The Barbour Report 1999

The Sourcing and Exchange of Information

across the building project team

Barbour Index plc

Barbour Index is a leading supplier of specialist information services to construction industry professionals, to facilities managers and to those responsible for health and safety at work. The company publishes technical and product information in printed form, electronically and on microfiche.

Barbour Index now serves more than 10,000 customers, employs 160 people and has an annual turnover of £15 million.

The company makes a significant investment every year, in improving existing and developing new services. In the last five years alone, over £5 million has been spent in developing electronic methods of delivering and accessing information.

Barbour Index has a long term commitment to meeting its customers' changing information needs and delivering them in the formats they demand.

Lychgate Projects Ltd

Lychgate is a marketing, market research and strategic development organisation offering a specialist service throughout the construction industry, and more recently, to the IT industry.

Formed in 1986, it is wholly independent and owned by the Directors. Its services are supplied across the full breadth of the building industry, from design professionals to product manufacturers, main contractors, sub-contractors and developers and end users.

The company's nationwide fieldforce of interviewers are highly experienced in the challenges of identifying and questioning decision-makers within business environments. Coupled with the range of skills, research expertise and market knowledge, the company specialises in providing tailored solutions to meet clients' specific information needs.

Price: £495

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FOREWORD

Michael G Ankers, Chief Executive, National Council of Building Material Producers

The consequences of the Information Revolution in the final quarter of the twentieth century are potentially as far reaching as those of the Industrial Revolution nearly two centuries earlier. Like all periods of great change, businesses have to decide whether to be at the forefront of the revolution, with the greater risks and higher costs that this potentially brings with it, or follow on hoping that others do not gain long term competitive advantage in the meantime.

For construction product manufacturers, the advantages now far outweigh the risks. This is all too evident to anyone who has seen the powerful way that many American companies now use the Internet to market their products. The publication of this Barbour Report could not, therefore, have been more timely – a point that is no better illustrated than by one of the final tables in the report.

Whilst 71% of those in the construction industry still prefer their product and technical information to be provided in paper format, in two years' time that figure is expected to fall to just 20%. At the same time, these people indicate that their preferred method of receiving this information on-line via the Internet is likely to increase threefold from 20% today to nearly 60% in 2 years' time.

This report contains a wealth of information which product manufacturers need to be aware of if they are going to meet the needs of those who specify and use their products in the next Millennium.

1. INTRODUCTION

Katherine Tickle, Managing Director, Barbour Index plc

There is no doubting the significance of the revolution taking place in the delivery, accessibility and format of information being disseminated worldwide.

It is the speed with which these changes are taking place and the level of impact they are having which raise some fundamental questions.

The challenge we all face is to deliver information in a format which can be applied directly to the business in hand and to present it in a way that allows the user to extract maximum benefit with minimum effort.

To take up this challenge and communicate effectively those of us in the business of conveying information must understand very clearly how our audience will use it, not only as individuals but across the whole construction team, within their own organisation and outside it.

These issues are of particular importance in an industry like ours where a building is the result of a complex assembly of numerous interacting components and people. Those responsible for the selection and specification of building products must have up to date information in the right format at their fingertips - and the means to communicate clearly and quickly to the other members of the project team.

The 1999 Barbour Report, the seventh in the series, takes an in-depth look at how the members of the project team are receiving, using, recording and passing on information. It examines the use of paper sources and the extent to which electronic communication has become part of current day to day practice.

In commissioning the research we were concerned to record what is actually happening today – aspirations, hopes or wishes provide a useful guide to the future but it is clear the transition to the paperless IT world in construction is taking far longer than was forecast. The reasons are set out in the report and embrace considerations such as contractual, legal and quality issues.

It is clear that there remain many areas to be addressed before electronic communication can be universally adopted in working practice.

This year's Barbour Report reminds us all that the information revolution is far from over. We are now in a critical period of transition, when the need for properly researched information on the process is essential if building product manufacturers are to make decisions with confidence on the most appropriate and effective means of meeting the specifier's needs.

This report highlights the important issues concerning the sourcing and exchange of information in current working practice. We believe it provides clear direction and guidance to all manufacturers who need to get their information in front of the right people in the right way at the right time.

2. REPORT HIGHLIGHTS

The research, undertaken in the first quarter of 1999, reviewed 150 construction projects and collected the views of 402 different professionals. This was supplemented by analysis of 5,000 responses from across the industry derived from the Barbour Index Building Product Compendium user survey. The 1999 Barbour Report on the Sourcing and Exchange of Information brings together the results of these studies. The main highlights taken from the report are:

- Around one-third of Architects, M & E Engineers and Contractors are spending over 20% of project time gathering technical and product information.
- Product and technical information is required throughout the life of a building project, with the main need occurring during the detailed design stage.
- Over one-third of all professionals are now spending more time on information gathering than they were two years ago.
- Around 40% of the project team has access to electronic information at their desk.
- More than half of professionals operate with some form of computer network.
- Manufacturers' literature and their representatives are the most used sources of product information.
- Product directories continue as the most important third party information source.
- The growth of electronic media is continuing, with 8 out of 10 professionals now having access to CD ROM and 6 in 10 having access to the Internet.
- Almost 60% of respondents have increased their use of the Internet in the last year.
- The influence of Main Contractors and Clients has continued to grow. Main Contractors' specification by brand has increased, against an overall decline in brand specification by the design team.
- Manufacturers' standard specification clauses are used by 29% of respondents and use of these has increased over the last two years.
- More than eight out of ten Architects still keep paper-based records, although nine out of ten were using information electronically to some degree.
- Project information is recorded on a mix of paper and electronic media. Only 17% of projects used electronic systems as the primary medium.
- Factors limiting greater usage of electronic media are incompatibility of systems, varying levels of IT adoption and concerns about contract and legal issues.

3. RESEARCH SOURCES

Method

As with previous Barbour Reports, the research process this year has utilised a mix of research methods and data sources.

Group discussion

As a precursor to the main information gathering programme, a group of active, industry professionals were brought together and asked to debate a range of communication issues. This consultation group, assembled to represent a typical project team, identified key issues and trends in the project information gathering process which have been subsequently subjected to detailed examination.

In-depth telephone interview programme

Information management methods were examined by researching actual processes taking place. A sample of over 150 projects was selected to include commercial, industrial and public non-residential works and the main parties involved on each contract were interviewed to develop an understanding of the differing needs of each professional. In total, 402 telephone interviews were completed, each averaging almost half an hour. One-third of respondents were Architects with the remainder spread across Contractors, Quantity Surveyors and the engineering disciplines. All projects were valued at over £1m and 31% of the contracts sampled were worth over £10m.

- Number of interviews

ALL	402	100%
By profession:		
Architects	132	33%
Quantity Surveyors	67	17%
M & E Engineers	67	17%
Structural Engineers	64	16%
Main Contractors	68	17%
Others	4	1%
By new/refurbishment:		
New build	287	71%
Refurbishment	110	27%
Mix of both	5	2%
By type of contract*:		
Traditional	192	48%
Design and Build	136	34%
Construction Management	56	14%
Other	21	5%

** Adds to over 100% as different stages of some contracts used different contract forms*

Barbour Index Building Product Compendium User Survey

Each year, with the publication of the Building Product Compendium, Barbour issues a questionnaire to all 22,000 recipients. These professionals cover the full spectrum of involvement in building, from clients at the briefing stage, through those involved in design, specification, and construction. The opportunity is taken to review and amend the questions included in this questionnaire in the light of the identified topic of each year's Barbour Report.

A sample of some 5,000 responses is independently analysed by Lychgate, providing probably the largest sample covering the full range of professions in all major sectors of the industry each year. Selected results, illustrating the information needs of construction professionals, have been included in this report.

Case studies

Five projects have been chosen from the detailed interview programme for further in-depth analysis. Diverse projects were selected to look for differences in the information handling and communication processes.

In each case, the approach ensured that additional members of these specific project teams were interviewed. Responses from the Architect, Quantity Surveyor, Main Contractor and at least one of the engineering professionals have been assembled to provide an overall picture of information use and communication practice.

Previous Barbour Reports

Within this document, reference is made to previous Barbour Reports. The topics for this programme of research reports, published annually since 1993, have been chosen to define specification and communication practice and identify trends in the industry. Since 1993, Barbour Index has commissioned over 3,000 in-depth interviews and has analysed over 20,000 detailed questionnaire responses from industry professionals in the preparation of these reports. Interestingly, many of the issues identified in early reports are still applicable in today's market and much of the information remains relevant. The series consists of the following titles:

1993 The Changing Face of Specification
1994 Contractors' Influence on Product Decisions
1995 The Influence of Clients on Product Decisions
1996 Communicating with Construction Customers
1997 Electronic Delivery of Product Information
1998 The Building Maintenance and Refurbishment Market

4. THE INFORMATION GATHERING PROCESS

In this report, reference is made to technical information and product information. In the research gathering process these were defined as:

Technical information

British Standards, Codes of Practice, Building Regulations, Health and Safety and other legislation covering building performance, practice and regulations.

Product information

Design features, technical details, dimensions, performance, installation and maintenance information related to a specific manufacturer's product or range.

4.1 Professional involvement at each project stage

In order to understand the timing and extent of information needs, respondents were initially asked to indicate their involvement in each particular stage of the project being examined and then to provide a profile of the timing and extent of information needs throughout the project.

The construction process has been broken down into five stages which are defined as follows:

Briefing/feasibility

Taking Client instruction and examining the feasibility of proposals.

Outline design/planning

Preparing design response to the brief and seeking planning and other statutory approvals.

Detailed Design

Detailed design development, detailing, specification and cost analysis, and product information.

Tender

Preparation of documentation and invitation to carry out construction works.

Construction

Appointment of main contractor, materials procurement and building processes.

- % by profession involved at stage

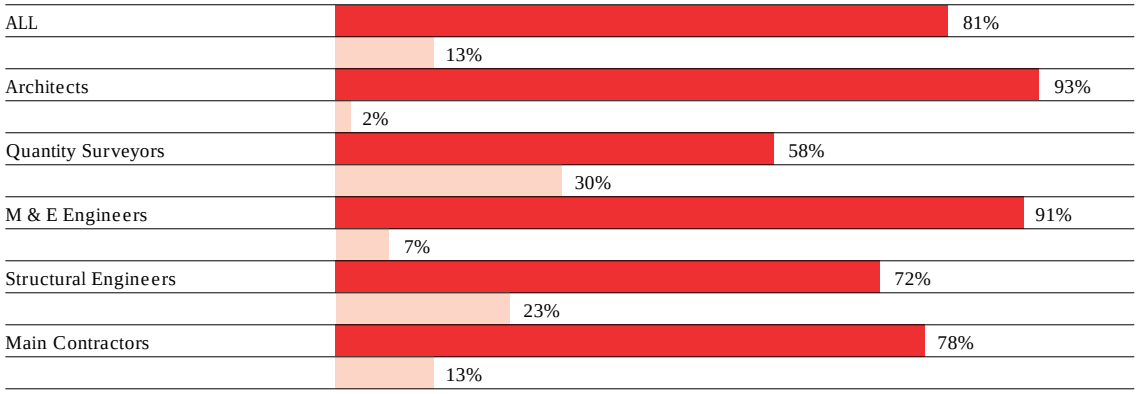
	Briefing/ feasibility	Outline design/ planning	Detailed Design	Tender	Construction
ALL	59%	73%	87%	83%	85%
Architects	74%	89%	95%	82%	86%
Quantity Surveyors	61%	70%	85%	84%	75%
M & E Engineers	67%	85%	93%	87%	84%
Structural Engineers	58%	80%	95%	84%	89%
Main Contractors	22%	32%	57%	81%	93%

Source: Telephone programme (Base: 402 respondents)

4.2 Involvement in decision-making and the need for information

Eight out of ten respondents said they were involved, to some extent, in the decisions covering the materials and brands specified or installed on their project. Consequently, all have a need for detailed information if a manufacturer's products are to be selected and specified. However, the research has identified professional activity which, although not directly related to material or brand decision-making, still needs to be supported by effective information. For example, Quantity Surveyors, who have a need for pricing or quantitative data for budgeting and estimating, need information that may influence the decision-making process, although these individual professionals may not make the final decision themselves.

- % involved in material and brand decision-making



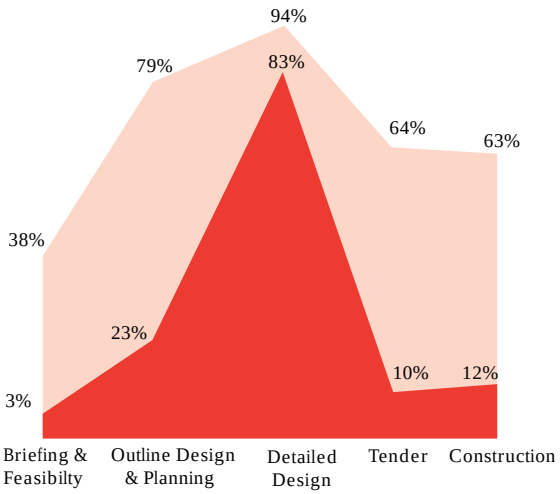
Source: Telephone programme (Base: 402 respondents)

Note: Does not add to 100% as small number in each profession said they were not involved and did not need product information.

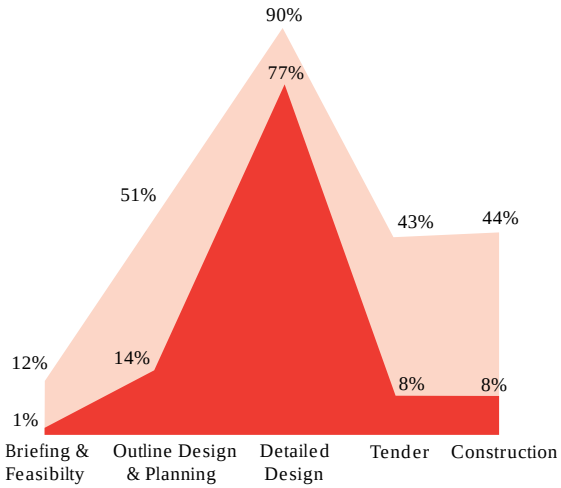
4.3 Need for information at each project stage

The need for technical and product information for each professional group differs throughout the construction process in terms of timing. The following graphs identify the percentages of each group who refer to information at each stage, and those who say they have their main need at a particular stage.

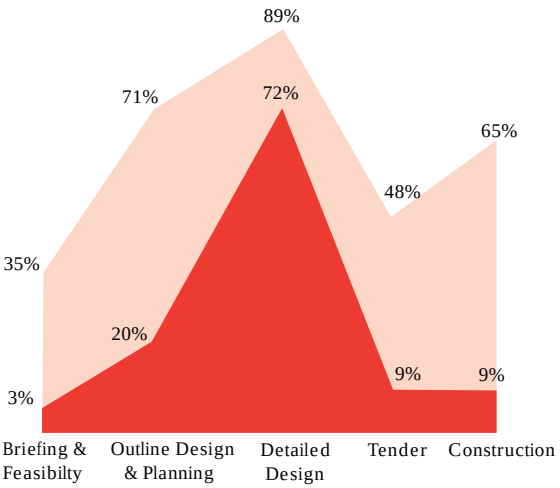
Architects' use of technical information



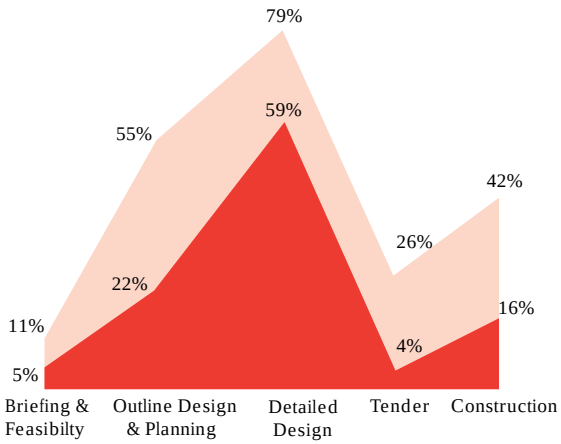
Architects' use of product information



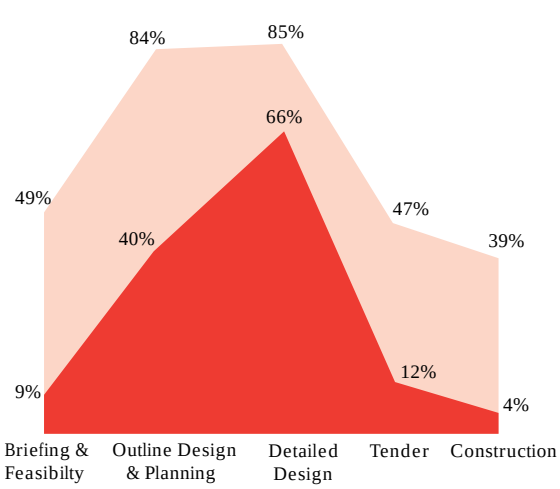
Structural Engineers' use of technical information



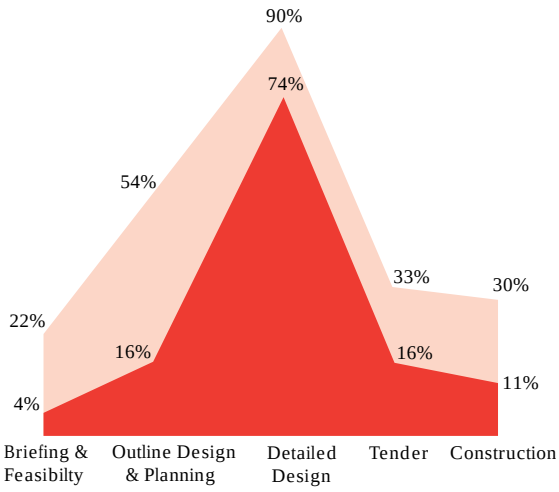
Structural Engineers' use of product information



M & E Engineers' use of technical information

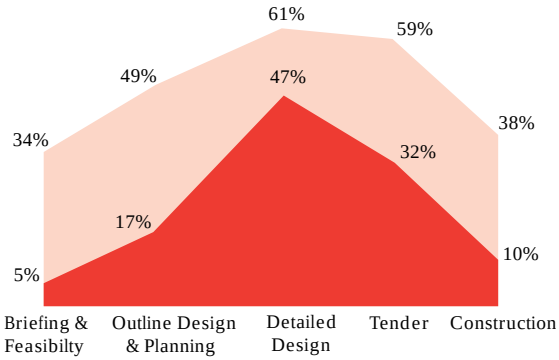


M & E Engineers' use of product information

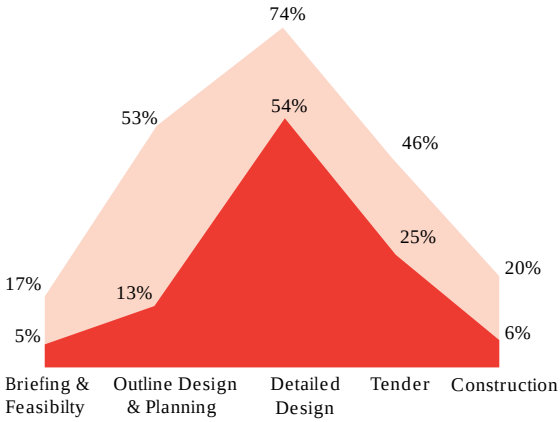


Referred to Mainly needed

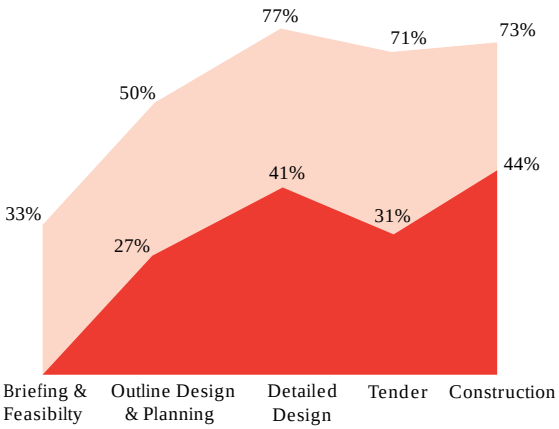
Quantity Surveyors' use of technical information



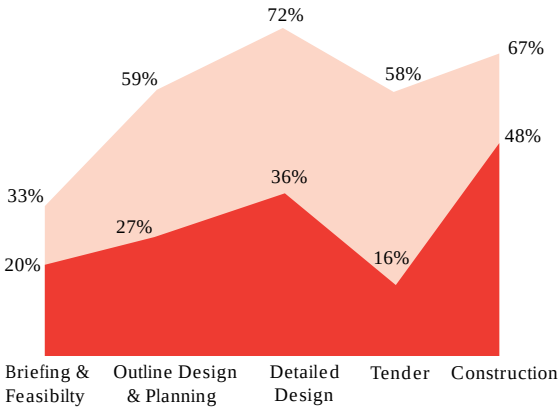
Quantity Surveyors' use of product information



Main Contractors' use of technical information



Main Contractors' use of product information



Referred to Mainly needed

Source: Telephone programme (Base for technical graphs: those respondents involved at each stage. Base for product graphs: those with a need to refer to product information at some point)

Timing differences are apparent. The design professionals' information need peaks during the production stage. Not surprisingly, the Main Contractors' need peaks during construction. Of particular interest to product manufacturers are the numbers of respondents who have a need to refer to information throughout the whole process.

Whilst it is essential that information is available when the requirement is greatest, it is clear from these results that it is referred to throughout the process and no stage can be ignored.

4.4 Time spent on gathering information

The amount of time dedicated to information gathering provides a measure of the commitment to this process within a construction professional's working practice.

- % of project time spent gathering information

Total	Architects		Structural Engineers		M & E Engineers		Quantity Surveyors		Main Contractors	
	Technical	Product	Technical	Product	Technical	Product	Technical	Product	Technical	Product
0%	3%	10%	0%	13%	0%	6%	12%	21%	5%	18%
1% - 10%	61%	63%	86%	81%	57%	73%	72%	66%	63%	54%
11% - 20%	26%	20%	9%	6%	30%	19%	15%	13%	28%	25%
21% - 40%	8%	5%	5%		12%	1%	1%		4%	3%
41% - 60%	2%	2%			1%	1%				

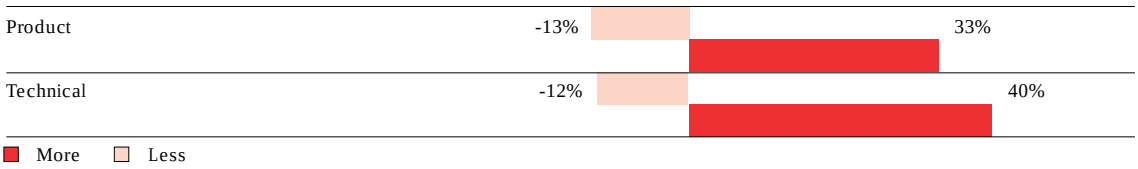
Source: Telephone programme (Base: 402 respondents)

Over half of all the professional groups are spending 10% or less of total project time gathering technical information and a similar percentage on product details. Clearly within the limited time allocated to the gathering process, is it essential that decision-makers have comprehensive, easy to use information immediately to hand.

However, over one-third of Architects are spending more than 10% of total project time on technical information and slightly less on product information. M & E Engineers and Main Contractors also commit higher proportions of project time to information gathering.

We sought to establish whether the time spent on information gathering is increasing or decreasing.

- % spending more/less time gathering information compared to two years ago



Source: Telephone programme (Base: 402 respondents)

Four in ten of the sample believe they are now spending more time gathering technical information than they were two years ago, and one-third think the time given over to product information gathering has increased over the same period.

Those using product and technical information to a greater or lesser extent, have been examined by profession.

- % spending more/less time gathering information compared to two years ago

Total	Architects		Structural Engineers		M & E Engineers		Quantity Surveyors		Main Contractors	
	Technical	Product	Technical	Product	Technical	Product	Technical	Product	Technical	Product
More	42%	33%	39%	28%	36%	25%	28%	30%	54%	51%
Less	15%	17%	11%	13%	9%	10%	12%	15%	9%	9%

Source: Telephone programme (Base: 402 respondents)

Main Contractors are spending more time gathering technical and product information than any other group. Over four in ten are spending more time gathering both types of information than they were two years ago.

Those stating 'More' were asked to suggest the reason for this. The table summarises the main reasons identified and gives the percentages expressing these views.

- Reasons given for spending more time gathering information

	% of comments on subject
More legislation	22%
Contractors spending more time (to save money/growth in D&B)	19%
More products available	16%
More information available	8%
Tighter specs	9%
Looking for best value	7%
Client driven/specific requirements	5%
More complex projects	3%
Need long term performance data	3%

Source: Telephone programme (Base: 165 respondents stating more time spent)

Amongst those spending less time, most believed that time is being saved due to electronic access to information, together with the standardisation of approaches to specifications and products used within them.

4.5 Information storage and access

A significant amount of time is being spent gathering all forms of information, so what formats are being used to store and access this within professionals' offices? Is this process now conducted using electronic systems or are paper based sources still favoured?

- How is information stored?

Source: Telephone programme (Base: 402 respondents)

Paper use remains dominant. Almost all respondents indicated that they still retain 'hard copies' of both technical and product information. However, electronic means of storage are now clearly commonplace. Around seven in ten are using some type of electronic system to store a proportion of their technical and product information.

Amongst the professions, there are again some notable differences in the use of electronic storage systems.

- % holding information electronically

	Technical	Product
ALL	72%	68%
Architects	81%	75%
Quantity Surveyors	45%	44%
M & E Engineers	81%	82%
Structural Engineers	86%	78%
Main Contractors	58%	52%

Source: Telephone programme (Base: 402 respondents)

Around 80% of Architects and Engineers have access to technical and product information in an electronic format.

The manner in which information is accessed has also been examined.

- How is information accessed?

Source: Telephone programme (Base: 402 respondents)

Almost nine out of ten professionals on the projects researched still have access to information which is stored at some central point or library. This finding runs contrary to anecdotal suggestions that there has been a move away from centralised libraries supported by dedicated staff.

When examined by profession and size of organisation, not surprisingly it is the larger architectural practices that are the most likely to retain the services of a librarian. 72% of those with more than 20 technical staff employ one.

Over half of the respondents interviewed keep their own paper based information alongside their desk. However, over 40% now have access to electronic information sources at their workstation. It would appear that electronic information is starting to migrate from being a centralised source to being a tool for the individual.

- % able to access information electronically at desk

ALL	43%
Architects	49%
Quantity Surveyors	37%
M & E Engineers	45%
Structural Engineers	39%
Main Contractors	41%

Source: Telephone programme (Base: 402 respondents)

4.6 Networking

Examining electronic information systems in greater depth, 57% of those with these systems have access to them through some form of computer network.

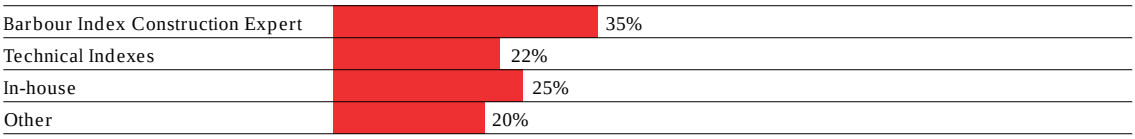
Two-thirds of those using networks said they were linking computers within one office. This is often referred to as a Local Area Network or LAN. The remaining one-third had links between different offices at different locations, an arrangement known as a Wide Area Network or WAN. Again, it is the larger practices and organisations that have invested in setting up networks of both types. The survey found that small practices are less likely to be networked.

This incidence of networked PCs was confirmed by the much larger sample analysed for the Barbour Compendium User survey. Results here showed that 55% of respondents operated with some form of network, of which 69% said this was a LAN and 29% a WAN.

4.7 Third Party Information Providers

The research identified which electronic information systems were being used.

- Electronic information systems in use



Source: Telephone programme (Base: 294 with electronic systems)

One quarter stated that their system had been developed 'in-house' but well over half had systems which were provided by a 'third party' supplier such as Barbour Index. Use of electronic information systems does not vary significantly across the range of sizes of practices and organisations examined. The table gives the use of electronic system across the professional groups.

- Electronic information system used by profession

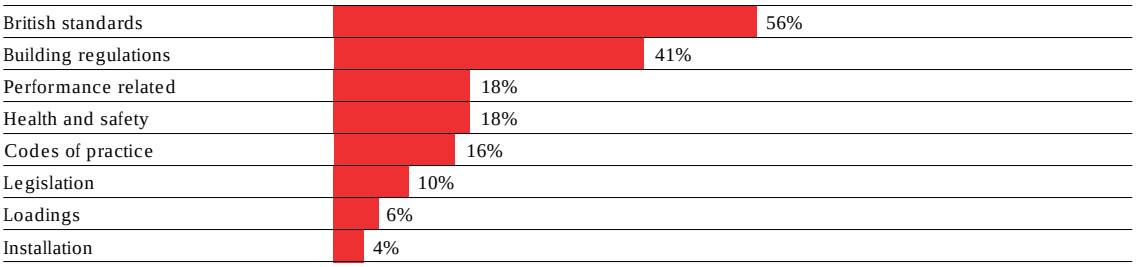
	Architects	Structural Engineers	M & E Engineers	Quantity Surveyors	Main Contractors
Barbour Index Construction Expert	38%	36%	38%	38%	18%
Technical Indexes	28%	35%	19%	6%	8%
In-house	18%	31%	21%	28%	38%
Other	19%	16%	24%	22%	25%

Source: Telephone programme (Base: 294 with electronic systems)

4.8 Types of technical information referred to on projects

For those who publish information in the form of product literature or technical data, it is important to understand the specific types of information most required by construction professionals.

- Most referred to technical information (unprompted)



Source: Telephone programme (Base: 383 needing to refer to technical information)

These unprompted responses show that information relating to British Standards and the Building regulations is most required from the technical viewpoint. Other information covering the performance of products and materials, use and compliance with the Health and Safety regulations, Codes of Practice and legislative issues is required.

- Types of technical information most frequently referred to (unprompted)

	Architects	Quantity Surveyors	M & E Engineers	Structural Engineers	Main Contractors
British standards	48%	44%	67%	78%	47%
Building regulations	61%	25%	33%	34%	32%
Performance related	16%	20%	15%	19%	24%
Health and Safety	19%	14%	15%	14%	29%
Codes of practice	14%	12%	12%	20%	20%
Legislation	15%	8%	14%	6%	3%
Loadings	2%	12%	2%	13%	5%
Installation	2%	8%	6%	2%	7%

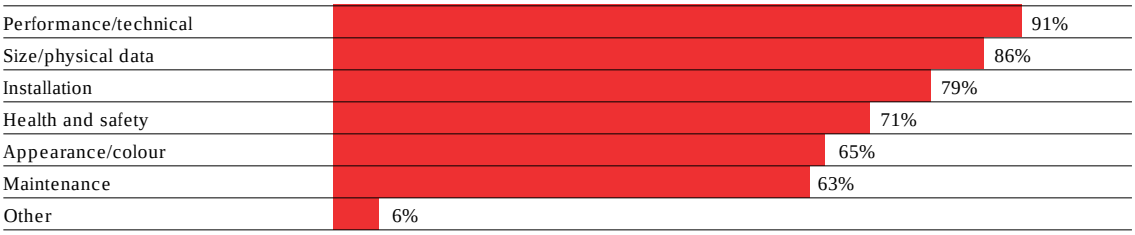
Source: Telephone programme (Base: 383 needing to refer to technical information)

Different respondent types show differing levels of use of technical information on the projects examined. For example, Engineers are more likely than any other profession to need British Standards information, whilst Architects said they refer to Building regulations at twice the rate of other groups. Main Contractors use more performance related information, one quarter said they use this compared to 16% of Architects. Similar patterns occur for Health and Safety information, where more Main Contractors said they used this compared to Architects.

4.9 Product information details needed

Receiving information containing the correct detail about a product increases the chance of the specifier making a favourable decision to use or specify it. Respondents were asked what details they needed most within product information.

- Most needed product information (prompted)



Source: Telephone programme (Base: 357 needing to refer to product information)

Clearly there is a need for product literature to be comprehensive and contain a full range of technical, installation and maintenance details. There are some differences in information requirements when examined by professional group.

- % needing product information (prompted)

	Performance/ technical	Size/physical data	Installation	Health and safety	Appearance/ colour	Maintenance
ALL	91%	86%	79%	71%	65%	63%
Architects	96%	92%	90%	87%	94%	80%
Quantity Surveyors	69%	73%	64%	38%	38%	31%
M & E Engineers	97%	95%	83%	80%	73%	66%
Structural Engineers	98%	84%	68%	55%	9%	46%
Main Contractors	88%	81%	77%	77%	72%	72%

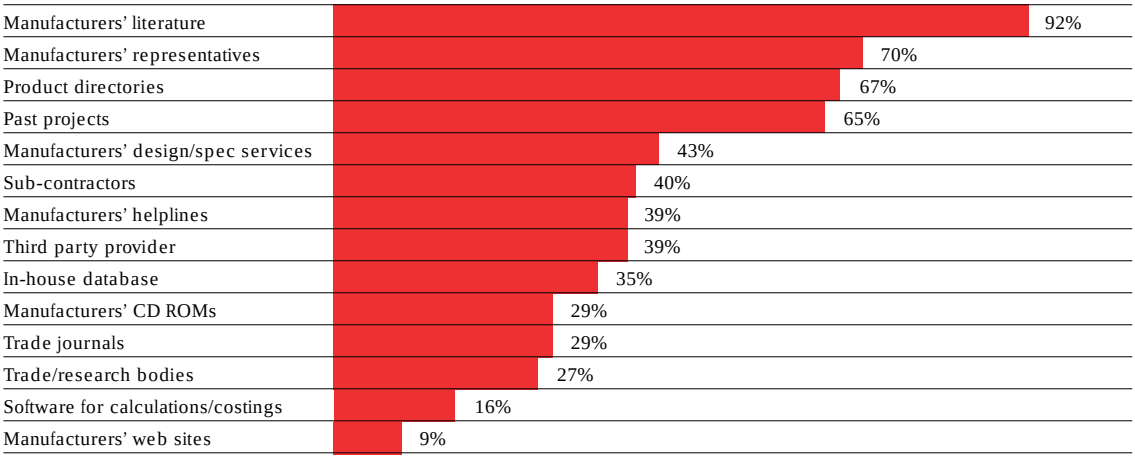
Source: Telephone programme (Base: 357 needing to refer to product information)

More Architects and M & E Engineers refer to all types of information and clearly need details covering the full spectrum of data than other groups. Quantity Surveyors on the other hand appear to have little interest in Health and Safety matters, appearance, colour or product maintenance issues.

4.10 Product information sources used on projects

The survey has established which sources of information are most used for product information across all the professional groups. The graph shows the proportions referring to each source on the project researched.

- Product information source used on researched projects



Source: Telephone programme (Base: 357 needing to refer to product information)

Note: Third party provider described as Barbour's CD ROM for example

The key role of information delivered directly by the building product manufacturers, i.e. contained in literature, delivered by representatives or provided by specification services and helplines is clearly identified. Product directories are the most used source for linking specifiers' with this range of manufacturers' directly delivered information sources.

- Sources used for product information by profession

	Architects	Quantity Surveyors	M & E Engineers	Structural Engineers	Main Contractors
Manufacturers' literature	94%	93%	95%	93%	81%
Manufacturers' representatives	83%	42%	88%	46%	72%
Product directories	84%	76%	59%	46%	54%
Past projects	73%	73%	66%	46%	58%
Manufacturers' design/spec services	58%	24%	42%	36%	35%
Sub-contractors	39%	40%	28%	18%	77%
Manufacturers' helplines	52%	29%	31%	39%	32%
Third party provider	47%	35%	36%	45%	30%
In-house database	30%	35%	39%	34%	44%
Manufacturers' CD ROMs	44%	2%	44%	20%	14%
Trade journals	34%	24%	34%	13%	30%
Trade/research bodies	34%	29%	23%	20%	25%
Software for calculations/costings	7%	20%	30%	18%	14%
Manufacturers' web sites	11%	9%	9%	11%	5%

Source: Telephone programme (Base: 402 respondents)

Manufacturers' literature has been identified as the most used source, by a significant margin, across all professional groups. The considerable investment in high quality literature made by many building product manufacturers therefore appears to be fully justified in terms of this measure of reference by decision-makers.

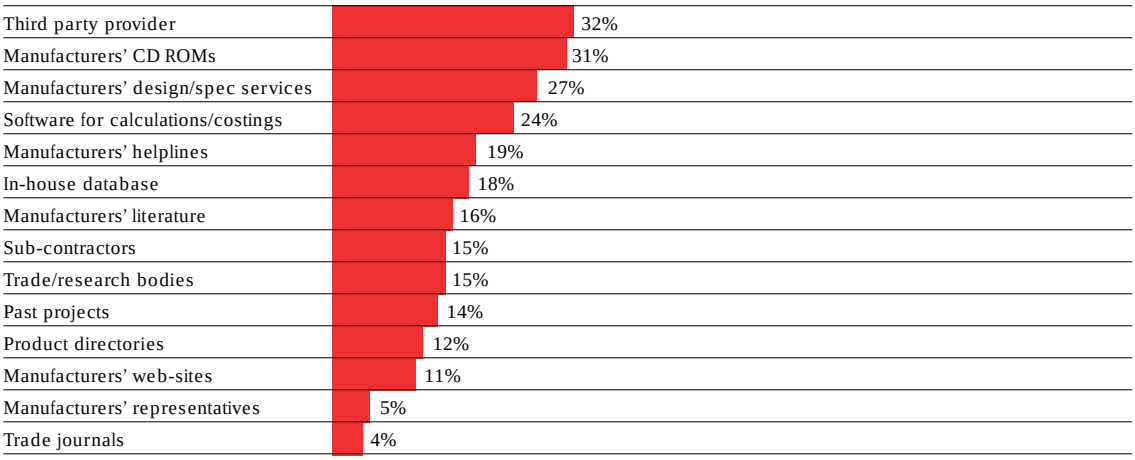
A significant number of Architects and M & E Engineers have made use of manufacturers' CD ROMs but those utilising manufacturers' web sites on these projects is low.

4.11 The future of the information gathering process

Trends in the last two years

Almost one-third of respondents to the main interview programme acknowledge that they are now using third party information sources more than they were two years ago. A similar proportion identify the impact that manufacturers' information issued on CD ROM has had in that period.

- Net increase in the use of information sources in the last two years



Source: Telephone programme (Base: 402 respondents)

Note: Third party provider described as Barbour's CD ROM for example

Although the use of third party providers has seen the highest growth in use in the last two years, four of the top seven sources are provided directly by manufacturers. This suggests that there is a growing use of services provided to support and develop a working relationship with product decision-makers after establishing initial contact.

Net increases in the use of information sources have been examined by profession.

- Net increase in use of information sources in last two years by profession

	Architects	Quantity Surveyors	M & E Engineers	Structural Engineers	Main Contractors
Third party provider	41%	22%	33%	38%	17%
Manufacturers' CD ROMs	41%	4%	54%	31%	13%
Manufacturers' design/spec services	34%	14%	18%	28%	34%
Software for calculations/costings	12%	25%	45%	41%	13%
Manufacturers' helplines	24%	9%	12%	28%	18%
In-house database	16%	20%	15%	19%	25%
Manufacturers' literature	16%	6%	7%	19%	34%
Sub-contractors	16%	19%	-5%	5%	40%
Trade/research bodies	18%	0%	25%	14%	15%
Past projects	18%	3%	16%	16%	13%
Product directories	5%	6%	24%	17%	16%
Manufacturers' web sites	17%	7%	10%	11%	7%
Manufacturers' representatives	4%	7%	4%	6%	12%
Trade journals	-1%	1%	12%	3%	9%

Source: Telephone programme (Base: 402 respondents)

Improvements required in the future

The survey invited respondents to give their views on how the information gathering process could be improved in the future. There were recurrent themes amongst the many comments and viewpoints. The following examples illustrate the kinds of responses given:

"We have spent years gathering information but it gets out of date. We need a method whereby information is updated regularly and is easily accessible"

"We need greater access throughout the industry to electronic methods"

"More information available at the desk rather than centrally"

"A good search engine is needed. The information is out there, the problem is finding it"

"All manufacturers suffer from too many pretty pictures on CD ROMs / web sites. Information needs to be more precise"

"I want access to electronic information that I can edit and incorporate in my documents"

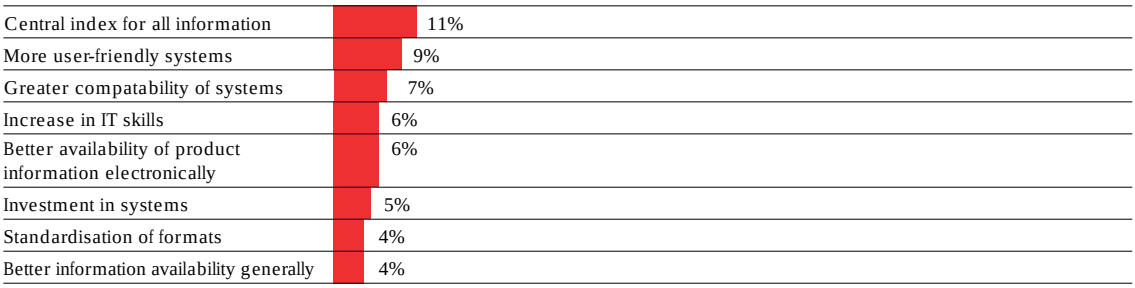
"Easy access to an index of producers web sites would be helpful"

"There is too much information available in too many different formats. I'm looking at knowledge transfer worldwide for our company at present"

"The whole system needs to be easier to access. Electronic systems are still not as easy as spreading paper out on the desk for cross-reference"

Overall, when all the comments offered were analysed, the following graph reflects the most common viewpoints.

- How can the information gathering process be improved? (unprompted)



Source: Telephone programme (Base: 402 respondents)

- Changes in access to electronic tools

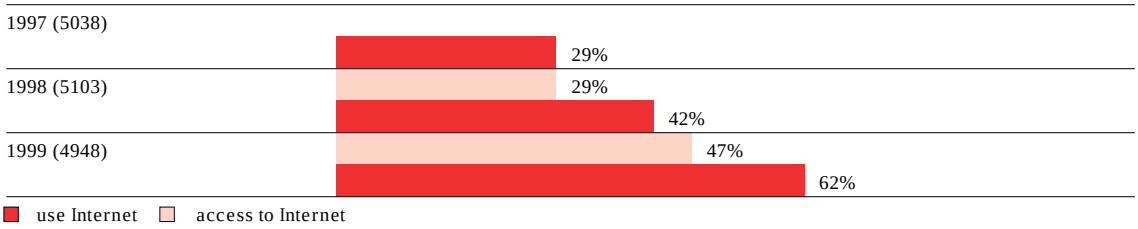
Increases in the use of manufacturers' CD ROMs and web sites can be expected to continue if the availability of hardware is used as a guide. Results from the Barbour Compendium User survey show CD ROM use amongst construction professionals at around 80%, having gone up from 50% in 1997. This is in line with the prediction made in the 1997 Barbour Report 'The Electronic Delivery of Product Information'.

- % Using CD ROM

Source: Barbour Compendium User Questionnaires 1997, 1998, 1999.

Access to the Internet in construction offices now stands at 62% and, perhaps more importantly, 47% are now using it, up from 29% in 1998.

- Access to and use of the Internet

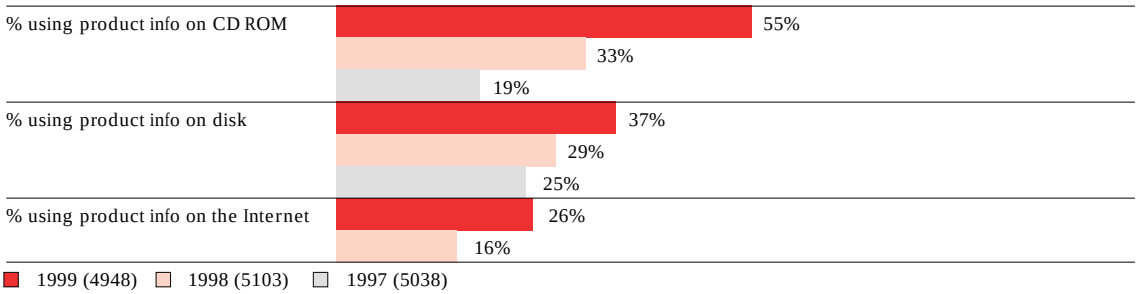


Source: Barbour Compendium User Questionnaires 1997, 1998, 1999.

Note: use of Internet added in 1998.

The investment by building product manufacturers in electronic media has clearly been recognised and taken up by specifiers and others involved in construction decision-making.

- Use of product information supplied by individual manufacturers on Disk, CD-ROM or the Internet



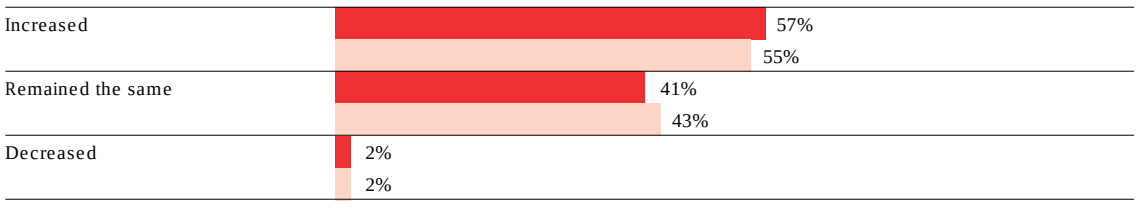
Source: Barbour Compendium User Questionnaires 1997, 1998, 1999.

Note: Internet added to 1998 questionnaire.

Use of product information on CD ROM has increased over each of the past three years, with a jump from one-third to over half in the numbers making use of this medium between '98 and '99. The number using disks has increased, but at the slowest rate. Use of the Internet to obtain product information increased by 10 percentage points between 1998 and 1999 with over one quarter now saying that they are using product information that has been accessed through this medium.

It should be noted that levels of stated usage of CD ROM and Internet for product information shown here are higher than those in Section 4.10 which relate to specific use on the projects researched.

- Use of the Internet for Construction business in the last year



Source: Barbour Compendium User Questionnaires 1998, 1999.

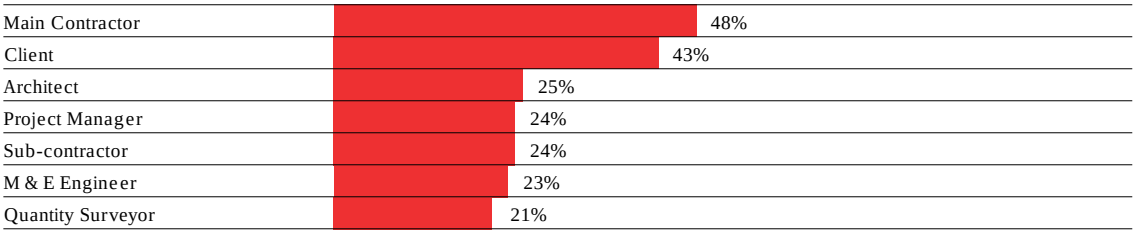
Well over half of respondents recognise that their use of the Internet in connection with their business has been increasing year on year since 1997 (January 1998 figures). Whilst we cannot define the extent of use for those saying that usage has remained the same, the lack of respondents noting a decrease suggests that once adopted, the Internet becomes an integral and increasingly used tool.

5. TRENDS IN SPECIFICATION PRACTICE

5.1 Changes in the last two years

Knowing how patterns of specification are changing is important if manufacturers are to address these in their marketing and selling approaches. The first Barbour Report in 1993, 'The Changing Face of Specification', and the subsequent report in 1994 'Contractors' Influence on Product Decisions' both highlighted the increasing influence of the Main Contractor. This year's research has established the current situation.

- Increase in influence on product decisions compared with two years' ago

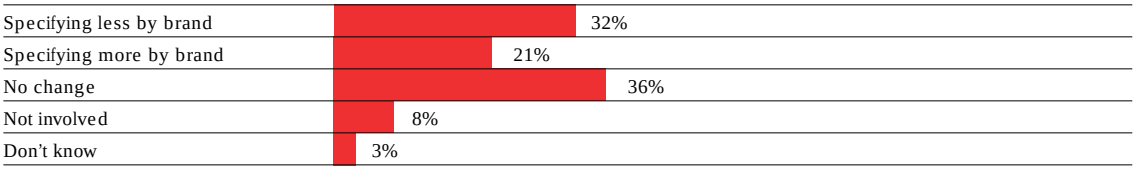


Source: Telephone programme (Base: 402 respondents)

Just under half of respondents think that the Main Contractor has more influence on product decisions now than two years ago. A similar pattern has emerged for Clients with over 40% of respondents believing this group now has greater influence. This was examined in detail in the 1995 Barbour Report 'The Influence of Clients on Product Decisions'.

The nature of specification is also changing; in the group discussion, specifiers suggested that it was becoming increasingly difficult to specify by brand on certain types of projects, particularly those with lottery funding and EEC or Government commissions.

- Changes in specification of brand compared with two years' ago



Source: Telephone programme (Base: 402 respondents)

Just under one-third suggest they are now specifying less by brand than they were two years ago although two in ten said they were being more brand specific. When examined by profession, interestingly, the only group specifying more by brand than they were two years ago are the Main Contractors.

- Changes in brand specification by profession

	Less by brand	More by brand	No change	Net Change
ALL	32%	21%	36%	-11%
Architects	32%	22%	39%	-10%
Quantity Surveyors	28%	12%	28%	-16%
M & E Engineers	25%	21%	49%	-4%
Structural Engineers	42%	11%	44%	-31%
Main Contractors	32%	37%	19%	+5%

Source: Telephone programme (Base: 402 respondents)

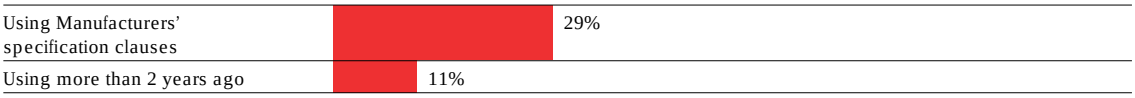
Further conclusions may be drawn from these figures: 42% of Structural Engineers are specifying less by brand, so those manufacturers of materials which would normally be specified by these professionals must now seek to identify the other parties who are taking the brand decisions. In this particular case it is likely to be organisations such as steelwork fabricators, main contractors or cladding specialists who have the final decision on the specific products used in the project.

5.2 Use of manufacturers' specification clauses

Anecdotal evidence in recent years has suggested that specifiers are now using specification clauses issued by manufacturers' who have sought to ensure that products are described in the most beneficial terms.

The research has quantified the number of respondents currently using these specification clauses and the percentage who believe they are using them more than they were two years ago.

- % using standard approaches



Source: Telephone programme (Base: 402 respondents)

Three in ten have made use of manufacturers' specification clauses and 11% feel they are now using them more than they were two years ago. There are interesting differences when examined by profession.

- % using manufacturers' standard clauses by profession

	% using manufacturers' clauses	% using more than 2 years ago
ALL	29%	11%
Architects	41%	14%
Quantity Surveyors	18%	6%
M & E Engineers	22%	7%
Structural Engineers	19%	2%
Main Contractors	35%	22%

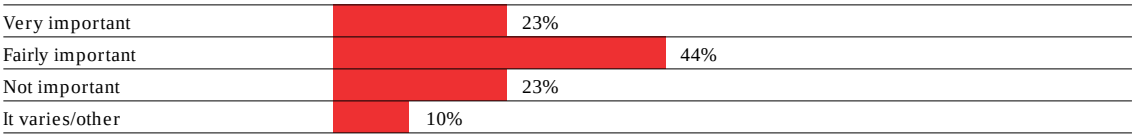
Source: Telephone programme (Base: 402 respondents)

Architects and Main Contractors in particular are making use of manufacturers' specification clauses and the highest proportion of these same two groups have seen their usage grow in the last two years.

5.3 Importance of manufacturers having QA approvals

The research investigated whether manufacturers having QA approval was an important issue for construction professionals.

- Importance of manufacturers having QA status



Source: Telephone programme (Base: 357 respondents needing to refer to product information)

The results show that QA approval is an important, but not an essential requirement for inclusion within a project. There are interesting differences when viewed by profession. Architects attach the least importance to QA status whilst Structural Engineers seem to give it a much higher emphasis. Seven out of ten Main Contractors rated having QA approval as important.

- Importance of manufacturers having QA status by profession

	% stating it is very/fairly important
ALL	67%
Architects	56%
Quantity Surveyors	67%
M & E Engineers	75%
Structural Engineers	80%
Main Contractors	70%

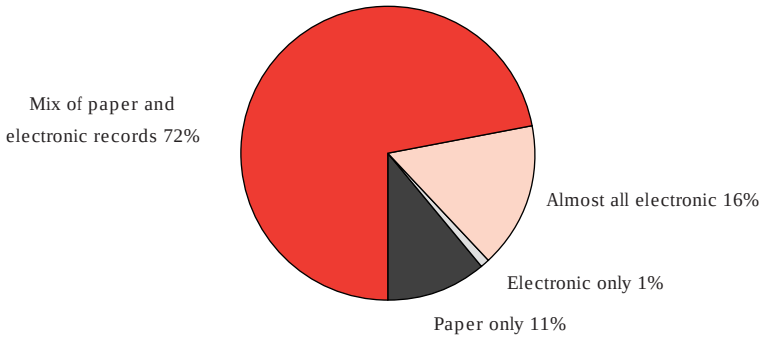
Source: Telephone programme (Base: 357 respondents needing to refer to product information)

6. THE RECORDING OF PROJECT INFORMATION

In the previous sections, the sources and formats of information used on projects have been examined. Information gathered is incorporated into each professional's output for onward communication to others in the construction chain. But how is this done? Has this process yet become electronic or is it still utilising paper based formats such as drawings and specification manuals?

The practice on the projects researched has been examined with the main communicators, the Architects on each project. In each case the format for recording information was established and the benefits of the particular methods used.

- Architects' view of general handling of project information on projects researched



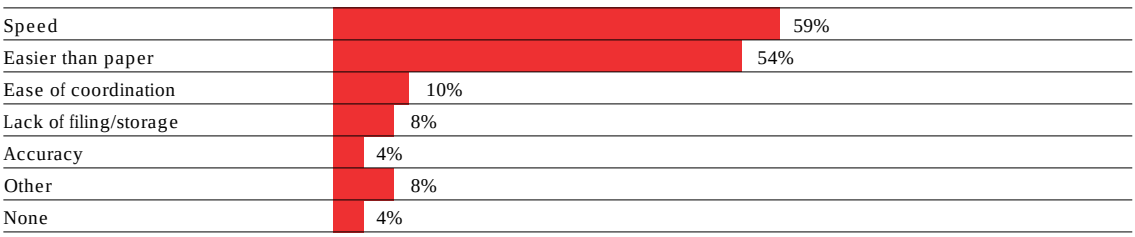
Source: Telephone programme (Base: 132 Architects)

80% of projects used some paper-based methods. However, almost 90% were using information electronically to some degree. 17% of projects have gone almost or totally to electronic means.

Wherever electronic methods were used, the determinant for this was mainly the Architect. The Client was thought to have driven the process on 15% of projects although for projects over £10m, this increased to 22%. Others credited with encouraging electronic information handling included Contractors (7%), mainly in Design and Build situations. This adds to over 100% as some felt that a joint decision had occurred between parties.

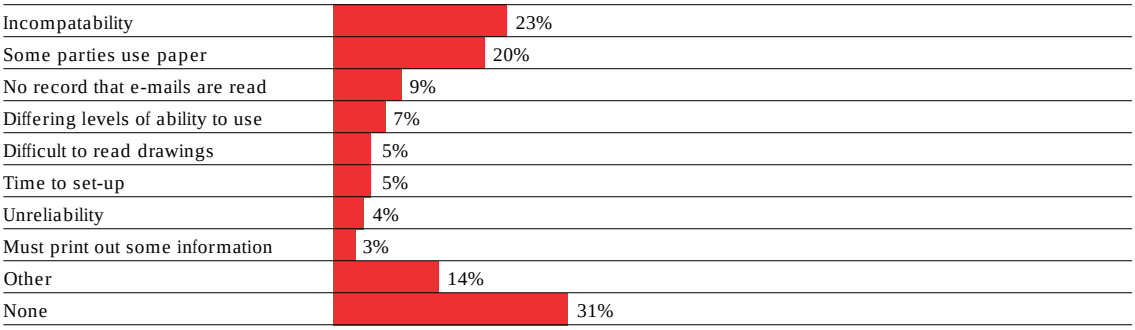
The Architects were asked to identify the main benefits accruing from the move to electronic tools.

- Benefits gained from use of electronic tools (unprompted)



Source: Telephone programme (Base: 115 Architects whose projects involved use of electronic records)

- Problems experienced with electronic tools (unprompted)



Source: Telephone programme (Base: 115 Architects whose projects involved use of electronic records)

The benefits mainly noted were improvements in speed and ease of use. However, the most identified problems referred to issues about the compatibility of systems used by different parties and the failure of others to adopt the electronic formats.

Information assembled for a project is recorded for on-going reference and as a record of the actual information used at the time. There has been much talk of the age of the paperless office, but this, it appears, has yet to have an impact on recording information relating to building products and processes used on a project.

- Recording of information gathered on project by profession

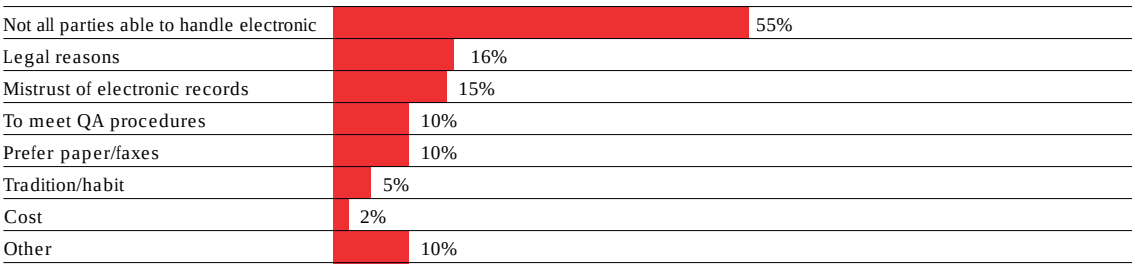
	Paper record	Electronic record	Incorporated into CAD
ALL	80%	37%	32%
Architects	77%	39%	48%
Main Contractors	88%	28%	6%
Quantity Surveyors	84%	39%	7%
M & E Engineers	72%	45%	40%
Structural Engineers	83%	34%	45%

Source: Telephone programme (Base: 402 respondents)

Whilst a little over one-third of respondents record some information electronically, and just under one-third incorporate information directly into their CAD models, eight out of ten still retain paper based records.

Those using paper to any degree were asked why records are maintained in hard copy rather than electronically.

- Reasons why paper records are still maintained (% of those still using paper)



Source: Telephone programme (Base: 128 Architects whose projects involved paper records)

The ’99 Barbour Compendium User Survey identified that over 90% of construction professionals have access to a PC and 73% have access to a modem. This therefore suggests that it is software incompatibility or user education, rather than a lack of hardware, that is the constraint upon the transition from paper to electronic record keeping. Other reasons identified in this survey for the maintenance of paper records relate to legal and QA responsibilities for record keeping and a certain mistrust of the whole electronic recording process.

As QA procedures were identified by some respondents in the interview programme as a reason for retaining paper records, with two-thirds saying it is important for manufacturers to be QA approved, the survey established how many construction organisations have QA status themselves.

- % of organisations with QA approval

ALL	57%
Architects	37%
Quantity Surveyors	70%
M & E Engineers	55%
Structural Engineers	70%
Main Contractors	76%

Source: Telephone programme (Base: 402 respondents)

It is interesting to note that the Architects, who place the lowest levels of importance on QA approval for manufacturers, have the lowest levels of approvals themselves.

7. COMMUNICATING PRODUCT INFORMATION WITHIN THE PROJECT TEAM

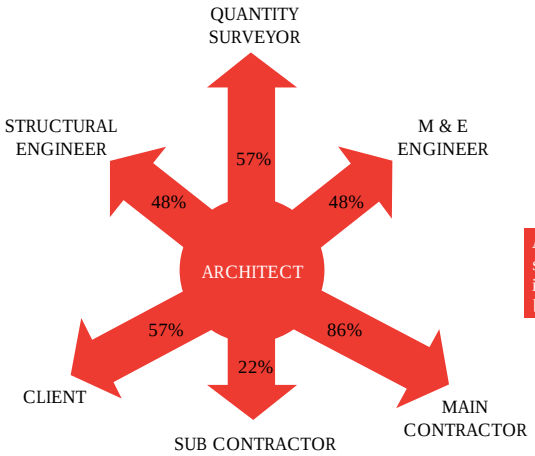
7.1 Product information flows and formats used within the project team

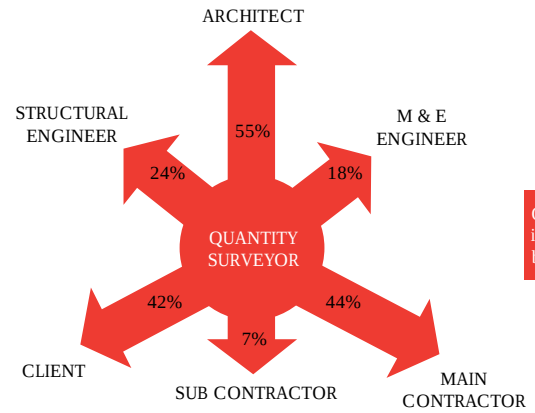
The parties who send product information to one another and the routes by which they pass this information have been examined in detail.

The greatest communicators of information are the Architects and Main Contractors. The diagrams to the left provide an understanding of the extent and direction of this product information flow across the construction project team. For example, the first diagram shows that 57% of Architects sent product information to the Quantity Surveyor on the projects examined.

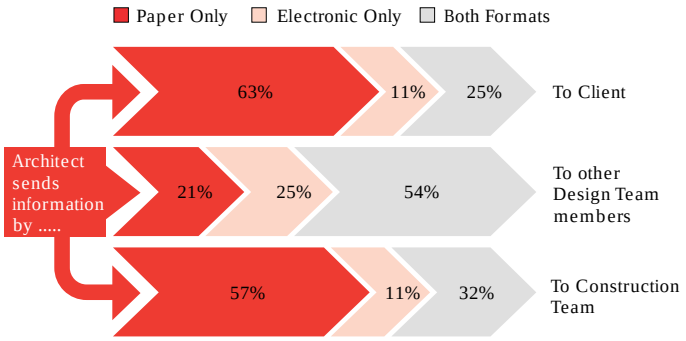
The formats used to pass information differ by profession and by recipient group and this is highlighted by the diagrams on the right. The diagrams for each profession illustrate the percentage of each medium used when communicating between the Client organisation, fellow members of the design team and the construction team. The first diagram shows that when communicating with the Client, 63% of Architects used paper only, 11% used electronic methods only and 25% used both paper and electronic.

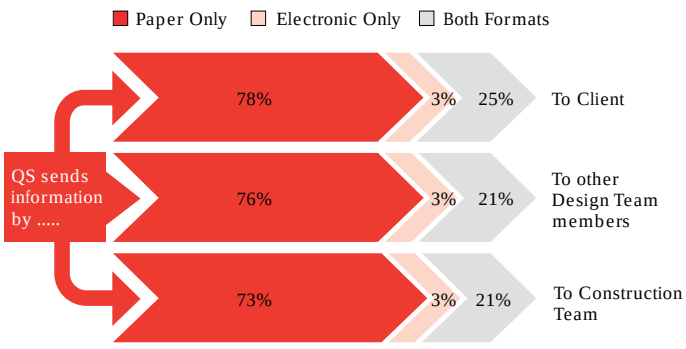
Product information flow from professions

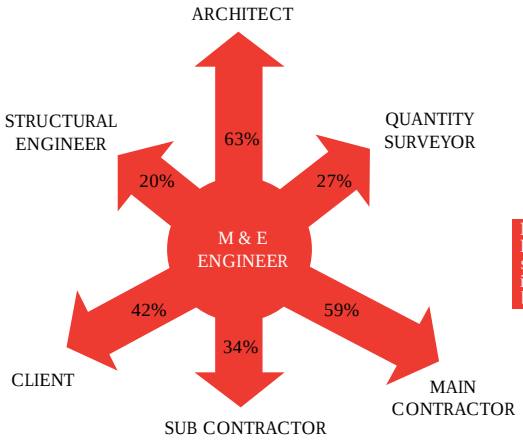


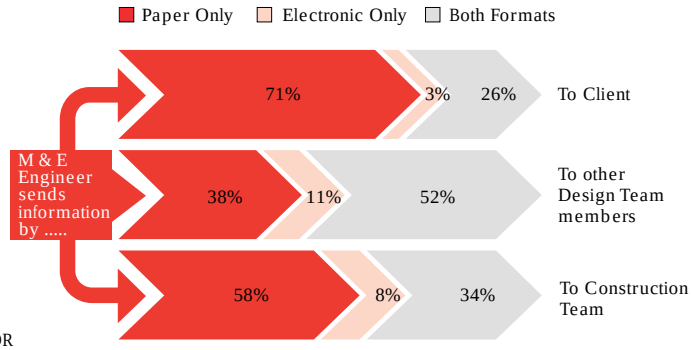


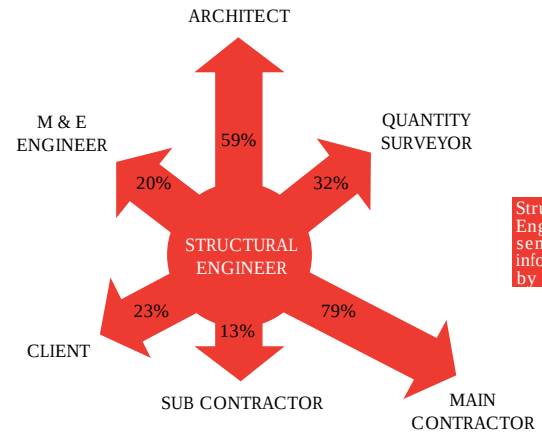
Formats used to transfer product information

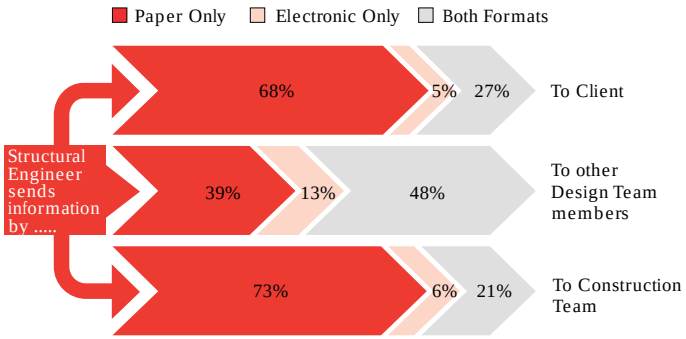


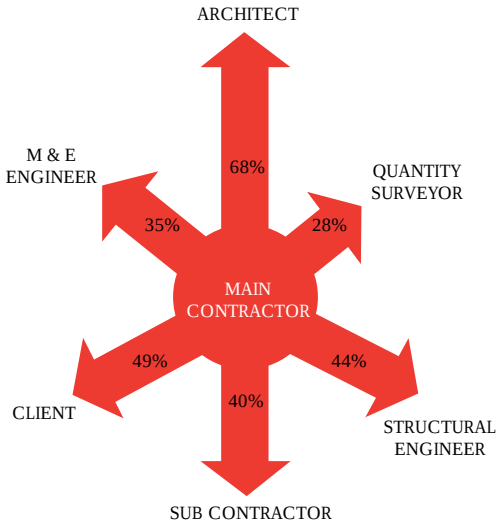


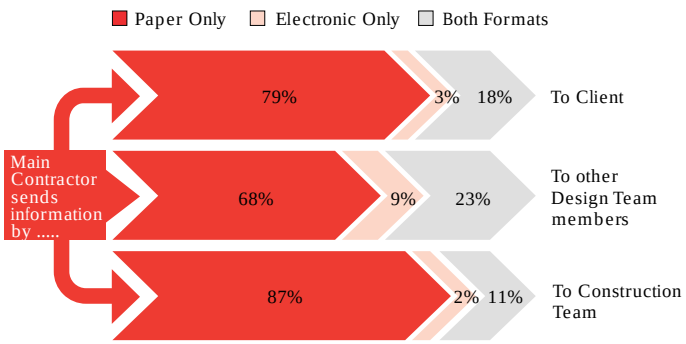












Source: Telephone programme (Base: 402 respondents)

Source: Telephone programme (Base: 402 respondents)

7.2 Did you maintain an audit trail on this project?

One of the issues surrounding electronic communications is the availability of records to confirm delivery and receipt of information. Another concern relates to recording any changes which may be made by different parties to a single document. Having a method of recording the movements of information, and being able to audit this process, can prove invaluable in the event of disputes or claims.

- % who maintained an audit trail

ALL	56%
Architects	39%
Quantity Surveyors	76%
M & E Engineers	64%
Structural Engineers	58%
Main Contractors	60%

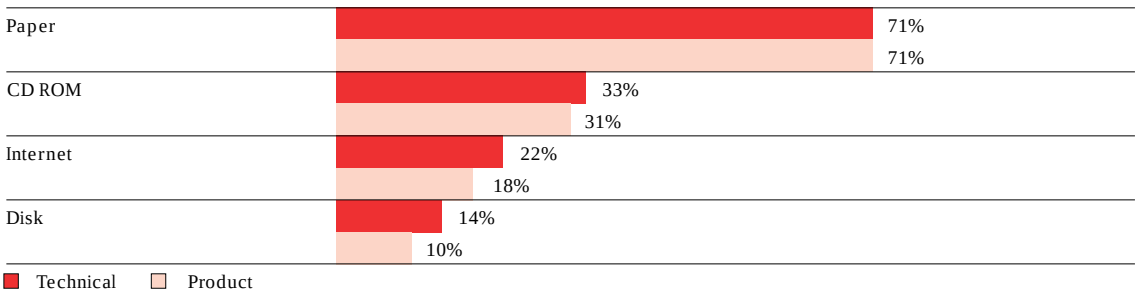
Source: Telephone programme (Base: 402 respondents)

Overall, over a half said they maintained an audit trail for the projects examined. When examined by profession, 39% of Architects said they had kept an audit trail, compared to 76% of Quantity Surveyors and 64% of M & E Engineers. During the research it was noted that the incidence of an audit trail increases as the contract value rises.

7.3 The delivery of information - today and in the future

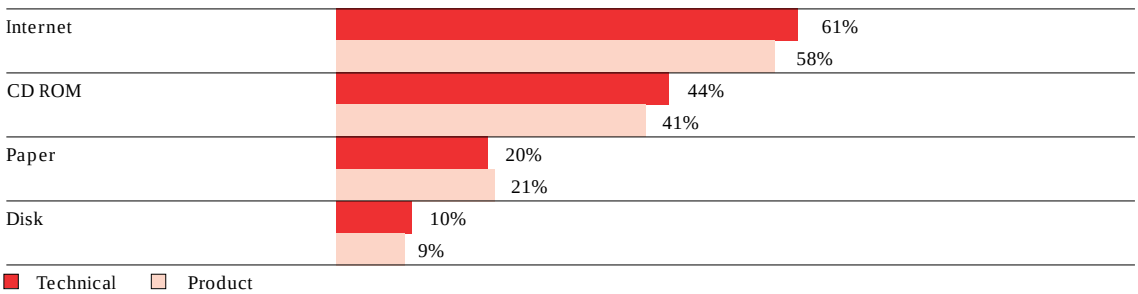
The 1997 Barbour Report, 'Electronic Delivery of Product Information', identified preferences for the future delivery of product information. At that time, 43% expressed a preference for delivery on CD ROM, with 11% preferring the Internet. This research, illustrated below, shows that there has been a change of view regarding the format of electronic delivery. CD ROM preference has declined by 10 percentage points to 33% whilst preference for the Internet has increased to 22%.

- Information formats preferred today



Source: Telephone programme (Base: 402 respondents)

- Anticipated preference in two years' time



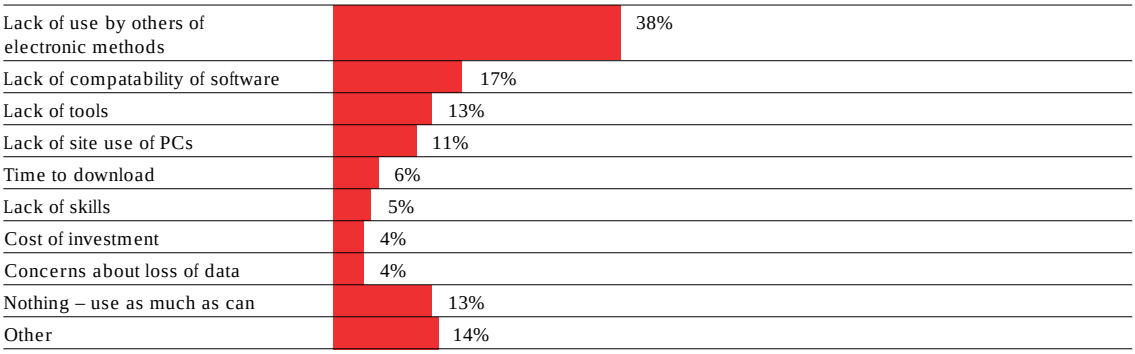
Source: Telephone programme (Base: 402 respondents)

Note: adds to more than 100% as more than one method stated

The trend towards receiving information across the Internet is clearly shown when respondents' anticipated preference two years ahead is examined. There is a strong preference for both technical and product information conveyed via the Internet.

Respondents were asked to suggest why electronic delivery has not developed further from the levels recorded in the 1997 Barbour Report?

- What is limiting delivery of information in electronic formats today?



Source: Telephone programme (Base: 402 respondents)

It appears that lack of commitment to using the available processes and failure to ensure the compatibility of tools are the main limitations.

Respondents were asked how they would react if more information was delivered to them in electronic formats. 78% stated they would react positively, or would not have any concerns, if more project information were passed to them in an electronic format.

8. IMPLICATIONS FOR MANUFACTURERS

The '97 Barbour Report 'Electronic Delivery of Product Information' identified the growing use of electronic information and sought to establish future trends. Two years on where are we?

This research shows that the availability of new technology has gone much as predicted, but its integration into working practices, and the impact on information sourcing, recording and communicating has been much slower.

Lack of compatibility of systems and lack of commitment from organisations is failing to drive adoption. This problem is compounded by different adoption rates in different parts of the project team.

Design information is more likely to be required electronically whilst those concerned with installation and erection still have a notable preference for hard copy.

Concerns about the need to ensure and track the movement and use of information for legal and professional reasons are likely to continue to constrain the transition. As a consequence, manufacturers are faced with the expense of continuing to provide information in hard copy whilst developing new electronic formats. Furthermore, they must ensure that the appropriate format is made available to each party within a given project team.

Manufacturers have the opportunity to encourage the use of information relating to their specific products by ensuring that as new communication material is prepared it incorporates all the required elements which users have identified, within media which integrates, interactively with their day-to-day working practices.

9. CASE STUDIES

Five projects have been chosen from the detailed interview programme for further in-depth analysis. Diverse projects have been selected to look for differences in the information handling and communication processes.

In each case, additional members of these specific project teams have been interviewed. Responses from the Architect, Quantity Surveyor, Main Contractor and at least one of the engineering professionals are assembled here to provide an overall picture of information use and communication practice on these five projects.

Project	New flagship retail store in out-of-town development £10-20m	Refurbishment of 18th century group of buildings £5-10m
General method of handling information on project	Paper/electronic (Consultants and Client driven)	Mainly paper
Benefits gained from electronic methods where used	Easier for cross-referencing information	Provided additional back-up
Drawbacks experienced	Incompatibility of systems, not all parties able to handle electronic data	Concerns about loss of data
Who needed product information?	Architect, M & E Engineer, QS, Main Contractor	Architect, M & E Engineer, QS, Main Contractor
To whom did Architect pass product information?	Client, QS, M & E Engineer, Structural Engineer, Main Contractor, Planning Officer	Client, QS, Main Contractor
Use of electronic information system	Architect, Structural Engineer, Main Contractor	M & E Engineer, Structural Engineer
Recording of information gathered on project	Architect: CAD and on paper QS: electronic files and on paper Structural Engineer: CAD, electronic file, on paper M & E Engineer managed the Sub-contractors and did not record information Main Contractor: on paper	Architect: CAD, electronic files and on paper QS: on paper Structural Engineer: incorporated into CAD, electronic files and on paper M & E Engineer: CAD and on paper Main Contractor: on paper
Standard specification tools used by Architect	Clients standard specs and Architect's own	NBS and in-house standard specs
Did Architect maintain an audit trail?	No	No
Exchange of information	Architect received instructions from Client on CD ROM and communicated with all parties by e-mail and on paper	Architect communicated with all parties on paper, Structural Engineer passed information to design team and Client on CD ROM, M & E Engineer: disk, QS: on paper
Quotes	*"The weak link in the electronic connection is the Sub-contractor. There is a good flow between us and the design teams"* M & E Engineer *"Too many manufacturers are just setting up sites with no information on them"* Main Contractor	*"It's often easier to flip through manuals than wait for a CD ROM to load"* M & E Engineer *"Use of e-mail by all parties would speed up the process, and ensure everyone has up-to-date information"* QS

HQ office building Over £20m	New museum, lottery funded £10m	New public library Under £5m
Paper/electronic (Architect led). Paper used for QA and legal reasons	Paper/electronic (Architect driven)	Paper/electronic (Architect driven)
Ease of communication	Faster than paper	Ease of co-ordination
None	Differing abilities to use electronic methods	Time taken to put information into digital form (CAD)
Architect, M & E Engineer, Structural Engineer, Main Contractor (not QS)	Architect, QS, Structural Engineer, M & E Engineer	Architect and M & E Engineer (not QS)
Client, QS, Structural Engineer, M & E Engineer, Planning Officer	Client, Project Manager, QS, Structural and M & E Engineer, Main and Sub-contractors, Planning Officer, Lottery Inspectorate, Disabled Access group	Client, Project Manager, QS, Structural Engineer, Main and Sub-contractors, Planning Officer
Architect, M & E Engineer, Structural Engineer, Main Contractor	Architect, QS, Structural Engineer, Planning Engineer	Quantity Surveyor
Architect: CAD, electronic file, paper QS: electronic file and paper M&E Engineer: paper Structural Engineer: paper Main Contractor: electronic file, paper	Architect: CAD and paper QS: on paper Structural Engineer: on paper M & E Engineer: on paper Planning Engineer: on paper	Architect: electronic record, CAD, paper QS: electronic record and paper M & E Engineer: CAD
NBS	NBS	NBS
No	No	Yes
Architect communicated with other members of design team by e-mail, CD ROM, disk and on paper, with the Client and QS on paper, Main Contractor passed information to design team on disk but on paper to the Construction team	Architect communicated with design team by e-mail, disk, CD ROM, paper, CAD QS used paper, Planning Engineer used paper	Architect mainly used paper to communicate with Client, design team and construction, QS also used paper
"We need a simple way of accessing the sheer volume of information that exists and finding our way around it" Architect *"It is falling more and more to the Contractor to find solutions. Greater controls and restrictions mean more research is needed"* Main Contractor	*"As busy designers we do not have enough time to study the systems available which would give us more confidence to use them"* M & E Engineer *"Information needs to be concise preferably with overviews"* Architect	*"More responsibility for gathering information has been passed to the contractor"* QS *"We need a centralised information source on the Internet with a good search engine"* Architect

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