

Rematerialise.org

An environmentally innovative materials project

Report to the Design Council
Innovation Fund Award 2001-2002



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Introduction

In April 2001 a Design Council Innovation Award was made to the School of 3D Design at Kingston University to support the development of an internet information resource for designers and design education institutions, based on the School's evolving Rematerialise collection.

The project aim was to develop a unique resource which enables design professionals, academics and students easy access to a carefully researched and compiled collection of environmentally sustainable and low impact materials - providing information which is diverse and inspirational to encourage the innovative and creative use of these materials by designers in the UK and more widely.

The project was conceived to bridge the gap between the raft of academic research that exists about the life cycles of products and fundamental design practice, providing a practical tool which enables a designer to find and appraise the materials which could be most environmentally suitable for their purposes - an innovative materials collection based on environmental as well as aesthetic criteria.

The Rematerialise.org project is part of a continuing research programme of related studies in the School of 3D Design at Kingston University, as follows:

- **The 'Rematerialise' exhibition (1995-96)**
A touring exhibition launched at the Royal College of Art demonstrating initial research into new materials made from waste, featuring examples of product application.
- **Industrial collaboration (on-going)**
A range of product or furniture design projects between students of the School of 3D Design and design and manufacturing industries developing new environmental practice (eg IKEA).
- **Exhibition (2003-04)**
A touring exhibition to follow on from the creation of the Rematerialise.org website resource covering the historical development and application of environmentally sustainable and low impact materials through commercial and educational case studies.
- **Publication (2004-05)**
Illustrated book covering the Rematerialise project.

As can be seen from the above chronology, the Rematerialise.org project has been an important development in the School of 3D Design's expanding interest in the use of environmental sustainable and low impact materials. The School has also examined other aspects of sustainable production which are beyond the scope of the Rematerialise project but which are referred to in the final section of this report on Broader Messages and Future Research.

For completeness this report includes some material from the interim project report, submitted to the Design Council in January 2002.

Project history

Background

Since 1996, the Rematerialise collection of sustainable and low impact material examples had been developed by staff in the School of 3D Design, primarily for access by design students and staff at Kingston University. However, by 2000 it became clear that the increasing scale and popularity of the collection, particularly through levels of external enquiry, merited the research and development of a complete information resource to provide:

- A specially developed and easily updated materials indexing system
- A capability to efficiently deal with a growing number of internal and external enquiries
- A learning resource to support design for sustainability courses and project initiatives
- A bridge between practice, industry and education.

The Research Committee in the Faculty of Design at Kingston provided initial support for a Research Assistant to help research into design for sustainability initiatives undertaken in the School of 3D Design. For the Rematerialise project, work involved the cataloguing of materials, detailing producer and supplier information and researching possible new additions to the collection.

As the number of physical material samples in the collection would inevitably be limited by finite space, the benefits of building the collection as a visual database using digital media were obvious, and the world wide web the most suitable and cost effective means of distributing and widening access.

An outline project proposal for Rematerialise.org was submitted to the Design Council for Innovation funding in December 2000, followed by a detailed application which was subsequently awarded Innovation Fund support in April 2001.

Project description

At its best, design can contribute to prosperity and well-being, within the UK and globally. However, it is now recognised that *"We need greater prosperity with less environmental damage. We need to improve the efficiency with which we use resources."* (A Better Quality of Life. A strategy for sustainable development for the UK. HM Government, CM 4345, May 1999.)

These principles are increasingly accepted in international, especially European policy, and are being enacted in a series of powerful EC regulations to increase producer responsibility for the environmental impacts of the design, production, use and disposal of new products. Particular emphasis is being placed on reducing waste and increasing recycling.

There is currently considerable research into design for sustainability within academic institutions (including the work at Kingston University), and in industry. There is, for example, a growing body of knowledge based on Life Cycle Analyses of certain products and materials. This is creating a wealth of detailed data.

However, there remained a substantial gap between this detailed academic research and practical tools which could enable designers and design education institutions to find out - easily, quickly and without excessive costs - which materials are the most environmentally sound for their purposes.

Project aims

The Rematerialise.org project has aimed to:

- Develop and provide easy access to a unique resource of a carefully researched and compiled collection of environmentally sustainable and low impact materials - providing information which is diverse and inspirational to encourage the innovative and creative use of these materials by designers in the UK and more widely.
- Encourage a creative interaction between suppliers, designers and producers, and encourage networking among these and other interests to ensure that the data is constantly updated and relevant to current practice and regulations.

Initially, the project aimed to achieve external endorsement of all the chosen materials in the collection, gaining a 'seal of approval' from organisations such as WWF UK or Friends of the Earth. However, following initial research, it was clear that the time required to resolve all of the political aspects of such an exercise would seriously inhibit project outcomes over the given timescale. Therefore, it was decided to postpone the development of an endorsement scheme to a subsequent research project.

Planned outcomes

In order to meet the overall project aims, a number of key outcomes were identified:

- The collection of a wide range of low impact and sustainable materials, particularly those made from recycle (the product of recycling), and the dissemination of information about these materials via a specially designed and created website.
- The development of a range of innovative search options, devised to encourage the creative use of these materials (eg viewing product case studies or videos of physical attributes).
- The provision of information in ways which enable easy assessment of the creative potential of different materials and related processes.

- The use of the internet as an effective means of dissemination to ensure that the Rematerialise resource is widely-known and used, using an 'electronic flyer' to publicise the resource to academic institutions and throughout the design profession.
- The potential to publish articles in appropriate research, education and industry publications, promoting design for sustainability initiatives.

To conclude the project, a national conference was planned to launch and promote the site (Winter 2002), with contributions from leading practitioners and commentators in the field. However, as it became necessary to bring the 'electronic' launch date of the site forward (see Schedule below), a conference with an associated exhibition are to be considered together as a subsequent project. This will require additional funding and sponsorship.

Schedule

On receiving support from the Design Council, an outline two stage project schedule was agreed, running from April 2001 through to December 2002, as follows:

Stage 1												Stage 2																			
Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec											
Sample research, database developed																															
						Collection digitised, index, site developed																									
							Pilot site with student groups																								
							Stage report		*																						
											Industrial liaison																				
												Site update																			
												Launch prepared																			
																	Launch; site on-line														
																		Prepare exhibition													

* Interim project presentation at the Design Council (Design for Sustainability lecture series)

Since planning the schedule, two key members of the project team, Nigel Ordish, Head of 3D Design, and Jonathan Chapman, Research Assistant, decided to leave Kingston University in September 2002. As a result, the project workload was condensed to enable an email site launch to conclude stage 2, with a planned follow-on conference and exhibition to be undertaken later.

Feedback mechanisms

● Site testing

Throughout March 2002, 300 individuals were e-mailed a request to test the site, using the provided link. This test group comprised of practitioners, academics and students covered the following subject areas:

- Automotive design
- Architecture (including landscape and planning)
- Fashion and textile design
- Fine art
- Graphic design
- Interior and exhibition design
- Product design

The recipients were also asked to complete and return a short e-mail questionnaire form (see Annex). From the total returned (57 or 19%) the accumulated results to the specific questions were as follows:

- | | | |
|--|-----------|----------|
| ● Did you find the site easy to use? | Yes: 100% | |
| ● Did you find the information useful? | Yes: 100% | |
| ● Did the site inspire you and your creative practice? | Yes: 91% | No: 9% |
| ● Is this a resource that you would use again? | Yes: 96% | No: 4% |
| ● Did you encounter any technical difficulties? | | No: 100% |

Although a fairly simplistic questionnaire, the feedback clearly indicated that the site was extremely well received and the interface was not presenting any difficulties. (There have subsequently been some problems encountered with version 6+ of the Netscape browser running on a Macintosh platform which should be remedied soon.) The total response of 19% was also considered quite successful relative to similar exercises.

Some members of the test group also sent comments with their questionnaire response which were very positive, for example:

"John Wood notified me of the website: it looks right up our street!"
Duncan Kramer, furniture designer

"Excellent!!!!!!!!!" Fernando Lourenco, design student

"...very attractive and a site I will visit again. Congratulations !!"
Aaron Tanner, designer

"Beautiful..." Beatrice Otto, Sustainable Design Catalyst

"Where can you buy it?" Suzy B, Feng Shui consultant

As a positive feedback mechanism, the questionnaire has subsequently been updated and is now included as part of the feedback section of the site.

● **Interim report**

An interim report on progress was completed and submitted to the Design Council in March 2002 (see Annex for outline of report).

● **Interim presentation**

In April 2002, as part of the Design for Sustainability evening lecture series organised by Kingston University and the Design Research Society, the project's researcher (Jonathan Chapman) gave a Powerpoint presentation of the background to the Rematerialise project. This included announcing the expected launch of the site, demonstrated using off-line example pages.

The feedback from the audience was very positive, many asking to be formally included on the launch mailshot listing. The event also enabled new contacts to be initiated with co-presenters from WRAP and the BodyShop.

● **Liaison with specifiers and producers**

A number of special presentations to specifiers, producers and related organisations were arranged to take place during the development stages of the project. These included:

- Corus Colours UK
- Steel Construction Institute
- BodyShop
- Waste and Resources Action Programme (WRAP)
- Design Council
- Design Austria

Outcomes from this liaison included potential future sponsorship, trial in-house site testing and feedback, network development and access to further material information for later expansion of the collection.

The network of designers who visit the School of 3D Design throughout the year were also able to view the library collection and inform development.

● **Site launch**

The site was officially launched in August 2002, with an electronic flyer sent to an extensive database of contacts built up during the course of the project (see Annex for copy of the launch invitation).

Range of users

Although a specially compiled collection of environmentally sustainable and low impact materials has a great deal of commercial potential, it was agreed from the onset that the website should initially aim to be free at point of access, facilitating use by a wide range of users from the design community, broadly defined into two categories:

● Academic

- Teaching staff developing course material, teaching and learning strategies, project briefs, industrial links and professional development.
- Students, Level 2 undergraduate to Level M postgraduate, searching for effective, stimulating and responsible material solutions in the creation of design concepts for products and environments (eg product, furniture, interior, graphics).

● Professional

- Design practitioners and related professions seeking new alternatives to 'resource hungry' materials.
- Related industries, producers and suppliers.
- Small and medium size enterprises unable to develop or maintain their own technical information resources.

The 'free access' to the search facility will be reviewed on the basis of use, feedback, research strategies and the development of potential industrial support.

Resources

● Project team

The core research team comprised of three full-time members of Kingston University's School of 3D Design academic staff, as follows:

- **Project manager**
Nigel Ordish, Head of the School of 3D Design
- **Development manager** (Rematerialise programme)
Jakki Dehn, Senior Lecturer Product and Furniture Design
- **Researcher**
Jonathan Chapman, Research Assistant, School of 3D Design

The range of complementary skills and expertise of the core team (see Annex 3) was supplemented by support service staff at Kingston University, co-opted where appropriate (eg ICT Services), and additional external specialists, including:

- **Special advisor**
Margaret Pope, material information consultant.

- **Research office**

Based in Kingston University's School of 3D Design, a central office was made available for the duration of the research project, equipped with networked PC and appropriate software. File storage and index drawer systems were supplied to enable the office to function as a specialist technical library, where material samples could be collated, displayed and accessed.

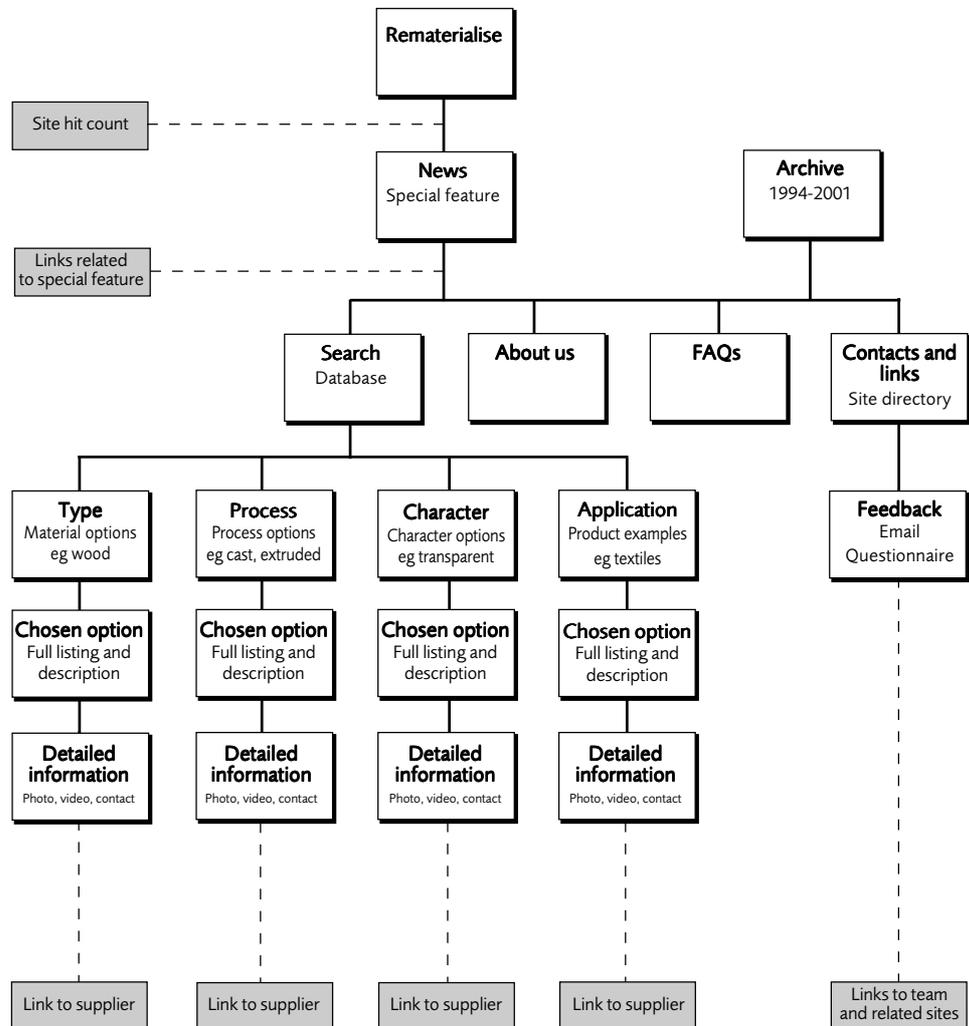
- **Digital equipment**

Digital video and still cameras, scanners and associated peripherals were made available by the School of 3D Design and associated media service departments at the University for the duration of the project.

Site structure

Overall framework

The site was designed to enable easy access by users of quite basic versions of browser software, with a familiar structure and intuitive interface to facilitate navigation through general information to specifically searching the materials database. User feedback has been vital throughout the project and continues to be an integral element of the site's structure to inform development.



Site sections

● Introduction and News

A minimal 'cover' page opens the site (which includes a 'hit' counter) which links directly to the lead feature story, using a magazine format to instil association and familiarity and encourage access (see Annex, image 1). Standard header and footer links to all of the sites main sections are included, as well as links to related news story sites.

● Search

The search section introduces the four categories used to describe the materials database, providing alternative means of access using the following links:

Type	Process	Character	Application
Glass	Blow moulded	Bendy	Board
Metal	Cast	Colourful	Cushioning
Minerals	Injection moulded	Elastic	Decking
Plastic	Non-woven	Lightweight	Floor covering
Rubber	Rotation moulded	Opaque	Insulation
Textiles	Woven	Squashy	Geo-textiles
Vegetables	Vacuum formed	Transparent	Paving
Wood	-	-	Textiles
-	-	-	Tiles
-	-	-	Wall surfacing
-	-	-	Windows

Categorising the materials collection database in this way caters for the full range of users from the casual browser (seeking stimulus) to the those seeking a specific application or material quality. It is an important aspect of the resource that the interface encourages browsing as well as active searching.

The four inter-relating categories were devised to easily accommodate future expansion of the collection.

The user's selection produces a full listing of the related materials stored on the database. To optimise speed of access, each sample has only a thumbnail image and short description at this stage. The user may subsequently choose to view further information (large image/s with supplier contact details) including, in certain cases, the option to download a video to view a demonstration of the material's physical qualities.

In addition to being able to save or print chosen images, it is possible to build up swatch palette for later reference (see Annex, images 3, 4, 5, 6).

- **About us**

The 'About us' section provides a brief history of the overall Rematerialise project (see Annex, image 7) and describes the core Rematerialise.org development team.

- **FAQs**

As found on many sites, Frequently Asked Questions draws together a range of common enquiries fed back during the development stages of the project, including feedback from the pilot site exercise and related questionnaire (see Annex, image 8).

- **Archive**

The initial Rematerialise exhibition included furniture and products which used low-impact or recycled materials suitable for the contemporary high street.

This archive section (an annual series, beginning after the 1995 Rematerialise exhibition) features environmentally sustainable or low impact materials used in diverse and innovative ways. Through product examples, the section aims to illustrate new approaches to design for sustainability issues in mainstream solutions (see Annex, images 9, 10).

- **Contacts and links**

The final section of the site offers opportunities to email feedback (using an updated questionnaire) and make enquiries, as well as access to a comprehensive directory of related sites (see Annex, images 11, 12). The (commercial) independence of the site has made it possible for the project team to specially compile an unrestricted network directory of related interest groups, companies, campaigns, publications and other appropriate information resources.

Evaluation

Meeting objectives

The original project objectives have been met through:

- Systematic research identifying a range of existing and new materials, particularly those made from recyclate (the product of recycling), which are appropriate to contemporary design practice and environmental impact assessment.
- Designing a range of search options to accommodate an individualistic approach to creative development, from the (passive) browser to the specific (active) researcher.
- Organising information to facilitate comparative assessment of the design potential of materials and related processes.
- Developing a comprehensive mailing list to effectively publicise the availability of the Rematerialise resource to a wide design audience, companies and the press.

The final planned outcome, a national conference and exhibition to accompany the launch of the site has been postponed to be considered as a subsequent research project (see Planned Outcomes, page 6).

Use of selection criteria

The development of specific criteria as a means by which materials were selected for the collection was seriously considered at the start of the project. After much discussion, it was agreed to base decisions about the selection of materials on criteria other than purely conventional scientifically based data (eg using life cycle analysis available through other information sources).

This decision was based on the conflicts inherent in providing different types and quantities of information. Life cycle analysis and other conventional environmental assessments of products and materials have to be very complex to be meaningful, because so many factors have to be taken into account (production, transport, chemicals used, etc). Not only does this approach require vast amounts of information, to allow informed choices, it also varies depending on the enquirer (where they are based, what they want to use the material for, etc). Such quantities of information, and the complex choices which then follow, very often mean that designers do not bother with these materials at all.

Since the provision of the information was not to be based purely on LCA and other scientific approaches, the project team decided the criteria for inclusion of materials should follow the same principles. The broad aim of the project was to provide information which was diverse and inspirational, encouraging the innovative and creative use of environmentally sustainable and low impact materials by designers. It was therefore essential that the choices of materials showed these possibilities, rather than overwhelming users with data.

The project team therefore decided to develop a more human, common sense approach to the use of criteria, selecting materials on the basis of their eco-potential, adding descriptor information to emphasise different qualities in each case, for example:

- Environmental impact
- Contemporary relevance
- Aesthetics
- Sustainability
- Recycling

This approach has been endorsed through consultation and feedback (see Annex 1). A major specifier, with long-term experience in using more conventional scientific environmental assessment criteria, felt that the use of detailed scientific data was not helpful to the designer and applauded the decision to devise a more usable assessment process.

A physical resource

A physical materials library evolved alongside the project research. Design students and staff at Kingston had first-hand access to the resource and external enquiries to gain access grew as the technical library was indirectly publicised at public presentations by members of the project team. However, it soon became clear that maintaining a physical library would prove unsustainable due to:

- Increasing enquiries (eg national rise in student numbers)
- Impracticalities in developing a secure loan scheme (eg limited number of samples)
- Limited space to accommodate growth of the collection
- Unsecured financial commitment to supporting development of the resource.

These limitations have been partly solved by collating the collection in 'non-physical' media through which a user can contact a supplier to request a physical material sample. However, the lack of immediacy in physical assessment (eg tactile qualities) is a drawback. Therefore, the development of a maintained physical resource remains a future consideration.

Specifier and producer participation

The project was to draw together materials from a range of industrial and commercial producers, so it was seen as imperative that the developing resource was seen as impartial, and the advantages of researching in an 'independent' academic environment were maximised. Therefore, producers and specifiers were not involved in defining the original project objectives. However, a number of key companies and organisations were involved in the research process.

- Corus Colours (UK) had collaborated with the School of 3D Design on a number of projects prior to the start of Rematerialise.org. An interim presentation of the pilot site provided the opportunity for Corus to assess the range of metals included in the database. The shortage of steel examples, and in particular pre-finished steel, was discussed in relation to Corus UK's changing organisational policy. As a producer/supplier they were very aware of new European and international political initiatives, standards and ethical practice, as well as the social dimension and impact industrial change can bring to communities. In this context, Corus were keen to contribute information to future updates of the site.
- A formal presentation of the Rematerialise research to a team from the government's Waste and Resources Action Programme (WRAP) resulted in discussion as to whether the project met the criteria necessary to achieve organisational support. WRAP has developed a specific agenda to meet sustainable development initiatives, against which the Rematerialise research could be seen as too non-specific. However, positive feedback did not preclude continuing discussions in the near future.
- The in-house design team at the BodyShop work to their own code of practice, which includes reference to scientific assessment criteria. Members of the BodyShop team provided very useful feedback during the development of the search section of the site, and they have offered to recommend the project for support to the BodyShop Foundation.

Following the site launch, it is expected that the levels of participation by specifiers, producers and related organisations will develop further as a result of growth in email enquiry, publicity and network expansion. Also, if collaboration with those who have already participated in the project's development continues there are positive indicators that a number of supportive outcomes could be achieved.

Conclusions

Broader messages

Fundamentally the Rematerialise.org site provides easy access to a range of quite basic material information. However, the types of materials covered, and the ways in which users can search for information, provides access to a unique collection of environmentally sustainable and low impact materials, selected and collated to encourage a range of innovative design applications and solutions.

Feedback during the development stages of the project from design practitioners, students, academics and industry clearly indicated positive support and need for such a resource. However, it has also been important to recognise negative responses too, from the sceptical or reactionary, to such an environmental initiative, and the tensions or issues which will result from no change in practice.

Design for sustainability has been dismissed as a trend, a passing fad which would not grow to become integrated as a mainstream activity. It was argued that the approach was not commercially realistic, and anyway many scientific predictions and modelled scenarios used to support the case for sustainability were being revised every year. For example, more efficient and improved exploration has resulted in a dramatic revision in the previously defined levels of oil reserves, forecasts now predicting ample supply of virgin material to satisfy expected consumption of plastic through to the next century, by which time biotechnologies are expected to enable viable alternatives. However, the changes in use of various materials do not entirely depend on how plentiful they are -

*"The oil age will come to an end, but not for lack of oil, just like the stone age came to an end, but not for lack of stone."*¹

At the same time, defenders of the status quo attack sustainability as being a limiter of individual choice and a threat to the very heart of capitalism. The contrasting approaches are illustrated in the following scenario:

J. Widget & Co. have designed and produced widgets for many years. Most homes have a widget. They have a short-life so are replaced often, maintaining a steady market. Over recent years, labour costs have encouraged the company to produce many of the widget's components overseas, particularly in Malaysia where all the required injection moulded parts are produced at a lower cost. Even after accounting for transport costs, out-sourcing production has greatly helped J.Widget & Co. to maximise their profit.

This is a common industrial scenario based on a standard supply and demand model - a short-life product, a stable demographic and 'disposable income'. Lobbying government has become a vital part of business in helping to control related costs which could result through change in international trade agreements, import duties, transport taxation, industrial grants through to the regulation of fossil fuels. Designers update the product line every five years and develop new house styles, and shareholders receive an annual dividend. This is a regular business, which is in control.

¹ Sheik Yamani, founder of OPEC. Earth - Guardian/Action Aid supplement, August 2002

However, J.Widget & Co, along with the rest of us, either consciously or unconsciously know that this scenario is not sustainable. An increasing number of long-term variables will so drastically effect the fine balance of the traditional business model, from climate change, energy taxation and new standards to strategies to assist the developing world. This is before accepting the doomsday scenario which could result from continued deforestation, where our flexible, digital newspapers of the future run the headline: *"Collapse of carbon bank in the rainforest and the seas to boil"*.²

Design helps shape our world: it can challenge convention, create delight, and meet human needs through exciting, elegant, creative and responsible design solutions for present and future generations. Not since the industrial revolution has there been a more appropriate time for design educationalists and practitioners to appraise their role and proactively lead change. If designers cannot instill a responsible and creatively viable approach to addressing human material needs, then who will?

In the UK, the Thatcherite years led to a complete fragmentation of collectiveness. 'Codes of practice' promoted by various design organisations disappeared (eg SIAD/CSD) and, for many, principles and ethics took a back seat to winning an unpaid pitch. Competition reduced the incentive to research, debate, question and develop. But times have changed. 'Sustainable development' is now common language, as are recycling schemes, pollution forecasts and consumer 'watchdogs'.

So, what is the broader message? The Rematerialise project has highlighted the lack of current information in an appropriate form that could help inform 'designing for sustainability'. But the project is primarily concerned with materials. Any real incentive for fundamental change will only begin when sustainability issues are firmly on the mainstream design agenda, informed by a hybrid catalyst of succinct commercial argument (eg case studies), innovative practice and opportunity (eg viable local batch production) and political strategy (eg directives). To do this, the design profession needs to aim for inclusion at the highest levels, working in partnership with many other areas of expertise to influence and appraise change, preparing to learn new practice through overcoming insularity. In this, a continuing partnership with education is vital in helping to define new roles for the designer, and so accommodating, managing and leading change.

² 'The day the ocean boiled', Dox Productions for BBC Equinox, 2001

Future research

Potential future areas for research include:

- Development of a professional-academic network
 - Links to research initiatives and centres
 - Interdisciplinary seminars and 'life long learning' programmes
- Collation of standards, directives, policies and strategies
 - Take-back and guarantee schemes
 - Mapping the relationship to the design process
- Change through current and emerging technologies
 - Desktop production
 - Local and regional batch variation
 - Transfer technologies and related skills
- Codes of practice in both the commercial and public sectors
 - Comparative practice between Europe and USA
 - Ethical practice
 - Working conditions
- Practical development of design for sustainability criteria
 - Design guidelines
 - New industrial and educational practices

The Rematerialise project itself is expected to continue at Kingston University with aims to research, curate and design a future exhibition and related publication.

