of initial applicants. However, it appears likely that with the current emphasis on health and safety matters, the relevant certification scheme will be taken up more widely. The environmental auditing is less buoyant, and understandably appears to be lagging health and safety.

A second initiative, being led by the BCSA, is to provide a focus for the development and use of sustainability KPIs among steelwork contractors through the ***Establishment of an internal sector sustainability pioneers group.***

Progress: A group of BCSA member companies has provided substantial information in support of the development of draft KPIs for the sector. This group of companies has agreed that it could form a sector pioneers group to refine and, if necessary, extend the development of sector KPIs in future. Unhappily, resource limitations have made it necessary to defer progress on the Pioneers Group at least in the short term. It is hoped, however, that when the pressure on BCSA resources caused by the huge emphasis on health and safety and the operational and financial imperatives of the associated new legislation eases, the Pioneers Group will become more active in the more general aspects of sector sustainability.

The sector is involved with integrated ***supply chain initiatives*** prompted by the Egan Report, and it is now accepted that there is a need to develop sustainability reporting along the supply chain. Organisations within the sector are being encouraged to promote supply chain reporting by developing their own reporting policies.

Corus is the largest supplier of steel to the UK construction industry and has taken the lead on this initiative by establishing an internet-based supplier assessment system to 'green' their supply chain (see box below). Corus expects their suppliers to make formal commitments to environmental protection and to adopt systems and standards in accordance with, or equivalent to, ISO 14001. Rather than just demanding improvements, Corus is working with its suppliers to provide advice and assistance (where appropriate) and is also providing their customers with advice and guidance on the use, recovery and recycling of their products. By doing this, Corus is extending its sustainability commitment down the supply chain.

Corus' Internet-based supplier & contractor assessment system

In order to assess the environmental credentials of our suppliers & contractors and to help 'green' the supply chain, Corus has developed an Internet-based suppliers assessment system. This paperless electronic system automatically scores the answers given to a series of questions. These scores are then weighted to ensure that issues such as persistent non-compliance are recognised and are then given due consideration.

The audit trail starts with the relevant regional Corus supply hub sending the questionnaire to a supplier or contractor supplying goods or services with potential environmental impacts. In addition to general data, those completing the questionnaire are required to answer a series of questions on items such as policy & management, environmental performance, training & awareness, public accountability and auditing.

On receipt of the completed questionnaire with its automatic score, the questionnaire is then sent to an environmental manager to assess the answers in more detail. At this stage, further information may be requested before either accepting or rejecting the supplier/contractor. The supplier/contractor is then informed of the outcome of the assessment.

Based on scores falling within given ranges, various improvement actions are recommended by Corus. A low score can result in a physical audit by Corus if appropriate. However, whilst some suppliers/contractors are rejected, most are encouraged and helped to improve in line with ISO14001, the international environmental management standard. To date over 150 questionnaires have been sent and assessed.

B.2 Informed decision-making

Provision of accurate information for more sustainable design

The principal activity under this initiative is a joint European project, involving Corus with support from SCI, to produce a comprehensive LCA model of buildings. Progress with this initiative is summarised in Appendix A. The LCA software is expected to be completed in 2004.

During 2003, Corus Colors completed extensive life cycle costing and life cycle assessment studies. The findings from these studies have been widely disseminated in a series of 10 seminars held at different locations throughout the UK and Ireland. The results are available from Corus Colors as part of their Insite™ series of publications.



Corus Colors' Insite programme

In addition to the above, Corus, SCI and the BCSA provide an extensive network of technical support for the construction industry. Some of the most relevant initiatives to implementing more sustainable construction are outlined below.

Technical support

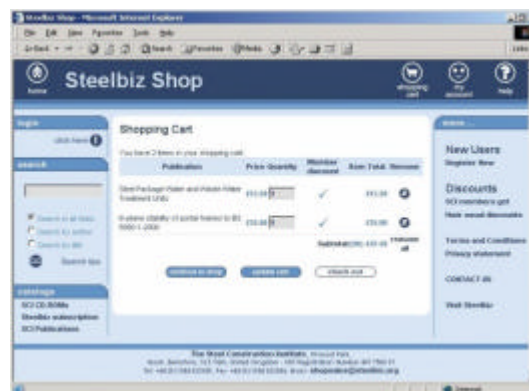
Well-developed codes and standards ensure that steel structures are designed and constructed safely and efficiently. Information and advice to implement sustainable construction, is provided to all parts of the sector through published guidance, continuing professional development and advisory services. This includes comprehensive life cycle assessment data for steel construction products.

In 2003, SCI published 18 new titles taking the total of SCI publications to over 200. Over 900 copies of each new title were distributed to SCI members and other key contacts within the sector during 2003. In addition, a range of electronic information products has been developed.

SCI runs a technical advisory service for its members. In 2003 the advisory desk received over 3,000 requests for advice on a diverse range of issues, including sustainability. Many queries are resolved directly on the telephone or by reference to existing publications. More complex issues may involve a number of SCI engineers

using their particular expertise to reach a conclusion. For complex issues, SCI often prepares advisory desk articles that are published in *New Steel Construction* and on Steelbiz, 10 articles were published in 2003. Major new issues in 2003 include the changes to Parts E and L of the Building Regulations and the use of both cold and hot-rolled steel in residential and hospital accommodation.

First launched in 2002, SCI's on-line technical service Steelbiz has grown, in both content and take-up, during 2003. Steelbiz gives subscribers and SCI members instant access to all of SCI's technical resources which includes publications, advisory desk articles and CPD lectures with voiceovers. It has 3,500 regular, active users and is attracting more than 10,000 hits per day!



SCI's on-line technical service Steelbiz

New Steel Construction is the sector's news magazine. Published six times a year by SCI and BCSA, it is distributed, worldwide, to over 6,500 construction professionals. The magazine contains a mix of technical articles, news and views.

In August 2003, the MCRMA published a leaflet outlining the sustainable construction benefits of composite flooring systems and, in January 2004, the BSSA published a leaflet entitled *Stainless steel and sustainable construction*.

Increased appreciation of recyclability

Steel construction products are highly recycled and are 100% recyclable using existing technologies. All new steel has a recycled content of between 10 and 100%.

The fact that steel construction products can be recycled again and again without any degradation in terms of properties or performance is an important differentiator in construction product selection.

Current global demand for steel exceeds the supply of scrap, necessitating the production of new steel by the BF/BOS steel-making route. While this remains the case, and as construction steel is already nearly 100% recycled, there is no net environmental benefit in specifying a minimum recycled steel content.

For products, like metals, that are recyclable into new products with the same properties, the end-of-life recycling rate is the more important sustainability indicator and should be used in preference to the recycled content when assessing the credentials of construction materials.

There are many misconceptions concerning recycling and therefore the sector is seeking to increase the understanding and appreciation of recyclability.

Progress towards this goal has been achieved in 2003 via articles in academic journals and industry publications and through CPD presentations and seminars.

The understanding of steel recycling within the construction sector has been underpinned and enhanced by two significant research studies completed in 2003:

- A material flow analysis of iron and steel within the UK economy undertaken by the University of Surrey with input from Corus and SCI.

- A three-year, post graduate project investigating the flow of steel through the UK construction industry. For the first time this project has quantified recycling rates of steel construction products (see the table below).

	Structural sections	Purlins and rails	Cladding	Composite floor decking	Rebar	Internal non structural steel
Recycling (%)	86	89	79	79	91	85
Reuse (%)	13	10	15	6	1	2
Landfill (%)	1	1	6	15	8	13

Re-use and recycling rates of steel construction products

In addition, Corus are involved in international recycling research activities, through the International Iron and Steel Institute. Corus has also committed to support an industry working group in 2004 that will address issues associated with recycling and reuse within the construction industry.

Improved selection of responsible contractors

The holistic approach that sustainability demands favours the use of partnering and the sector aims to actively encourage this practice. Although the Sector is committed to the broader partnering initiatives recommended by Constructing Excellence, no significant progress has been achieved in implementing this target in 2003.



Raines Court is the largest affordable housing project to be built in the UK using modular construction. Located in Hackney, London, this six-storey apartment block comprises 61 shared-ownership flats aimed at key workers and local people. Built from scratch in just 50 weeks, Raines Court was constructed from 127 steel modules 3.8m wide by 9.6 to 11.6m long that were craned into position, on a busy and restricted-access city centre site, in just four weeks. The modules, complete with all fixtures and fittings, kitchens, bathrooms, plumbing and heating, were manufactured off-site by Yorkon while foundations were concurrently laid on-site. High levels of acoustic and thermal insulation were fitted to the modules in the factory to ensure occupier comfort and energy efficiency.

B.3 Aligning solutions with priorities

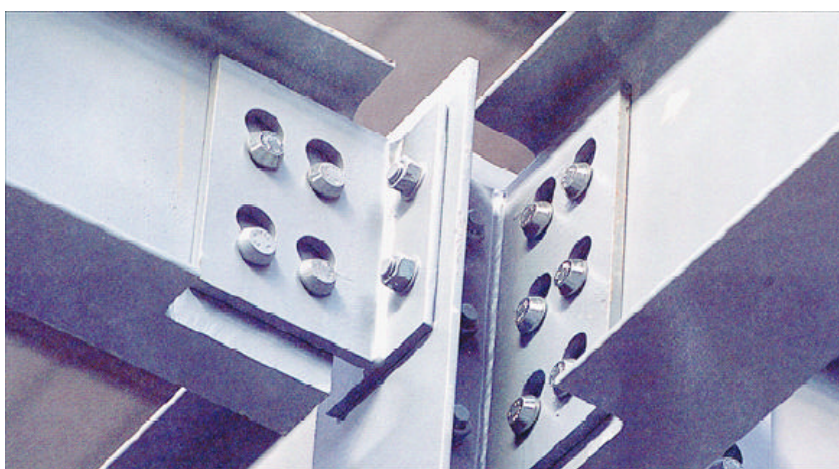
Sustainable market solutions

More sustainable construction requires new solutions and steel's versatility makes it the ideal material to innovate in the built environment. Clients and designers are looking for new, cost effective systems and products and the sector is responding. A number of new solutions have come to market in 2003 and many more are in the developmental stage. Here we report some of the highlights from 2003.

Quicon

SCI has developed a new, steel frame connector Quicon that was used for the first time in 2002, to construct a 1650 m² mezzanine floor within a warehouse unit in Dartford. Using the system, the steelwork contractor, Caunton Engineering, achieved a 50% reduction in the construction programme, compared with traditional methods.

The Quicon system includes a slotted T-piece which is welded to the main column or beam in the factory. On site, the T-piece is attached to the supporting beam or column via a series of short studs attached to the beam.



The Quicon system

Since the Dartford pilot project, SCI has undertaken further testing in collaboration with the University of Salford, to develop design guidance. In September 2003 the Quicon design guide was completed for issue, under licence, to steelwork contractors. Caunton Engineering has taken the first licence.

Quicon brings a number of sustainability benefits to steel construction:

- Standardised components are easy and fast to manufacture and help to promote the demountability and reuse of the steelwork.
- Erecting steelwork using Quicon is faster, safer and cheaper. A shorter construction programme lessens the local environmental and social impacts of construction, such as noise, dust and traffic congestion.

Living Solutions

Responding to the need for more affordable homes, Corus has invested £4m in a new business producing factory-built modules in North Wales.

Corus Living Solutions uses advanced automated assembly techniques, commonplace in the automotive industry, and has the capacity to produce 3000 units a year, providing a step change in the volume of modular housing available in the UK market. Restricted manufacturing capacity is seen by many as one of the primary barriers to more widespread use of modular construction by house builders and others.

A number of prototype buildings were built at Shotton, North Wales during 2002 and, in June 2003, Corus Living Solutions started its first major project to deliver fully fitted out, high-quality modules for a new accommodation wing at Ashorne Hill Management College in Warwickshire. Construction work was completed at the end of 2003.



Living Solutions at Ashorne Hill Management College, Warwickshire

Off-site manufacture brings many sustainability benefits that include:

- fast, cost effective construction
- predictability of time and cost
- high product and build quality
- social benefits of factory working (as opposed to itinerant site working).

Corus Living Solutions will initially focus on meeting demand for affordable homes but also has future plans to provide accommodation units for health, education and hotel sectors. Many clients in health and education sectors have already experienced the benefits of off-site construction and are committed to continuing down that route. The business will provide design services as well as the manufacture and delivery of fully fitted-out accommodation modules to site.

Advanced coatings technology

Organic-coated, light gauge steel construction products continue to grow in popularity in the UK, particularly for external envelope applications. Corus are working with coating manufacturers to develop new, more advanced and more sustainable products. Two important developments during 2003 are outlined below.

Isoclاد PCM

Corus, in collaboration with Liquid Plastics, has developed a new, water-based paint system for over-coating pre-coated metal cladding. Isoclاد PCM is an ultra-low VOC content coating provides a durable, hard-wearing and attractive finish. It is available in a wide range of colours and a colour-matching service is available. The coating system is guaranteed for 10 years.

VOCs, (volatile organic compounds) evaporate as the paint dries and can contribute to the formation of low level ozone which in turn, can cause smog. Isoclad PMC can be used to extending the life of buildings through over-coating, while minimising the impacts of VOCs on the environment.



Isoclad paint system

Assure

Corus, in partnership with Microban International Ltd, has developed Assure™, an innovative pre-finished metal product for preventing and controlling the spread of harmful bacteria in applications where good hygiene is critical, such as the food industry, heating, ventilation and medical environments.

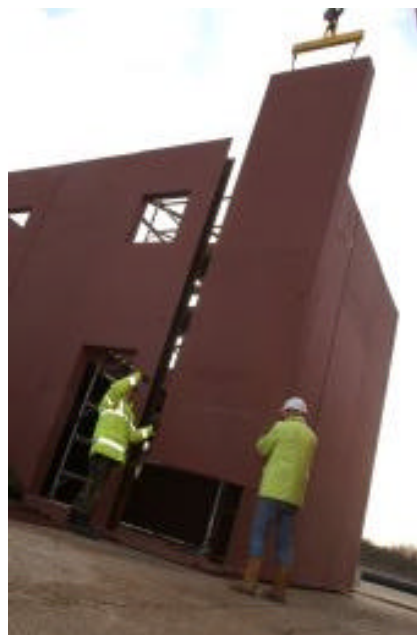


Assure has been used to help create the world's first internal anti-bacterial industrial factory in Southall, London. The factory, the largest ethnic cuisine food factory in Europe, consists of both a large cooking area and a high-risk packing area and totals nearly 76,000 square feet excluding warehouse and other facilities.

The manufacturing areas within the unit are clad with Assure technology on the walls and ceilings combined with an anti-bacterial industrial flooring system. Thus providing an holistic anti-bacterial solution.

Surefast – High security, blast-resistant building system

Surefast is a new, off-site manufactured system, developed by Corus, for the rapid construction of blast-resistant structures.



Surefast provides effective protection against the threat of terrorist and criminal attack, military action, or industrial hazards. Applications include the building superstructure and core, defence installations and certain industrial applications.

The system uses modular *Bi-Steel* technology, a steel and concrete hybrid system, and simple connections. This makes Surefast structures fast to build as well as providing unrivalled protection and security.

For more information see
<http://www.corusconstructionandindustrial.com>

Innovative, modular rail system

Corus Rail Modular System offers a uniquely versatile product and design solution for the delivery of passenger railway platforms and platform extensions. In February 2003, Corus Rail was awarded the Rail Engineering Excellence award for the innovative railway platform.

The product comprises a steel framed system that draws on the benefits of general modular construction. All components used can be manually handled into place and are standardised so that they can fit together to produce a product that remains flexible in all dimensions, meaning that the system can be adapted to fit the majority of onsite conditions.

The modular platform offers many sustainability benefits:

- construction is fast, reducing time on site which gives safety and disruption benefits in addition to being cost effective
- the system is pre-designed and pre-approved, avoiding costly 'one-off' designs
- the system is lightweight, reducing the foundation requirements
- the system is adaptable, demountable and reusable.

The modular rail system has already been used at a number of stations including St Pancras, Barry Waterfront and, as shown in the image, at Lichfield.



Installing a steel modular platform at Lichfield station

Reuse practicalities

There is a clear message from the market that the technical ability to re-use steel components needs to be facilitated by market mechanisms for reusing more construction steel. A steel-framed building can be considered as a 'warehouse of its parts' that can be deconstructed and the components reused. However more work is needed that addresses:

- traceability of products
- fitness for purpose of recovered products and performance guarantees
- business models for reusing construction steel and market stimulation.

Preliminary studies have been undertaken by SCI to identify the barriers to greater reuse and to quantify the environmental and economic benefits of reuse. The results are promising but further work is required if reuse is to become commonplace. Proposals are in place to explore the feasibility for greater reuse of steel construction products but a funding mechanism has yet to be found.

Dialogue with government and stakeholders

Delivery of sustainable development requires a collective effort. In addition to engaging all parts of its own supply chain, the Sector maintains a dialogue with Government and other stakeholders concerning the implementation of the Sector strategy and other, evolving sustainability issues.

The signatories to *Building a Better Future*, have a good track record of dialogue with Government. This has included dialogue about sustainable development.

Relevant involvement with Government and stakeholders during 2003 included:

- continued collaboration through the DTI/Defra Pioneers Group
- involvement with other construction industry bodies including nCRISP, CIC, CIRIA and BRE
- DTI involvement on the Steel Construction Sector Sustainability Committee
- regular meetings with DTI both directly and through the Construction Products Association
- representation on the main board of Achieving Excellence

- involvement on a number of international sustainable development initiatives particularly those of the International Iron and Steel Institute
- input to the revisions to Parts E and L of the Building Regulations
- representation at the Better Buildings Summit in October 2003.



Steel has been used as part of a major refurbishment programme of the Empress State Building in West London. This included a 27-storey, 5.5m wide horizontal extension to the southern façade of the building and a 3-storey vertical extension.

B.4 Measuring progress

Review of ongoing initiatives

The Steel Construction Sector Sustainability Committee met three times during 2003. At these meetings progress on all relevant ongoing initiatives was reviewed. A more formal and thorough annual review was undertaken at the end of 2003 after which this annual progress report was prepared.

Measurement of awareness

The sector routinely uses market research to gauge the attitudes of clients and designers to steel construction. In 2003 this methodology was extended to measure how the 'sustainability message' is appreciated, interpreted and implemented by the construction industry.

Two surveys were undertaken in 2003, one by SCI and one by Corus.

To gauge the views of client's designers to sustainable steel construction, SCI sent a one-page, electronic questionnaire to around 600 of its members. The questions sought to:

- establish the proportion of projects in which sustainability issues influence decision-making
- rank sustainability credentials influencing the choice of construction materials and rate steel's performance against these criteria
- ascertain steel's most positive and most negative sustainable construction credentials
- find out whether the sector is doing enough to meet respondent's sustainable construction agenda and identify what additional information or advice they require.

A summary of the responses to the survey is given in the box below.

SCI survey of members' attitudes to sustainable construction – summary of responses

85% of respondents thought that sustainability will become a major issue in building design in the near future.

On average, respondents estimated that sustainability issues currently influence decision-making on only 30% of projects.

Based on the responses to the survey, 11 sustainable construction credentials were ranked in order of perceived importance. For each credential, steel's relative performance was also assessed. The following overall results were obtained:

Sustainable credential	Rank	Rating of steel's performance relative to other materials (%)		
		Worse	Average	Better
Overall environmental impact of material	1	8	69	23
Operational energy efficiency of building	2	46	46	8
Flexible/adaptable buildings	3	0	15	85
Structurally efficient (i.e. resource efficient)	3	0	23	77
Recyclable	5	8	15	77
Low waste	6	0	23	77

Durable, low maintenance, long-lived products	7	8	62	31
Demountable and reusable buildings and components	8	8	8	85
Prefabrication and off-site manufacture	9	0	0	100
High quality and low defect products	10	0	23	77
Fast construction time	11	0	31	69

Respondents were also asked to identify steel's three most positive and most negative sustainable construction credentials:

Steel's **most positive** sustainable credentials:

1. Recyclability
2. Structural efficiency
3. Demountability and reusability.

Steel's **most negative** sustainable credentials:

1. Operational inefficiency
2. Overall environmental impact of material (particularly mineral extraction)
3. Corrosion and fire (and associated maintenance and coatings)
4. High embodied energy.

57% of respondents felt that the steel construction industry was doing enough to meet their sustainable construction agenda; 43% felt that this was not the case!

Respondents were asked to suggest information on sustainable steel construction that they would find useful to help them to design more sustainable buildings. Responses included:

1. Information on the durability of and energy efficiency of the various building fabrics (for walls and roofs) for steel framed buildings
2. Comparison of steel's sustainability credentials versus concrete
3. Quantify and demonstrate how steel-framed buildings can cost effectively achieve the same operational efficiencies of concrete-framed buildings
4. Solve vibration issues in healthcare buildings
5. Provide examples of sustainable steel buildings
6. Post occupancy research on performance and productivity
7. Provide much simpler environmental and building design information.
8. Provide better information on cladding performance.
9. Guidance on whole life costings; suggested opportunities for reuse and recycling; advantages of initial over-engineering; demountable connections
10. Embodied energy of steel in production, construction, operation, demolition (whole life performance)
11. Information on the REAL unit energy costs of production and erection of steel
12. Information in a presentable form to show the longevity of steel
13. More seminars/presentations

Corus's survey involved telephone interviews with 35 randomly selected UK architects during the autumn of 2003. A summary of the findings is presented in the box below:

Corus survey of architect's attitudes to sustainable construction and Steel Construction Institute

Conclusions from the survey include:

- Sustainability is only a major consideration for 54% of respondents. However all respondents believe that some construction materials have better sustainability credentials than others.
- Steel is viewed favourably by 87% of respondents as a general construction material, rising to 94% as a structural framing material.
- The most positive credentials for steel are:
 - that it is recyclable and reusable
 - that it is long-lived.
- The most negative credential is the high consumption of energy in the production of steel.
- 60% of respondents said that whole life cost is an important factor in building design, citing client's insistence and the reduction of maintenance and operational energy costs as the principle drivers for considering whole life costs.
- Respondents were asked if they designed buildings to allow for future adaptability, demountability and reuse of components. 60% of respondents stated that these factors are taken into account. The following features had been used to facilitate greater adaptability:
 - using non load-bearing internal walls
 - designing buildings on a regular, modular grid
 - use of a bolted steel frame
 - careful location of M&E plant.
- Questioned specifically about environmental issues, 77% of respondents stated that environmental factors were important. The following design factors were highlighted:
 - high levels of thermal insulation
 - M&E is a vital component to reduce energy costs
 - orientation of building to reduce solar gain
 - only use recyclable and reusable materials
 - specify that timber comes from a renewable source.
- 57% of respondents said that their buildings were to take advantage of off-site manufacture. Asked how this was achieved, respondents cited the following pre-fabricated products:
 - structural steel frame
 - curtain wall cladding
 - steel cladding
 - precast concrete stairways
 - timber frames.

Development of measurable targets

The need to measure and report improvement in performance is understood but at present the sector does not have sufficient data or a monitoring system in place. Specific objectives need to be established and monitored and this work is ongoing although progress has been limited since the launch of the strategy.

Two relevant initiatives have been progressed during 2003. The first of these relates to steel production in which Corus has participated in a working group of the International Iron & Steel Institute (IISI). This working group has agreed a provisional set of eleven indicators that can be used to assess progress within the worldwide iron and steel manufacturing industry. The eleven indicators are:

1. Investment in new processes & products (capital and R&D expenditure)
2. Operating income (EBIT - earnings before interest and tax)
3. Return on capital employed (ROCE)
4. Value added (wealth created by a companies activities)
5. Green house gas emissions (CO₂ emissions)
6. Material efficiency (wastes sent to landfill or incinerated)
7. Energy intensity (energy required to produce steel)
8. Steel recycling (pre & post consumer scrap)
9. Environmental management systems (certification to a recognised standard)
10. Employee training
11. Lost time injury frequency rate (LTIFR).

Selected steel companies, including Corus, have been asked to trial the provisional indicators using data collected from 2002. This information has now been fed back to IISI, along with comments on the data gathering process. A revised questionnaire will be circulated to all IISI member companies, in 2004, with the aim of collecting data and reporting the 2003 KPIs, later in 2004.

Although not strictly within the remit of the Strategy, which only addresses steel in construction, i.e. downstream of production, this initiative is considered important because of the position of Corus as the largest supplier of steel to the UK construction industry. Following Corus's example, it is hoped that KPIs will be picked-up and further developed by the rest of the supply chain.

The second initiative is being led by the BCSA and has involved the establishment of an internal sector sustainability pioneers group. The aim of this group is to provide a focus for the development and use of sustainability KPIs among steelwork contractors. A number of KPIs have been proposed and these have been the subject of a trial by the BCSA. Progress has, however, been limited and this work still ongoing.