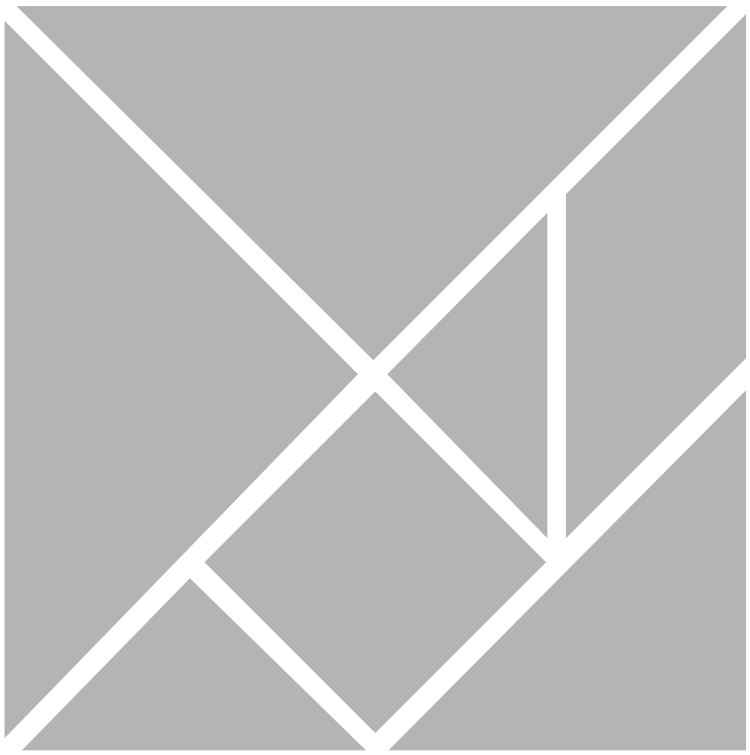
RETHINKING



CONSTRUCTION

THE REPORT OF THE CONSTRUCTION TASK FORCE

Rethinking Construction

The report of the Construction Task Force to the Deputy Prime Minister, John Prescott, on the scope for improving the quality and efficiency of UK construction.

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Foreword by Sir John Egan

Deputy Prime Minister

“It gives me great pleasure to present the report of the Construction Task Force on the scope for improving quality and efficiency in UK construction.

A successful construction industry is essential to us all. we all benefit from high quality housing, hospitals or transport infrastructure that are constructed efficiently. At its best the UK construction industry displays excellence. But, there is no doubt that substantial improvements in quality and efficiency are possible. Indeed, they are vital if the industry is to satisfy all its customers and reap the benefits of becoming a world leader. The Construction Task Force wishes to see the dramatic improvements already being demonstrated on client-led projects spread throughout UK construction.

In formulating our proposals for improving performance we have studied the experience that has been gained at the cutting edge of construction and in other industries that have transformed themselves in recent years. We have learnt that continuous and sustained improvement is achievable if we focus all our efforts on delivering the value that our customers need, and if we are prepared to challenge the waste and poor quality arising from our existing structures and working practices.

We know that it is not easy to sustain radical improvement in an industry as diverse as construction. But, we must do so to secure our future. Through the Task Force, the major clients have committed themselves to driving forward the modernisation of the construction industry. We look to Government, as the largest client, to join us. But, we are also issuing a challenge to the construction industry to commit itself to change, so that, working together, we can create a modern industry, ready to face the new millennium.”

Sir John Egan
Chairman of the Construction Task Force

Executive Summary

- The UK construction industry at its best is excellent. Its capability to deliver the most difficult and innovative projects matches that of any other construction industry in the world (paragraph 3).

- Nonetheless, there is deep concern that the industry as a whole is under-achieving. It has low profitability and invests too little in capital, research and development and training. Too many of the industry's clients are dissatisfied with its overall performance (paragraphs 4-6).

- The Task Force's ambition for construction is informed by our experience of radical change and improvement in other industries, and by our experience of delivering improvements in quality and efficiency within our own construction programmes. We are convinced that these improvements can be spread throughout the construction industry and made available to all its clients (paragraphs 15, 16 and 18).

- We have identified five key drivers of change which need to set the agenda for the construction industry at large: *committed leadership, a focus on the customer, integrated processes and teams, a quality driven agenda and commitment to people* (paragraph 17).

- Our experience tells us that ambitious targets and effective measurement of performance are essential to deliver improvement. We have proposed a series of targets for annual improvement and we would like to see more extensive use of performance data by the industry to inform its clients (paragraphs 19-22).

- Our targets are based on our own experience and evidence that we have obtained from projects in the UK and overseas. Our targets include annual reductions of 10% *in construction cost and construction time. We also propose that defects in projects should be reduced by 20% per year* (paragraphs 23-26).

- To achieve these targets the industry will need to make radical changes to the processes through which it delivers its projects. These processes should be explicit and transparent to the industry and its clients. The industry should create an integrated project process around the four key elements of *product development, project implementation, partnering the supply chain and production of components.* Sustained improvement should then be delivered through use of techniques for eliminating waste and increasing value for the customer (chapter 3).

- If the industry is to achieve its full potential, substantial changes in its culture and structure are also required to support improvement. The industry must provide *decent and safe working conditions and improve management and supervisory skills* at all levels. The industry must design projects for ease of construction making maximum use of standard components and processes (paragraphs 53-61).

- The industry must replace competitive tendering with *long term relationships* based on clear measurement of performance and *sustained improvements in quality and efficiency* (paragraphs 67- 71).

- The Task Force has looked specifically at housebuilding. We believe that the main initial opportunities for improvements in housebuilding performance exist in the social housing sector for the simple reason that most social housing is commissioned by a few major clients. Corporate clients – housing associations and local authorities – can work with the housebuilding industry to improve processes and technologies and develop quality products. We propose that a forum for improving performance in housebuilding is established (paragraphs 75- 79).

- The Task force has concluded that the major clients of the construction industry must give leadership by implementing projects which will demonstrate the approach that we have described. We want other clients, including those from across the public sector, to join us in sponsoring demonstration projects. We also wish to see the construction industry join us in these projects and devise its own means of making improved performance available to all its clients. Our ambition is to make a start with at least £500 million of demonstration projects (paragraphs 82-83).

- In sum, we propose to initiate a movement for change in the construction industry, for radical improvement in the process of construction. This movement will be the means of sustaining improvement and sharing learning (paragraph 84).

- We invite the Deputy Prime Minister to turn his Department's Best Practice Programme into a knowledge centre for construction which will give the whole industry and all of its clients access to information and learning from the demonstration projects. There is a real opportunity for the industry to develop independent and objective assessments of completed projects and of the performance of companies (paragraph 85).

- The public sector has a vital role to play in leading development of a more sophisticated and demanding customer base for construction. The Task Force invites the Government to commit itself to leading public sector bodies towards the goal of becoming best practice clients seeking improvements in efficiency and quality through the methods that we have proposed (paragraphs 86-87).

- The members of the Task Force and other major clients will continue their drive for improved performance, and will focus their efforts on the demonstration projects. We ask the Government and the industry to join with us in rethinking construction.

CHAPTER 1
The Need to Improve

1. The Construction Task Force has been set up by the Deputy Prime Minister against a background of deep concern in the industry and among its clients that the construction industry is under-achieving, both in terms of meeting its own needs and those of its clients.

2. Construction in the UK is one of the pillars of the domestic economy. The industry in its widest sense is likely to have an output of some £58 billions in 1998, equivalent to roughly 10% of GDP and employs around 1.4 million people. It is simply too important to be allowed to stagnate.

3. UK construction at its best is excellent. We applaud the engineering ingenuity and design flair that are renowned both here and overseas. The industry is also eminently flexible. Its labour force is willing, adaptable and able to work in the harshest conditions. Its capability to deliver the most difficult and innovative projects matches that of any other construction industry in the world.

The Terms of Reference of the Construction Task Force

To advise the Deputy Prime Minister from the clients' perspective on the opportunities to improve efficiency and quality of delivery of UK construction, to reinforce the impetus for change and to make the industry more responsive to customer needs.

The Task Force will:

- quantify the scope for improving construction efficiency and derive relevant quality and efficiency targets and performance measures which might be adopted by UK construction;
- examine current practice and the scope for improving it by innovation in products and processes;
- identify specific actions and good practice which would help achieve more efficient construction in terms of quality and customer satisfaction, timeliness in delivery and value for money;
- identify projects to help demonstrate the improvements that can be achieved through the application of best practice.

The Deputy Prime Minister wishes especially to be advised on improving the quality and efficiency of housebuilding.

The members of the Construction Task Force
Sir John Egan (Chairman), Chief Executive, BAA plc.
Mike Raycraft, Property Services Director, Tesco Stores Ltd.
Ian Gibson, Managing Director, Nissan UK Ltd.
Sir Brian Moffatt, Chief Executive, British Steel plc.
Alan Parker, Managing Director, Whitbread Hotels.
Anthony Mayer, Chief Executive, Housing Corporation.
Sir Nigel Mobbs, Chairman, Slough Estates and Chief Executive, Bovis Homes.
Professor Daniel Jones, Director of the Lean Enterprise Centre, Cardiff Business School.
David Gye, Director, Morgan Stanley & Co Ltd.
David Warburton, GMB Union.

Need to Modernise

4. Nevertheless, the industry recognises that it needs to modernise in order to tackle the severe problems facing it, not least that:

- it has a low and unreliable rate of profitability. Margins are characteristically very low. The view of the Task Force is that these are too low for the industry to sustain healthy development and we wish to see those companies who serve their clients well making much better returns;

- it invests little in research and development and in capital. In-house R & D has fallen by 80% since 1981 and capital investment is a third of what it was twenty years ago. This lack of investment is damaging the industry's ability to keep abreast of innovation in processes and technology;

- there is a crisis in training. The proportion of trainees in the workforce appears to have declined by half since the 1970s and there is increasing concern about skill shortages in the industry. Too few people are being trained to replace the ageing skilled workforce, and too few are acquiring the technical and managerial skills required to get full value from new techniques and technologies. Construction also lacks a proper career structure to develop supervisory and management grades;

- too many clients are undiscriminating and still equate price with cost, selecting designers and constructors almost exclusively on the basis of tendered price. This tendency is widely seen as one of the greatest barriers to improvement. The public sector, because of its need to interpret accountability in a rather narrow sense, is often viewed as a major culprit in this respect. The industry needs to educate and help its clients to differentiate between best value and lowest price.

Client Dissatisfaction

5. Under-achievement can also be found in the growing dissatisfaction with construction among both private and public sector clients. Projects are widely seen as unpredictable in terms of delivery on time, within budget and to the standards of quality expected. Investment in construction is seen as expensive, when compared both to other goods and services and to other countries. In short, construction too often fails to meet the needs of modern businesses that must be competitive in international markets, and rarely provides best value for clients and taxpayers.

6. The under-achievement of construction is graphically demonstrated by the City's view of the industry as a poor investment. The City regards construction as a business that is unpredictable, competitive only on price not quality, with too few barriers to entry for poor performers. With few exceptions, investors cannot identify brands among companies to which they can attach future value. As a result there are few loyal, strategic long-term shareholders in quoted construction companies.

7. Discussions with City analysts suggest that effective barriers to entry in the construction industry, together with structural changes that differentiated brands and improved companies' "quality of earnings" (i.e. stability and predictability of margins), could result in higher share prices and more strategic shareholders. We believe such a change towards stability of profit margins would be at least as highly valued by the City as a simple increase in margins.

The Client View

The British Property Federations 1997 survey of major UK clients reveals that:

- more than a third of major clients are dissatisfied with contractors' performance in keeping to the quoted price and to time, resolving defects, and delivering a final product of the required quality;
- more than a third of major clients are dissatisfied with consultants' performance in co-ordinating teams, in design and innovation, in providing a speedy and reliable service and in providing value for money.

A recent survey by the Design Build Foundation shows that:

- clients want greater value from their buildings by achieving a clearer focus on meeting functional business needs;
- clients' immediate priorities are to reduce capital costs and improve the quality of new buildings;
- clients believe that a longer-term, more important issue is reducing running-costs and improving the standard of existing buildings;
- clients believe that significant value improvement and cost reduction can be gained by the integration of design and construction.

Fragmentation

8. We recognise that the fragmentation of the UK construction industry inhibits performance improvement. One of the most striking things about the industry is the number of companies that exist – there are some 163,000 construction companies listed on the Department of the Environment, Transport and the Regions' (DETR) statistical register, most employing fewer than eight people.

9. We regard this level of fragmentation in construction both as a strength and a weakness:

- on the positive side, it is likely that it has provided flexibility to deal with highly variable workloads. Economic cycles have affected the industry seriously over past decades and have meant that it has been forced to concentrate more on survival than on investing for the future;

- on the negative side, the extensive use of subcontracting has brought contractual relations to the fore and prevented the continuity of teams that is essential to efficient working.

Building on Latham

10. It was the consequences of fragmentation which Sir Michael Latham principally examined in his landmark report published in 1994. The Task Force recognises that we are building on the firm foundations which Sir Michaellaid. We welcome the impact that his report has had on the industry and the developments arising from it, including the establishment of the Construction Industry Board and the recent legislation on adjudication and fair payment. Together with the Government's current initiative *Combating Cowboy Builders*, this will help to reform the way the industry does business and to counter the strongly ingrained adversarial culture.

11. In consequence, our view of UK construction is that, although it suffers from serious problems, the outlook is positive if action is taken quickly. Despite low levels of investment, falling employment and cyclical downturns, the industry's output has maintained a strong long term upward trend in real terms. Over the last forty years growth in real output has broadly matched GDP: Furthermore, labour productivity appears to have risen by more than 5% per year in real terms since 1981, faster than the average for the economy as a whole.

Promising Developments

12. We are also greatly encouraged by the wide range of promising developments which have emerged from the industry, its clients and its Government sponsors over the last few years, including:

- recent initiatives to improve construction performance, such as the Construction Round Table's "Agenda for Change", the Construction Clients' Forum's "Pact with the Industry" and the DETR's Construction Best Practice Programme;

- improved components, materials and construction methods, including standardisation and pre-assembly, and new technology such as 3D object-oriented modelling and global positioning systems;

- tools to tackle fragmentation, such as partnering and framework agreements, which are becoming increasingly used by the best firms in place of traditional contract-based procurement and project management;

- increasing interest in tools and techniques for improving efficiency and quality learned from other industries, including benchmarking, value management, teamworking, Just-In-Time, concurrent engineering and Total Quality Management.

Partnering

Partnering involves two or more organisations working together to improve performance through agreeing mutual objectives, devising a way for resolving any disputes and committing themselves to continuous improvement, measuring progress and sharing the gains. The Reading Construction Forum's best practice guides to partnering, 'Trusting the Team' and 'Seven Pillars of Partnering' demonstrate that where partnering is used over a series of construction projects 30% savings are common, and that a 50% reduction in cost and an 80% reduction in time are possible in some cases.

Tesco Stores have reduced the capital cost of their stores by 40% since 1991 and by 20% in the last two years, through partnering with a smaller supplier base with whom they have established long term relationships. Tesco is now aiming for a further 20% reduction in costs in the next two years and a 50% reduction in project time.

Argent, a major commercial developer, has used partnering arrangements to reduce the capitol cost of its offices by 33% and total project time in some instances by 50% since 1991. They partner with three contractors and a limited number of specialist sub-contractors, consultants and designers.

Standardisation and Pre-Assembly

Volumetric Ltd designs and manufactures prefabricated units which can be incorporated in a variety of buildings, including Forte's Travelodge, speculative housing and housing association developments, military accommodation, private hospitals and top of the range self-build houses. Advantages include speed of construction, lower cost, reduced need for skilled labour and achievement of zero defects.

McDonald's Restaurants have demonstrated an ability to construct a fully-functioning restaurant on site in 24 hours, using a very high degree of prefabrication and modularisation. The design allows expansion or even relocation

Performance Improvement Tools and Techniques

CALIBRE has been developed by BRE as a simple but effective system for mapping and understanding site processes and measuring and comparing on-site performance. Using hand-held computer technology feeding back to a lap top computer it provides real-time feedback to site managers to help them remove barriers to productivity, eliminate waste and improve value-adding activities

Value management is a structured method of eliminating waste from the brief and from the design before binding commitments are made. Value management is now used by up to a quarter of the construction industry to deliver more effective and better quality buildings, for example through taking unnecessary costs out of designs, and ensuring clearer understanding of the brief by all project participants and improving teamworking. Value management can also reduce costs by up to 10%

Benchmarking is a management tool which can help construction firms to understand how their performance measures up to their competitors' and drive improvement up to 'world class' standards. Taywood Engineering Ltd are using benchmarking in a project to identify a strategy for achieving zero defects in construction, including the principles of a 'zero defects culture' and a range a possible tools, such as the concept of a 'stop button' in site production, to prevent defects "going down the line".

Great Scope for Improvement

13. Leading clients working with the best construction companies are successfully combining many of these developments to achieve significant improvements in the cost, time and quality of projects. But there is plenty of scope for further improvement at the leading edge of the industry and for these improvements to be spread across the industry and offered to the vast majority of occasional and inexperienced clients. The Task Force is strongly of the view that there is nothing exceptional about what major clients are doing to improve performance in construction. Anybody can do it, given the time, the commitment and the resources.

Direction from Major Clients

14. In construction the need to improve is clear. Clients need better value from their projects, and construction companies need reasonable profits to assure their long-term future. Both points of view increasingly recognise that not only is there plenty of scope to improve, but they also have a powerful mutual interest in doing so. To achieve the performance improvements required there is a pressing need to draw all the promising developments in construction together and give them direction. The Task Force believes that this direction and the impetus for change must come from major clients. In the next section we, as representatives of major clients, set out the basis of this direction through our ambition to create a thoroughly modern construction industry.

CHAPTER 2
Our Ambition for UK Construction

15. The members of the Task Force were chosen for their expertise as construction clients and also for their extensive experience of other industries that have improved their performance. Dramatic changes have occurred in these industries over the last two or three decades driven largely by the customer and the need simply to survive the competition.

Improvements in Other Industries

16. In both manufacturing and service industries there have been increases in efficiency and transformations of companies which a decade or more ago nobody would have believed possible. For example, British grocery chains are now world leaders, the UK steel industry is a highly competitive international player, and car plants in this country are among the best internationally in terms of efficiency and productivity. And of course these successes come against a background of rising world-class standards – defects in the car industry are now measured in parts per million components rather than per hundred.

The Experience of Other Industries

Car Manufacturing

World-wide benchmarking studies of car and component manufacturing in the early 1990s revealed a two to one gap in performance and a 100 to one gap in quality between Japanese and Western car manufacturers. The opening of the Nissan, Toyota and Honda plants in the UK showed that this level of performance could also be achieved in plants outside Japan. Western car manufacturers then began crash programmes to implement "lean production" systems in order to close the gap. To fulfil their aim of 80% local content within a few years, the Japanese carmakers also began to work closely with local component suppliers to help them implement lean production.

The scale of the improvements achieved by the best and being sought by the others is impressive. The time to introduce a new car, from design freeze to launch, is coming down from 40 to 15 months. the time to weld, paint and assemble a car is coming down from 40 to 15 hours per car, with similar reductions in effort in component production. The rate of supplier defects delivered to the assembly pant is coming down from 3% to 5 parts per million. The time from placing an order on the factory to sale to a customer is coming down from 120 days to 15 days. As a result of these improvements UK car production and exports have nearly doubled over the last decade.

The most critical constraint on improvement lay in spreading lean production to smaller second tier suppliers. The Department of Trade and Industry sponsored initiatives to help smaller suppliers learn from Japan. In 1995 the leading manufacturers and suppliers established the "Industry Forum" as the focus for industry-wide improvement activities. The forum is unique in bringing together experienced engineers from Nissan, Honda, Toyota, General Motors and Volkswagen to train local engineers in accelerated process improvement on the shop floor in smaller component suppliers. They are also developing generic tools for spreading accelerated process improvement throughout the industry. After initial pump priming from the DTI the Forum will shortly become self-financing.

The Experience of Other Industries

Steel-making

The key drivers for the restructuring of British Steel were the need to respond to shareholders' and customers' simultaneous requirements for cost reduction and performance improvement, and the longer term need to secure the competitive position of steel compared with other materials such as concrete, plastic or aluminium. A series of complementary initiatives were introduced to deliver a dramatic and sustained improvement in performance.

Business procedures were revised, processes simplified and improved, and waste eliminated. A programme of Total Quality Management covering products, processes and employees throughout the Company was initiated, facilitating moves towards multi-skilling and teamworking. An essential enabler was and remains a substantial training programme: employees currently receive, on average, 11.4 training days each, representing a spend of 5% of employment costs. Capital investment was closely linked to customer requirements, productivity and quality improvements, and removal of bottlenecks.

Partnership arrangements with customers were put in hand to drive joint initiatives to take out cost and complexity, British Steel has taken steps to become involved at the design stage of customers' products, through broadening the Company's selling organisation to reach specifiers directly, and enhancing research and development facilities to facilitate joint working with customers. As a result of these initiatives British Steel has increased sales and production levels whilst reducing UK manpower from 200,000 to less than 40,000 in two decades. The programme has on ongoing objective of maintaining the competitive edge.

Grocery Retailing

Leading grocery producers and retailers established the Efficient Consumer Response (ECR) movement in the USA in 1993 to improve their competitiveness. The aim was to develop a common framework for jointly managing the grocery supply chain and to replace the advesarial relationships of the past. It was built around an industry 'scorecard' measuring the progress of all parties and a value chain costing methodoloy for identifying the savings being realised. In the UK ECR is co-ordinated by the Institute for Grocery Distribution, run jointly by the retailers and producers. Groups of ECR members undertook to carry out pilot projects together and to share the findings with the rest of the industry. Theses pilots were successful in demonstrating real savings that could only be achieved by working together, and led to new partnerships between producers and retailers.

ECR has spread right across the world and the UK industry is a leading player. In the last 15 years UK grocery retailers have made huge progress in streamlining their distribution systems, shrinking order lead times from two weeks to two days and cutting inventories from five to 2.5 weeks, at the same time as product ranges and volumes grew eight to ten fold. ECR has been instrumental in sustaining this rate of improvement across the whole supply chain and in breaking down adversarial relationships. It has also led to new cross-industry initiatives on standardisation, shared distribution arrangements and other issues.

Offshore Engineering

In 1992 the offshore oil and gas engineering industry in the North Sea faced a crisis. The price of oil dropped from $35 a barrel to $12, making exploitation uneconomic. Platform operators, contractors and suppliers came together to form the **C**ost **R**eduction **I**nitiative for the **N**ew **E**ra or CRINE, a co-operative effort to find ways of reducing wasteful activity in platform construction.

After 12 months of investigation and analysis the CRINE Report was published, recommending: functional rather than prescriptive specifications; common working practices; non-adversarial contracts and use of alliancing; reduction in procurement bureaucracy; and a single industry body for prequalification. These recommendations were put into practice by the industry. As a result the cost of oil and gas field developments was reduced by 40%.

The Experience of Other Industries

An unexpected result was the emergence of a network of innovative individuals committed to on-going co-operation for further improvement. By 1997 CRINE had been transformed into the CRINE Network, a continuous agent for change and a brand-name for cost reduction and competitiveness in the oil industry. Its vision is *"People working together to make the UK oil and gas industry competitive anywhere in the world by the year 2000"*. CRINE remains a model of "co-operative effort" in the supply chain which has been emulated and copied in many parts of the world. It has usefully been extended, through the ACTIVE Engineering Construction Initiative, to the UK's process plant industries, with a view to improving efficiency and enhancing competitiveness

Drivers of Change

17. We have looked at what has driven manufacturing and service industry to achieve these radical changes. We have identified a series of fundamentals to the process which we believe are just as applicable to construction as to any other business concern. These are:

- committed leadership: this is about management believing in and being totally committed to driving forward an agenda for improvement and communicating the required cultural and operational changes throughout the whole of the organisation.

  In construction, there is no part of the industry which can escape this requirement: it affects constructors, suppliers and designers alike. The Task Force has met many managers of companies in the construction industry over the last few months and, while many wish to improve company performance, we have yet to see widespread evidence of the burning commitment to raise quality and efficiency which we believe is necessary;

- a focus on the customer: in the best companies, the customer drives everything. These companies provide precisely what the end customer needs, when the customer needs it and at a price that reflects the products value to the customer. Activities which do not add value from the customer's viewpoint are classified as waste and eliminated.

  In the Task Force's experience, the construction industry tends not to think about the customer (either the client or the consumer) but more about the next employer in the contractual chain. Companies do little systematic research on what the end-user actually wants, nor do they seek to raise customers' aspirations and educate them to become more discerning. The industry has no objective process for auditing client satisfaction comparable with the 'ID Power survey' of cars or the 'Which' report. We think clients, both public sector and private sector; should be much more demanding of construction;

- integrate the process and the team around the product: the most successful enterprises do not fragment their operations - they work back from the customer's needs and focus on the product and the value it delivers to the customer. The process and the production team are then integrated to deliver value to the customer efficiently and eliminate waste in all its forms.

  The Task Force has looked for this concept in construction and sees the industry typically dealing with the project process as a series of sequential and largely separate operations undertaken by individual designers, constructors and suppliers who have no stake in the long term success of the product and no commitment to it. Changing this culture is fundamental to increasing efficiency and quality in construction.

- a quality driven agenda: Quality means not only zero defects but right first time, delivery on time and to budget, innovating for the benefit of the client and stripping out waste, whether it be in design, materials or construction on site. It also means after-sales care and reduced cost in use. Quality means the total package - exceeding customer expectations and providing real service.

  The industry rightly complains about the difficulty of providing quality when clients select designers and constructors on the basis of lowest cost and not overall value for money. We agree. But it must understand what clients mean by quality and break the vicious circle of poor service and low client expectations by delivering real quality.

- commitment to people: this means not only decent site conditions, fair wages and care for the health and safety of the work force. It means a commitment to training and development of committed and highly capable managers and supervisors. It also means respect for all participants in the process, involving everyone in sustained improvement and learning, and a no-blame culture based on mutual interdependence and trust.

  In the Task Force"s view much of construction does not yet recognise that its people are its greatest asset and treat them as such. Too much talent is simply wasted, particularly through failure to recognise the significant contribution that suppliers can make to innovation. We understand the difficulties posed by site conditions and the fragmented structure of the industry" but construction cannot afford not to get the best from the people who create value for clients and profits for companies.

18. We believe that these fundamentals together provide the model for the dramatic improvements in performance that UK construction must achieve if it is to succeed in the 21st century. Among many leading clients and construction companies this model is already being turned into reality, and is beginning to deliver dramatic improvements in the efficiency and quality of construction. We want to see this progress accelerated and spread to the rest of the industry and its clients.

Set targets for Improvement

19. To drive dramatic performance improvement the Task Force believes that the construction industry should set itself clear measurable objectives, and then give them focus by adopting quantified targets, milestones and performance indicators. This is evidently not the case at present. For example, it is not clear whether the construction industry is on target to meet Sir Michael Latham's aspiration to see a 30% improvement in productivity. In this respect, we welcome the work which the Construction Industry Board has now commenced on performance indicators.

20. If construction is to share in the benefits of improved performance the objectives and targets that it sets must be directly related to client's perceptions of performance. This means measures of improvement in terms of predictability, cost, time and quality. Clients will then be able to recognise increased value and reward companies that deliver it. Targets must also be set for improving the quality and efficiency of construction processes – in terms of safety and labour productivity for example. In this way corners are not cut and companies and their staff share in the benefits of success. In our experience this is the only way to make gains last and deliver continuous improvement.

Measure Progress

21. Construction must also put in place a means of measuring progress towards its objectives and targets. The industry starts with a clean sheet in this respect. It has a great opportunity to create an industry-wide performance measurement system which will enable clients to differentiate between the best and the rest, providing a rational basis for selection and to reward excellence.

22. In addition to objectives and targets, the Task Force would therefore like to see:

- the construction industry produce its own structure of objective performance measures agreed with clients;
- construction companies prepare comparative performance data and share it with clients and each other. The experience of other industries shows that this can be done without compromising legitimate needs for confidentiality;
- a system of independently monitored company 'scorecards', measuring companies' progress towards objectives and targets, instead of simple benchmarking. The names of the best performers would be made public and every company would be privately informed of where it stood in relation to its competitors.

The Scope for Improvement

23. To illustrate the kind of targets which the Task Force wants to see construction adopt we have set out in the table below our assessment of the minimum scope for improvement in the performance of UK construction. It is necessarily an impressionistic and partial assessment, since construction has no accepted performance indicators. Solid data on company and project performance in terms of efficiency and quality is hard to come by.

24. The scope for improvement that we have identified is underpinned by evidence from leading clients and construction companies from the UK and the USA. Indeed, we have taken a conservative view in most cases of what we know is being achieved by leading edge companies. We expect that the best UK construction companies and clients will meet these minimum rates of improvement in full and go on to surpass them.

25. Our assessment is also underpinned by what is known about the amount of waste in construction. Recent studies in the USA, Scandinavia and this country suggest that up to 30% of construction is rework, labour is used at only 40-60% of potential efficiency, accidents can account for 3-6% of total project costs, and at least 10% of materials are wasted. These are probably conservative estimates when compared to the amount of waste identified in manufacturing by best practice firms such as Toyota. Furthermore, an OECD study suggests that UK input costs are generally a third of those of other developed countries but output costs are similar or higher. The message is clear - there is plenty of scope for improving efficiency and quality simply by taking waste out of construction.

26. We have set our measures in terms of annual improvement. We expect construction to make dramatic initial increases in efficiency and quality, but in our experience greatest value is obtained through significant sustained improvement rather than one-off advances. We expect the leading companies in the industry to adopt these measures as targets, or similar ones of their own devising, to monitor them regularly and to report progress publicly – and that includes companies in all sections of the industry.

The Scope for Sustained Improvement		
Indicator	**Improvement per year**	**Current performance of leading clients and construction companies**
Capital cost All costs excluding land and finance.	Reduce by **10%**	Leading clients and their supply chains have achieved cost reductions of between 6 and 14% per ear in the last five years. Many are now achieving an average of 10% or greater per year.
Construction time Time from client approval to practical completion.	Reduce by **10%**	Leading UK clients and design and build firms in the USA are currently achieving reductions in to construction time for offices, roads, stores and houses of 10-15% per year.
Predictability Number of projects completed on time and within budget.	Increase by **20%**	Many leading clients have increased predictability by more than 20% annually in recent years, and now regularly achieve predictability rates of 95% or greater.
Defects Reduction in number of defects on handover.	Reduce by **20%**	There is much evidence to suggest that the goal of zero defects is achievable across construction within five years. Some UK clients and US construction firms already regularly achieve zero defects on handover.
Accidents Reduction in the number of reportable accidents.	Reduce by **20%**	Some leading clients and construction companies have recently achieved reductions in reportable accidents of 50-60% in two years or less, with consequent substantial reductions in project costs.
Productivity Increase in value added per head	Increase by **10%**	UK construction appears to be already achieving productivity gains of 5% a year. Some of the best UK and US projects demonstrate increases equivalent to 10-15% a year.
Turnover and profits Turnover and profits of construction firms.	Increase by **10%**	The best construction firms are increasing turnover and profits by 10-20% a year, and are raising their profit margins as a proportion of turnover well above the industry average.

Performance Improvement in Construction

- Tesco Stores have reduced the capital cost of their stores by 40% in five years. They are now targeting a further 20% reduction in costs over two years and a 50% reduction in project time.
- Argent have reduced the capital cost of office construction by 33% and total project time by 50% since 1991.
- BAA Pavement Team have reduced project time on airport runways and taxiways by more than 30%, reduced accidents by 50%, and achieved 95% predictability of cost and time in two years.
- The Whitbread Hotel Company have reduced construction time for its hotels by 40% since 1995 and costs have also been progressively reduced annually in real terms.
- Raynesway Construction Southern in a year have reduced the costs of maintaining Hampshire County Council's roads by 10%, increased turnover by 20& with the same labour force, and reduced accidents by 60%.
- The Neenan Company in Colorado have used 'lean construction' techniques over two years to reduce the time to produce a schematic design by 80% and project times and costs by 30%.
- Pacific Contracting of San Fransisco have used 'lean construction' to increase their productivity and turnover as a cladding and roofing subcontractor by 20% in eighteen months.
- Neil Muller Construction of South Africa have used Total Quality Management techniques to achieve an 18% increase in output per employee in a year, a 65% reduction in absenteeism in four years, and a 12% saving on construction time on a major project.

27. If the industry is not prepared to do this, the we propose that the clients should take the initiative. We are already aware of the Construction Round Table's an the Construction Clients' Forum's intentions in this respect and of the British Property Federations customer survey. We think it is essential that any comparative data takes account of user satisfaction with the buildings they occupy and with the services of the design and construction team.

Our ambition for UK Construction

28. This then is our ambition for a modern construction industry in the UK: adoption of the model of dramatic performance improvement that other industries have followed with such success, in order to deliver the challenging targets for increased efficiency and quality that we know are achievable. In the next section we offer the industry a practical approach to doing so, through the concept of the integrated project process.

CHAPTER 3
Improving the Project Process

29. Can construction learn from the successes of manufacturing and service industry? The Task Force believes it can. Our view is similar to that of construction industry representatives on the Task Force's visit to Nissan UK to see its advanced approach to production, who wrote:

"we see that construction has two choices: ignore all this in the belief that construction is so unique that there are no lessons to be learned; or seek improvement through re-engineering construction, learning as much as possible from those who have done it elsewhere"

30. If we follow the latter approach, what is it that construction has to learn to do differently ? We believe that at least part of the answer is that the industry has to rethink the process through which it delivers its projects with the aim of achieving continuous improvement in its performance and products.

Repeated Processes

31. We have repeatedly heard the claim that construction is different from manufacturing because every product is unique. We do not agree. Not only are many buildings, such as houses, essentially repeat products which can be continually improved but, more importantly, the process of construction is itself repeated in its essentials from project to project. Indeed, research suggests that up to 80% of inputs into buildings are repeated. Much repair and maintenance work also uses a repeat process. The parallel is not with building cars on the production line; it is with designing and planning the production of anew car model.

32. The Task Force has looked at what leading clients and innovative constructors both here and overseas are doing to rethink the construction process. We have been informed by our own experience and have tested out ideas with our own construction supply chains. The documentary evidence is scattered at present but there are a number of pointers which indicate the same direction. These include, for example BSRIA's study of the installation of building services in office buildings and the Genesis project undertaken by BAA with support from BRE. Both studies confirmed that as much as 40% of the manpower used on construction sites can be wasted.

33. These and other studies all suggest that there are significant inefficiencies in the construction process and that there is potential for a much more systematised and integrated project process in which waste in all its forms is significantly reduced and both quality and efficiency improved. This ties in with our observation that manufacturing has achieved performance improvements by integrating the process and team around the product.

An Integrated Project Process

34. If we are to extend throughout the construction industry the improvements in performance that are already being achieved by the best, we must begin by defining the integrated project process. It is a process that utilises the full construction team, bringing the skills of all the participants to bear on delivering value to the client. It is a process that is explicit and transparent, and therefore easily understood by the participants and their clients.

35. The rationale behind the development of an integrated process is that the efficiency of project delivery is presently constrained by the largely separated processes through which they are generally planned, designed and constructed. These processes reflect the fragmented structure of the industry and sustain a contractual and confrontational culture.

36. The conventional construction process is generally sequential because it reflects the input of designers, constructors and key suppliers. This process may well minimise the risk to constructors by defining precisely, through specifications and contracts, what the next company in the process will do. Unfortunately, it is less clear that this strategy protects the clients and it often acts as an effective barrier to using the skills and knowledge of suppliers and constructors effectively in the design and planning of the projects.

37. Moreover, the conventional processes assume that clients benefit from choosing anew team of designers, constructors and suppliers competitively for every project they do. We are far from convinced of this. The repeated selection of new teams in our view inhibits learning, innovation and the development of skilled and experienced teams. Critically, it has prevented the industry from developing products and an identity - or brand - that can be understood by its clients.

Focus on the End Product

38. The Task Force believes that construction can learn from other sectors of the economy in tackling these problems by focusing the construction process on delivering the needs of the end-user or consumer through the end product. Most clients for construction are interested only in the finished product, its cost, whether it is delivered on time, its quality and functionality. Concentrating on the needs of the consumer leads to a view of construction as a much more integrated process.

39. Our experience is that the overall process can be subdivided into four complementary and interlocked elements:

- product development
- project implementation
- partnering the supply chain
- production of components

40. The key premise behind the integrated project process is that teams of designers, constructors and suppliers work together through a series of projects, continuously developing the product and the supply chain, eliminating waste in the delivery process, innovating and learning from experience. Many major and experienced clients are already doing this through their partnering arrangements and are achieving the levels of performance improvement that we have targeted earlier in this report. The challenge for the construction industry is to develop their own integrated teams to deliver the same benefits to occasional and inexperienced clients. The Task Force believes that this is not only desirable but wholly possible.

Product Development

41. Product development is the means of continuously developing a generic construction product – for example, a house, a road, an office or a repair and maintenance service – to meet and inform the needs of clients and consumers. It requires a detailed knowledge of clients and their aspirations, and effective processes for innovating and for learning through objective measurement of completed projects. The Task Force see this activity as parallelling the sort of research into the needs of customers undertaken by most other industries.

Product Development

- Listening to the voice of the consumer and understanding their needs and aspirations.
- Developing products that will exceed client expectations.
- Defining the attributes of a construction product and understanding how they are influenced through specific engineering systems and components.
- Defining projects that deliver the product in specific circumstances and setting clear targets for the project of delivery teams.
- Assessing completed projects and customer satisfaction systematically and objectively, and feeding the knowledge gained back into the product development process.
- Innovating with suppliers to improve the product without loss of reliability,

42. Product development requires continuity from a dedicated product team: one with product design skills, with close links to the supply chain through which the skills of suppliers and their innovations can be assessed, and with access to relevant market research. Many major and experienced clients already have organisations dedicated to developing their own construction products and the construction industry is beginning to develop similar teams in response to the opportunities presented by the Private Finance Initiative. Again, there is a need to devise means of making these arrangements available to all clients.

Project Implementation

43. Project implementation is about translating the generic product into a specific project on a specific site for a specific customer. The implementation team, incorporating all of the key suppliers, needs to work together to design the engineering systems, select key components and pre-plan the manufacture, construction and commissioning. The Task Force would like to see this approach being backed by the use of computer modelling to test the performance of the end-product for the customer and, especially, to minimise the problems of construction on site. Our feeling is that good IT is an essential part of improving the efficiency of construction.

44. We see more effective project implementation as being one of the keys which can unlock greater efficiency on site, arising from, for example, using standardised components, precise engineering fit and the use of extensive pre-assembly. We also believe this will significantly improve quality. However, the delivery of such an approach has, in our experience, revealed a culture gap. Site construction needs to be carried out by a relatively small dedicated team of multi-skilled operatives who develop their expertise over a series of projects. We consider such cultural implications further in the next chapter.

Project Implementation

- Leadership of an integrated team of suppliers, constructors and designers dedicated to engineering and constructing the project.
- Mapping of processes, measurement of performance and continuous improvement to improve quality and eliminate waste.
- Development of engineering systems and selection of components to achieve product performance targets.
- Pre-planning of manufacture, construction and commissioning.
- Assembly of components and sub-assemblies on site and commissioning of the completed project.
- Training and development of all participants to support improvements in performance.
- Learning from experience and feedback into the project delivery process.

Partnering the Supply Chain

45. The Task Force envisages a very different role for the construction supply chain. In our view, the supply chain is critical to driving innovation and to sustaining incremental and sustained improvement in performance. Partnering is, however, far from being an easy option for constructors and suppliers. There is already some evidence that it is more demanding than conventional tendering, requiring recognition of interdependence between clients and constructors, open relationships, effective measurement of performance and an ongoing commitment to improvement. For example, the Ministry of Defence/DETR "Building down Barriers" project is supported by the Tavistock Institute whose hob it has been to help the project participants unlearn the traditional relationships between constructors themselves and with their clients. An essential aspect of partnering is the opportunity for participants to share in the rewards of improved performance.

Project Implementation

- Acquisition of new suppliers through value-based sourcing.
- Organisation and management of the supply chain to maximise innovation, learning and efficiency.
- Supplier development and measurement of suppliers' performance.
- Managing workload to match capacity and to incentivise suppliers to improve performance.
- Capturing suppliers' innovations in components and systems.

Production of Components

46. There is no reason why constructions' approach to component production should be radically different from that used by today's leading manufacturers of consumer products. It should involve the detailed planning, management and sustained improvement of the production process to eliminate waste and ensure the right components are produced and delivered at the right time, in the right order and without any defects. The Task Force believes that construction has a great deal to learn about effective logistics management: the industry would do well to study the experience of the retail and distribution industries and vehicle manufacturing in this respect.

Production of Components

- Detailed engineering design of components and sub-assemblies.
- Planning, management and continuous improvement of the production process.
- Development of a range of standard components which are used in most projects
- Production of components and sub-assemblies to achieve ‘right first time’ quality.
- Management of the delivery of components and sub-assemblies to site exactly when needed
- Measurement of the performance of completed components and systems.
- Learning from experience about product performance and durability.
- Innovation in the design of components to improve construction products.

47. Component production also includes the sustained commitment to innovation in the design of components, and development of a range of standard components which are used in most projects. By working closely with the product development teams component manufacturers can push forward the boundaries of client aspirations. The construction industry very often fails to educate the client about what improvements in products are available and this is an especially serious omission when dealing with smaller clients who are naturally less familiar with what is available.

Sustained Improvement

48. Once the integrated project process has been put in place the next step is to maintain the momentum of the increases in efficiency and quality that it offers. The key to this is to implement a programme of sustained improvement of the construction process to eliminate waste and increase the value that it adds to the client. Again the Task Force has turned to other industries with experience of success in this area for guidance.

49. We have investigated the emerging business philosophy of "lean thinking" which has been developed first in the car industry and is now spreading through the best manufacturers and into retailing and other industries. Lean thinking presents a powerful and coherent synthesis of the most effective techniques for eliminating waste and delivering significant sustained improvements in efficiency and quality.

50. We are impressed by the dramatic success being achieved by leading companies that are implementing the principles of "lean thinking" and we believe that the concept holds much promise for construction as well. Indeed, we have found that lean thinking is already beginning to be applied with success by some construction companies in the USA. We recommend that the UK construction industry should also adopt lean thinking as a means of sustaining performance improvement.

What is Lean Thinking?

Lean Production is the generic version of the Toyota Production System, recognised as the most efficient production system in the world today. Lean Thinking describes the core principles underlying this system that can also be applied to every other business activity – from designing new products and working with suppliers to processing orders from customers.

The starting point is to recognise that only a small fraction of he total time and effort in any organisation actually adds value for the end customer. By clearly defining **value** for a specific product or service from the end customer's perspective all the non value activities, often as much as 95% of the total, can be targeted for removal step by step.

Few products or services are provided by one organisation alone, so that waste removal has to be pursued throughout the whole **value stream** – the entire set of activities across all firms involved in jointly delivering the product or service. New relationships are required to eliminate inter-firm waste and to manage the value stream as a whole.

Instead of managing the workload through successive departments, process are reorganised so that the product design flows through all the value adding steps without interruption, using the toolbox of lean techniques to successively remove the obstacle to **flow**. Activities across each firm are synchronised by **pulling** the product or design from upstream steps just when required in time to meet the demand from the end customer.

Removing wasted time and effort represents the biggest opportunity for performance improvement. Creating flow and pull starts with radically reorganising individual process steps, but the gains become truly significant as all the steps link together. As this happens more and more layers of waste become visible and the process continues towards the theoretical end point of **perfection**, where every asset and every action adds value for the end customer. Lean Thinking represents a path of sustained performance improvement and not a one-off programme.

Applying Lean Thinking in Construction

Pacific Contracting of San Fransisco, a specialist cladding and roofing contractor, have used the principles of *lean thinking* to increase their annual turnover by 20% in 18 months with the same member of staff. The key to this success was improvement of the design and procurement process in order to facilitate construction on site, investing in the front end of projects to reduce costs and construction times. They identified two major problems to achieving flow in the whole construction process – inefficient supply of materials which prevented site operations from flowing smoothly, and poor design information from the prime contractor which frequently resulted in a large amount of redesign work.

To tackle these problems Pacific Contracting combined more efficient use of technology with tools for improving planning of construction processes. They use a computerised 3D design system to provide a better, faster method of redesign that leads to better construction information. Their design system provides a range of benefits, including isometric drawings of components and interfaces, fit co-ordination, planning of construction methods, motivation of work crews through visualisation, first run tests of construction sequences and virtual walk-throughs of the product. They also use a process planning tool known as Last Planner, developed by Glen Ballard of the Lean Construction Institute, to improve the flow of work on site through reducing constraints such as lack of materials or labour.

Applying Lean Thinking in Construction

The Neenan Company, a design and build firm, is one of the most successful and fastest growing construction companies in Colorado. The firm has worked to understand the principles of lean thinking and look for applications to its business, using 'Study Action Teams' of employees to rethink they way they work. Neenan's have reduced project times and costs by up to 30%, through developments such as:

- Improving the flow of work on site by defining units of production and using tools such as visual control processes;
- Using dedicated design teams working exclusively on one design from beginning to end and developing a tool known as 'Schematic Design in a Day' to dramatically speed up the design process;
- Innovating in design and assembly, for example through the use of pre-fabricated brick infill panels manufactured off site and pre-assembled atrium roofs lifted into place;
- Supporting sub-contractors in developing tools for improving processes.

CHAPTER 4
Enabling Improvement

51. Substantial changes in the culture and structure of UK construction are required to enable the improvements in the project process that will deliver our ambition of a modem construction industry. These include changes in working conditions, skills and training, approaches to design, use of technology and relationships between companies.

52. The Task Force believes that, to deliver the cultural changes necessary to improve the project process, we must start by valuing our people. Not only is the quality of the workforce fundamental to the process of change in construction, but also the way workers are treated. In our view, the workforce is undervalued, under-resourced and frequently treated as a commodity rather than the industry's single most important asset.

Decent Working Conditions

53. Some of the changes we are looking for may take time to achieve. Others can be delivered almost instantly. For example, the facilities which are available to workers on site are typically appaling. Clients and their customers do not like the poor image of the industry in this respect any more than does the industry itself. It does not require a big step to provide workers with uniforms, proper facilities and rest areas. Construction sites themselves should become advertisements for the industry and the firms working on them.

Improving Conditions on Site

As part of its *Building for the Future* initiative Tesco Stores has introduced visitor centres, on-site canteens, changing rooms and showers on its sites. Construction materials are stored in warehouses on site, reducing losses from theft and damage. Site branding has been introduced – all Tesco sites have identical blue hoardings and workers on them wear branded overalls with both Tesco and their employer's name. The increased team spirit and commitment engendered by these simple innovations have contributed to Tesco's achievement of a 40% reduction in construction costs.

54. The health and safety record of construction is the second worst of any industry. We have observed that most accidents seem to occur when people are either not properly trained or working out of process. The Task Force has asked the Health and Safety Executive to comment on our provisional targets for improvement, published in February. Their advice was to ask the industry to reflect not only on the purely welfare consequences of a poor health and safety record but to consider as well its cost in terms of lost work days, potential prosecutions and, in extreme cases, the enforced closure of construction sites.

More and Better Training

55. We have posed the question whether construction has the right skills to improve productivity. Our view is that there are significant gaps:

- at the top management level, there is a shortage of people with the commitment to being best in class and with the right balance of technical and leadership skills to manage their businesses accordingly. The industry needs to create the necessary career structure to develop more leaders of excellence;

- at the project manager level, we see a need for training in integrating projects and leading performance improvement, from conception to final delivery. We invite training organisations, including the professional institutions, to develop the necessary training programmes;

- the key grade on site is the supervisor. The UK has one of the highest levels of supervision on site internationally but one of the poorest records of training for supervisors. We invite the Construction Industry Training Board and other relevant National Training Organisations to consider this issue as a matter of urgency;

- among designers the high standards of professional competence achieved in their training and development need to be matched by a more practical understanding of the needs of clients and of the industry more generally. They need to develop greater understanding of how they can contribute value in the project process and the supply chain;

- there is not enough multi-skilling. The experience of other industries is that heavily compartmentalised, specialist operations detract from overall efficiency. Modern building techniques require fewer specialist craftsmen but more workers able to undertake a range of functions based around processes rather than trade skills. This is being addressed by overseas companies but the UK is in danger of being left behind;

- upgrading, retraining and continuous learning are not part of construction's current vocabulary. There is already frustration amongst component suppliers that their innovations are blocked because construction workers cannot cope with the new technologies that they are making available. This has to change.

56. Training and quality are inextricably interlinked. The experience of Task Force members is unequivocally that quality will not improve and costs will not reduce until the industry educates its workforce not only in the skills required but in the culture of teamwork. We invite the employers and the National Training Organisations to work with Government to put together an agenda for urgent action on this issue.

57. In our view, training will only be given the emphasis it deserves if all major clients, including the public sector, give preference to constructors who can demonstrate that they use trained workers. One way of achieving this is for major clients to insist that workers hold valid cards under the Construction Skills Certification Scheme. We would like to see this valuable scheme extended and use made of smart card technology to discourage the employment of workers who do not have the appropriate qualifications.

Design for Construction and Use

58. As we have already emphasised, in our experience too much time and effort is spent in construction on site, trying to make designs work in practice. The Task Force believes that this is indicative of a fundamental malaise in the industry - the separation of design from the rest of the project process. Too many buildings perform poorly in terms of flexibility of use, operating and maintenance costs and sustainability. In our view there has to be a significant re-balancing of the typical project so that all these issues are given much more prominence in the design and planning stage before anything happens on site. In other words, design needs to be properly integrated with construction and performance in use. Time spent in reconnaissance is not wasted.

59. There is a series of practical consequences that flows from this:

- suppliers and subcontractors have to be fully involved in the design team. In manufacturing industry, the concept of "design for manufacture" is a vital part of delivering efficiency and quality, and construction needs to develop an equivalent concept of “design for construction”;

- the experience of completed projects must be fed into the next one. With some exceptions the industry has little expertise in this area. There are significant gains to be made from understanding client satisfaction and capturing technical information, such as the effectiveness of control systems or the durability of components;

- quality must be fundamental to the design process. Defects and snagging need to be designed out on the computer before work starts on site. ‘Right first time’ means designing buildings and their components so that they cannot be wrong;

- designers should work in close collaboration with the other participants in the project process. They must understand more clearly how components are manufactured and assembled, and how their creative and analytical skills can be used to best effect in the process as a whole. There is no longer a place for a regime of design fees based on a percentage of the costs of a project, which offers little incentive to build efficiently;

- design needs to encompass whole life costs, including costs of energy consumption and maintenance costs. Sustainability is equally important. Increasingly, clients take the view that construction should be designed and costed as a total package including costs in use and final decommissioning.

- clients too must accept their responsibilities for effective design. Too often they are impatient to get their project on site the day after planning consent is obtained. The industry must help clients to understand the need for resources to be concentrated up-front on projects if greater efficiency and quality are to be delivered.

Standardisation

60. Standardisation also has an important role to play in improving the design stage of construction. The average car contains about 3,000 components. A house, by comparison, has about 40,000. We see a useful way of dealing more efficiently with the complexity of construction is to make greater use of standardised components. We call on clients and designers to make much greater use of standardised components and measure the benefits of greater efficiency and quality that standardisation can deliver.

61. There is also much scope for standardising processes. This can provide much greater predictability about what is performed, by whom, how and when. Standardisation of processes and components need not result in poor aesthetics or monotonous buildings. We have seen that, both in this country and abroad, the best architects are entirely capable of designing attractive buildings that use a high degree of standardisation.

The Scope for Standardisation

The Construction Confederation in its evidence to the Task Force told us there was scope to standardise many construction products and components. Examples include:

- Manhole covers – local authorities have more than 30 different specifications for standard manhole covers;
- Doors – hundreds of combinations of size, veneer and ironmongary exist;
- Motorway bridges – many UK bridges are prototypes, whereas they are of standard construction in France, Germany, and Belgium;
- Toilet pans – there are 150 different types in the UK but only six in the USA;
- Lift cars – although standard products are available, designers almost invariably wish to customise these.

The Confederation cites the benefits of standardisation as being: reductions in manufacturing costs; fewer interface and tolerance problems; shorter construction periods; and more efficient research and development of components.

Technology as a Tool

62. The Task Force does not consider that technology on its own can provide the answer to the need for greater efficiency and quality in construction. There have been celebrated examples of new technology being used to reinforce outdated and wasteful processes – and it does not work. The advice offered to construction by leading manufacturing industries is to approach change by first sorting out the culture, then defining and improving processes and finally applying technology as a tool to support these cultural and process improvements.

63. Members of the Task Force have seen the effectiveness of this approach for themselves on European housing sites that are using innovative forms of building, together with a high degree of prefabrication, pre-assembly and standardisation. What surprised us was that, when asked for the source of efficiency savings on site, the constructors and developers tended not to attribute them to the technology of construction but to pre-planning with suppliers and component manufacturers to minimise the time actually spent on site.

64. One area in which we know new technology to be a very useful tool is in the design of buildings and their components, and in the exchange of design information throughout the construction team. There are enormous benefits to be gained, in terms of eliminating waste and rework for example, from using modern CAD technology to prototype buildings and by rapidly exchanging information on design changes. Redesign should take place on computer, not on the construction site.

Better Regulation

65. We accept that a framework of regulatory controls in construction and development is entirely necessary, and indeed can help to produce efficiency and quality. But, in our view the interpretation and application of regulations is inconsistent across the country, making it more difficult to implement a construction project speedily and efficiently. Significant costs and delays are often incurred in the design and planning of projects by the variability of enforcement of regulations, and by duplication of processes between agencies.

66. We invite central and local Government to look carefully at ways of achieving better regulation. In particular, we feel that there is scope for regulatory regimes such as building control to be more output driven, so that constructors and their clients are able to deliver to performance standards rather than detailed prescriptions. We are also of the view that making the processes of the land use planning system more predictable would help improve the efficiency of construction, particularly housebuilding. We look to Lord Rogers' task force on urban regeneration to consider this issue.

Long Term Relationships

67. An essential ingredient in the delivery of radical performance improvements in other industries has been the creation of long term relationships or alliances throughout the supply chain on the basis of mutual interest. Alliances offer the co-operation and continuity needed to enable the team to learn and take a stake in improving the product. A team that does not stay together has no learning capability and no chance of making the incremental improvements that improve efficiency over the long term. The concept of the alliance is therefore fundamental to our view of how efficiency and quality in construction can be improved and made available to all clients, including inexperienced ones.

68. We have already mentioned the need for long term relationships in construction in the previous section where we discussed partnering the supply chain. Partnering on a series of projects is a powerful tool increasingly being used in construction to deliver valuable performance improvements. We are proposing that the industry now goes a stage further and develops long-term alliances that include all those involved in the whole process of delivering the product, from identification of client need to fulfilment of that need.

Long Term Relationships

The Whitbread Hotel Company rationalised its supply chain from 30 contractors to 5 and embarked on long-term partnership arrangements. Working on the basis of mutual interest, a construction strategy, objectives and improvement targets are set through negotiation between Whitbread, its partners and the supply chain. whitbread shares its five year business plan with its partners so that they contribute proactively to the achievement of Whitbread's objectives whilst planning their own businesses with greater effectiveness. Whitbread agrees fixed amounts for contractors' profits and overheads and shares savings from performance improvement with its partners. Competition within the supply chain focuses upon delivering continually improving performance.

69 In this connection, the Task Force wishes to see:

- new criteria for the selection of partners. This is not about lowest price, but ultimately about best overall value for money. Partnering implies selection on the basis of attitude to teamworking, ability to innovate and to offer efficient solutions. We think that it offers a much more satisfying role for most people engaged in construction;

- all the players in the team sharing in success in line with the value that they add for the client. Clients should not take all the benefits: we want to see proper incentive arrangements to enable cost savings to be shared and all members of the team making fair and reasonable returns;

- an end to reliance on contracts. Effective partnering does not rest on contracts. Contracts can add significantly to the cost of a project and often add no value for the client. If the relationship between a constructor and employer is soundly based and the parties recognise their mutual interdependence, then formal contract documents should gradually become obsolete. The construction industry may find this revolutionary. So did the motor industry, but we have seen non-contractually based relationships between Nissan and its 130 principal suppliers and we know they work;

- the introduction of performance measurement and competition against clear targets for improvement, in terms of quality, timeliness and cost, as the principal means of sustaining and bringing discipline to the relationships between clients, project teams and their suppliers. The evidence we have seen is that these relationships, when conducted properly, are much more demanding and rewarding than those based on competitive tendering. There are important issues here, particularly for the pubic sector.

Replacing Contracts with Performance Measurement

Nissan UK and Tallent Engineering Ltd have no formal contract beyond an annual negotiation of the cost and quality of the rear axles that Tallent produce for Nissan's cars, and rigorous targets for improving performance. Each morning Tallent receives an order from Nissan detailing the precise mix of axles required by Nissan and five times a day Tallent deliver to Nissan's Sunderland plant. If a problem was to occur with quality Tallent would send engineers to Nissan to fix it on the car production line. If a problem resulted in a significant loss of production, Nissan would expect to compensate Tallent for lost business or vice versa, but this has never happened and both sides work hard to ensure it cannot. Both Nissan and Tallent use similar no-contracts relationships with the firms delivering their construction projects.

Nissan's QCDDM supply chain management system is acknowledged to be among the most effective in the world. It measures all suppliers on **Q**uality, **C**ost, **D**elivery, **D**esign and **M**anagement against negotiated continuous improvement targets. For each element the supplier is marked on a range of product and process items which are aggregated on a weighted basis to give a performance percentage for that element. Competition is created across the supply chain by collating the performance information every month and informing each supplier of its performance in relation to the others.

70. Such relationships inevitably require mutual interdependence, some continuity in workflow and, if not stability, at least greater predictability. The Task Force recognises that this can be difficult for the construction industry. It is also potentially difficult for many clients. However, experience suggests that long term satisfactory partnering arrangements themselves generate greater continuity in workload, and this may be especially true in a construction industry in which an increasing premium is being placed by clients on quality.

Reduced Reliance on Tendering

71. The most immediately accessible savings from alliances and partnering come from a reduced requirement for tendering. Whilst this may go against the grain, especially for the public sector, it is vital that away is found to modify processes so that tendering is reduced. Clients may well ask how they can be satisfied that they are getting value for money. The answer lies in comparison between suppliers and rigorous measurement of their performance. With quantitative performance targets and open book accounting, together with demanding arrangements for selecting partners, the Task Force believes that value for money can be adequately demonstrated and properly audited. We invite the Treasury, with DETR, to consider the appropriate mechanisms further and give guidance to public bodies.

72. The radical changes required in the culture of the construction industry are likely to mean that there will be fewer but bigger winners. The Task Force's view is that those companies with the right culture deserve to thrive. Cut-throat price competition and inadequate profitability benefit no-one. For the sake of the long-term health of the industry and its clients we wish to see a culture of radical and sustained improvement in performance enabled in UK construction.

CHAPTER 5
Improving House building

73. As part of its terms of reference the Task Force was asked to look particularly at improving the efficiency and quality of housing construction. Whilst the Task Force considers that the scope for improving performance is as great in housing development as in other forms of construction, we believe that there should be specific initiatives to encourage advances in this sector. In our view housebuilding is affected by some significant factors that distinguish it from other sectors of the construction industry:

- housing development operates within a regulatory environment, affecting the level and location of activity. There are some in-built inefficiencies within the process which arise from the present requirements of the planning system;

- land prices have a major impact on out turn costs, representing up to 50% of total costs in some areas. These are a function of demand rather than of efficiency;

- in the private housing market demand by a 'one-off' disaggregated client base is dictated as much by price and location as by quality of the housing product or the efficiency of its performance;

- in the social housing sector, demand by corporate clients {housing associations and local authorities) is affected by uncertainties and inefficiencies resulting from periodic changes in policy direction and unpredictable levels of investment.

Promising Developments

74. There are promising developments in both private and public sector housing in the UK, although most innovatory housebuilding is being undertaken overseas. Good quality public housing, indistinguishable from the housing for sale that it is increasingly located alongside, is becoming commonplace. In the social housing sector the main corporate clients are increasingly investigating innovative approaches to housebuilding which offer significant improvements in the speed and cost of construction while retaining high quality.

75. In the social housing sector housing associations are the dominant providers of new housing. In 1998/99 they expect to start schemes {both new build and rehabilitation) worth around £2 billion for approximately 30,000 homes. 60 housing associations account for some 50% of these schemes. The sector, including both housing associations and local authorities, also faces a growing demand for repairs and maintenance.

76. The Task Force believes that the main initial opportunities for improvements in housebuilding performance exist in the social housing sector for the simple reason that most social housing is commissioned by a few major clients. However, we would expect improved practice in developing social housing to affect expectations and activity in the wider housing market. Consequently we see much scope for cross-fertilisation of innovation between the public and private sectors.

Developments in Housebuilding

Westbury Homes are actively pursuing an innovation approach to housing. They are developing new customer-focused approaches to develop products which will enable them to expand into new markets. They are trailing new component systems and production processes in demonstration projects and they are developing partnering arrangements with their suppliers. Both Wimpey Homes and Westbury have brought in board-level expertise from manufacturing industry in order to implement new supply-chain management techniques.

Over the last three years Bovis Homes, like many volume housebuilders, has standardised its product by using standard plan forms built from bulk-purchased parts. The standard house types are regularly re-engineered by the product development team in response to feedback from the sales and marketing team and customers. Research into what the customer wants is continually carried out using questionnaires, and value for different types of customer is defined in terms of price, locality, number of rooms, appearance, and quality of construction. A full customer care service is also provided.

Housing associations such as Southern Housing Group, Peabody, Hyde Housing Association and Guiness Trust are implementing lessons from abroad to improve the procurement of low-cost, high quality adaptable housing. For example, the Dutch Open Building approach is being demonstrated, offering tenants a wider range of choices of internal fit-out in both new-build and refurbishment schemes. Modular industrialised housing systems such as those used in Japan by Sekisui and Toyota are being trailed to reduce the cost and time of construction and provide tight quality control. This can deliver housing with zero defects on-site, removing the need for expensive and time-consuming ‘snagging’ and ‘making good’.

Leading suppliers in the social housing market, such as Willmott Dixon, have initiated their own innovation strategies aimed at delivering greatly improved products and services to housing associations. Component manufacturers like Redland and Hepworth are also investing heavily in R&D to develop better component systems to speed up construction.

Potential for Change

77. In support of the Task Force's work programme and as part of a wider programme of meetings to test our thinking, the Housing Corporation organised seminars to which representatives of some of the major housing associations and housing construction companies were invited. They offered a useful opportunity to assess the potential for radical change. These events highlighted:

- an enthusiasm amongst both housing associations, as clients, and contractors for the pursuit of greater efficiency and quality;
- the vital influence of clients over the performance of the housebuilding industry. Well informed, demanding clients who know what they want and how much they are prepared to pay for it, and are able to specify their requirements clearly, are an essential pre-requisite to the achievement of a modern, efficient, world-class housebuilding industry;
- the belief that sustained improvement in the industry can only be achieved if rigorous targets are set and performance measured on a consistent basis;
- the fact that to achieve step improvements in innovation, standardisation of components and cost efficiency, more can be achieved by co-operation between clients, constructors and suppliers than through competition.

A Housing Forum

78. The conclusion of these seminars was that a forum of major developing housing associations and the major housebuilding and construction firms could act as the catalyst for change. The Task Force proposes the setting up of such a forum to take forward the agenda. We would see the main objectives of this body to be to bring together those clients, contractors and suppliers committed to performance improvement to:

- agree targets for improvement, performance indicators, and arrangements for data collection, analysis and dissemination;
- establish principles for commissioning and evaluating innovative demonstration projects and disseminating good practice;
- simplify procurement processes, streamline supply chains and standardise component linkages;
- encourage long term partnering arrangements between clients and providers to secure consistency, continuity, innovation and value for money.

Government Support

79. Although it would be for the members of the forum to agree a way forward, pro-active s support and encouragement from Government will also be essential. The Task Force sees this as taking three forms:

- pump priming contributions to support a secretariat for the forum. We feel that DETR and the Housing Corporation should partly support the secretariat costs of the forum, alongside membership fees from client and construction companies;
- capital funding for demonstration projects. The government should establish within the Housing Corporation's Approved Development Programme an allocation for demonstration projects. We suggest £10 million. This, when matched with private finance will support a programme of innovative development totalling some £20 million per annum;
- prioritising those investment projects offering improved value for money. In the longer term if the forum is successful, it should result in a range of lower cost, more innovative, better value homes. These should routinely receive high priority in the allocation of future public investment, thereby reinforcing the impetus for continuous improvement.

80. Housebuilders and their clients need to share experience of innovation. However, the key ingredient for success in achieving significant improvements in the quality and efficiency of housebuilding will be the commitment of those involved. In this housebuilding shares the same ground as the rest of UK construction.

CHAPTER 6
The Way Forward

81. The Task Force believes that the way forward to achieving the ambition of a modern construction industry lies in commitment. We are calling for:

- commitment from major clients to fulfil their responsibility to lead the implementation of our agenda for dramatically improving the efficiency and quality of construction;
- commitment from the construction industry to work with major clients to deliver the significant performance improvements that are possible, and offer these to the occasional and inexperienced clients; and
- commitment from Government to create and sustain the environment that is needed to enable dramatic improvements in construction performance, and encourage the public sector to become best practice clients.

Demonstration Projects

82. The major clients represented on the Task Force have agreed to take the lead and demonstrate their own commitment to improving performance by undertaking demonstration projects to develop and illustrate the ideas that we have set out. However, we do not want this to be an exclusive exercise: we invite other major private and public sector clients of the construction industry, together with the constructors, designers and suppliers that work with them, to offer similar projects on which together we can test and develop innovation. Our ambition is to make a start with at least £500 million worth of projects.

83. We propose that this core of projects and the housebuilding forum should become the basis of a movement for change and innovation in construction, established to pool experience among major clients and construction companies, develop ideas and drive improvement in quality and efficiency. We see such a movement as the principal way in which the construction industry can gain benefit from the lead being given by the major clients and grasp the initiative itself.

A Movement for Change

84. We envisage the movement for change as a group of people, possibly supported by a secretariat, who are committed to improving the delivery of their projects and the performance of their companies by applying the ideas that the Task Force has set out. The movement would be a network through which members could collaborate with each other in developing construction techniques and skills and exchanging ideas for increasing efficiency and quality. The movement should be open to all who are able to demonstrate commitment to:

- carrying out demonstration projects to advance the knowledge and practice of construction best practice;
- focusing on the needs of their clients in everything that they do;

- developing within their own organisations and throughout their supply chains a culture of trust and respect that encourages the contributions of all participants in the project process;

- training all their staff fully and providing them with conditions of employment and facilities that enable them to give of their best;

- measuring performance against other member's projects and project processes, and sharing the results with the wider industry;

- extending the benefits of improved performance to all their clients.

Knowledge Centre

86. There is an urgent need for the construction industry to develop a knowledge centre through which the whole industry and all of its clients can access to knowledge about good practices, innovations and the performance of companies and projects; in particular the knowledge gained from demonstration projects. It is important that the knowledge centre is objective, impartial and efficient. The DETR is already developing a Construction Best Practice Programme and we invite the Department to use this to create a national knowledge centre for construction.

Public Sector Clients

87. The public sector is the largest client of the construction industry. The Task Force recommends that the Government commits itself to leading public sector bodies towards becoming best practice clients. We believe that this process must begin with substantial improvements in the way that the public sector procures construction. In our view this can be achieved while still meeting the need for public accountability.

88. The Government has already demonstrated through Public-Private Partnerships and the PFI its ability to make radical and successful changes in its procurement policies. By defining precisely what is wanted from facilities and allowing the construction industry to respond in innovative ways, Government Departments and Agencies have begun to tap a rich seam of ingenuity which previously had been stifled by the traditional processes of prescriptive design and tendering. We wish to see this approach become the norm throughout the public sector.

Occasional Clients

89. This report is largely presented from the point of view of clients who are knowledgeable about the construction process. That is appropriate, since it is these clients who can give leadership to improvement in construction. We are conscious, however, that much new construction and repair and maintenance work is done for occasional and inexperienced clients, many of whom commission major projects. Such clients are often unfamiliar with the construction process and unable to provide the environment in which the industry can meet their needs efficiently. This is of great concern to the Task Force, since we wish to see significant performance improvements across the whole industry.

Branded Products

The Task Force believes that the construction industry must grasp the opportunity for improvement that is being offered by major clients, and take responsibility for delivering these improvements to all of its customers. The industry must create supply chains for one-off clients and a single-point of contact on projects. It must develop products and brands which exceed customers' expectations and give customers confidence in the reliability and integrity of industry.

90. The construction industry must also introduce independent and objective assessments of performance, comparable with the Which report or the JO Power survey, that can be used by its customers to understand the industry's products and choose between them. We recognise the scale of this challenge and that it will take many years to achieve. We see no other practical strategy that the industry can adopt to escape from the debilitating cycle of competitive tendering, conflict, low margins and dissatisfied clients.

91. We have included few specific recommendations in our report, though we have frequently suggested a way forward. This approach is deliberate; what the Task Force is looking for is a change of style, culture and process, not just a series of mechanistic activities. We look to clients, the industry and Government to put in place the necessary plan of detailed actions to deliver change. The Task Force's objective will have been achieved if the spirit of change becomes genuinely embedded in this deeply conservative industry. The members of the Task Force stand ready to help with the vital process of implementing change.

Summary

92. To summarise, the Task Force wishes to emphasise that we are not inviting UK construction to look at what it does already and do it better: we are asking the industry and Government to join with major clients to do it entirely differently. What we are proposing is a radical change in the way we build. We wish to see, within five years, the construction industry deliver its products to its customers in the same way as the best consumer-lead manufacturing and service industries. To achieve the dramatic increases in efficiency and quality that are both possible and necessary we must all rethink construction.

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