



## IMPROVING CONSTRUCTION LOGISTICS

Report of the Strategic Forum for Construction Logistics Group

August 2005





The report 'Accelerating Change' published by the Strategic Forum for Construction (SFfC) in September 2002, highlighted that 'a considerable amount of waste is incurred in the industry as a result of poor logistics'. The SFfC set up a task group, under the chairmanship of Mike Eberlin of Castle Cement, with the support of the Construction Products Association, to research what needed to be done and report on their findings. This report records the group's findings to date.

There is a lot of opportunity for change. Construction has been slower than other industries to realise the benefits that the application of good logistics can provide. The good news is that we don't have to make large changes in order to obtain considerable benefits. A lot can be achieved simply through more integrated working. For example, engaging designers early on in the construction process allows them to consider how the components they design might be delivered to site, when the component will be needed and how it will be handled on site. This sort of pre-planning can lead to a substantial reduction in unnecessary transport costs, time wasting, and damage on site. To quote that much over used phrase, 'it's not rocket science'!

Change is possible on small as well as larger projects. There is potential for builders' merchants to expand on their existing business by developing into consolidation centres. Procurement clubs amongst housing associations (where smaller projects are grouped together) are in a good position to improve on how they aggregate logistics across their projects.

These and the other recommendations made by the SFfC Logistics Group have been drawn together in an action plan that is being coordinated by Constructing Excellence in the Built Environment. Progress on the action plan will be reviewed by the SFfC in twelve months time. In the meantime we welcome your feedback on this report which should be sent to Kate Dunne at [kdunne@strategicforum.org.uk](mailto:kdunne@strategicforum.org.uk).

A handwritten signature in black ink, appearing to read 'Peter Rogers', with a long horizontal line extending from the end of the signature.

**Peter Rogers**  
Chairman, Strategic Forum for Construction

# Improving Construction Logistics

## ANALYSIS

### Background

The report 'Accelerating Change' published by the Strategic Forum for Construction in September 2002, highlighted that 'a considerable amount of waste is incurred in the industry as a result of poor logistics'. The Forum subsequently identified addressing logistics as one of its priorities and set up a Task Group under the chairmanship of Mike Eberlin of Castle Cement to recommend what needed to be done. The list of the members of the Group is at *Appendix 1*.

The Group did not want to start from scratch in addressing this subject and set out to build on work already undertaken by the Construction Best Practice Programme in its '*Factsheets on Logistics*', the research '*Construction Logistics: Consolidation Centre*', and the Constructing Excellence publication '*Construction Logistics: Models for Consolidation*'. Against this background the Group agreed that its terms of reference should be to;

*Identify the key issues that need to be addressed to improve logistics in the construction industry*

*Develop an Action Plan that highlights the steps that need to be undertaken by the different parts of the industry in order to address these issues*

*Establish means by which the impact of the proposals in the Action Plan can be measured and a resulting improvement in logistics demonstrated*

Arising from this, the Group identified 4 key issues on which it chose to focus its attention:

- Design
- Transport
- Stockholding
- More efficient use of on-site labour

The Group 'brainstormed' these four issues and its conclusions were tested at a Workshop hosted by Constructing Excellence and attended by some 30 people from across the construction industry.

## What points to Logistics being poor in the Construction Industry?

There is plenty of non-quantified evidence that demonstrates the inadequacy of logistics in the construction process, whilst in other industry sectors there are increasing examples of how they are addressing logistics. This can be illustrated in a number of ways.

- A high proportion of lorries in the construction industry move around the road network either empty or with part-loads, whereas the retail sector and wider manufacturing industry are continually working to consolidate delivery loads to maximise vehicle fill, and reduce transport costs.
- Many lorries arriving at construction sites are having to wait to gain access or be unloaded, whereas retail and other sectors designate time slots for supplier deliveries. Late or early deliveries can be turned away and suppliers charged a penalty.
- In construction, skilled craftsmen are often using their skills for less than 50% of their time on site. Amongst the non-skilled tasks they are involved in are unloading lorries and moving products around site. Other industrial and retail sectors use special equipment to unload lorries and designated trained teams to deal with material handling activities.
- Construction products are often stored on site for long periods of time and have to be moved to other parts of the site when they are eventually needed. Retailers and those in other industries are continually trying to reduce inventories and at least ensure they are held in the most appropriate location. Effort goes into delivering the right quantities at the right time.
- In construction, specialist contractors sometimes arrive on site when they are not expected or when the job is not ready for them. Good manufacturers would ensure they had the right information flows about work progress to ensure this never happened.
- There continues to be much secondary working on site, whereas other industrial sectors make every effort to get it right first time and avoid multiple handling.
- In construction there would appear to be a much higher proportion of damaged and waste product removed from site than in other sectors.
- There is little formal training in logistics and yet there are a large number of tasks that fall within a logistics umbrella. The chart at *Appendix 2* has been prepared by Wilson James to illustrate the point. In many other sectors, training in logistics skills is given much greater priority and some employ those with degrees in the subject.

In summary, other industry sectors, especially manufacturing and retail, have made huge advances in improving logistics, whereas the construction industry does not seem to be taking advantage of these opportunities.

## **What are the consequences of poor Logistics?**

### *Unnecessary cost in the system*

All the evidence highlighted above points to there being additional cost in the system that could be saved if the process operated more efficiently as a result of improved logistics. Research by BSRIA in the 10 years since 2004 has shown that on average 10% of the working day of site operatives in all trades is lost due to waiting for materials, or collecting materials, tools, and equipment. Given that site operations account for about 30% of construction costs, this would suggest that this inefficiency alone is adding about £3billion to the annual cost of construction.

### *Poor image of the construction industry*

Lorries parked in an inconsiderate way outside construction sites whilst waiting to unload does not give the image of an efficient industry. Disorganised sites with skilled craftsmen being used for un-skilled jobs does not encourage quality people to join the industry. Vehicles driving around empty or with part-loads does not convey the image of an industry that has environmental concerns at the top of its agenda, nor does large amounts of waste being removed from site, 85% of which goes to landfill. None of this seems consistent with the growing attention that companies are expected to pay to corporate social responsibility.

### *Poor quality construction*

Working in a disorganised environment will inevitably make the production of quality construction more difficult. Work interrupted whilst materials are sort from elsewhere on site, or delayed whilst products are delivered, will have an adverse effect on quality. Secondary working of products on site is also less likely to provide the same quality of product that could be manufactured in a factory environment.

### *Increased project time*

Most of those features of construction projects that point to poor logistics will add to the time of construction projects. Delays whilst product is unloaded, subsequent movement of products around site and secondary working of product all add unnecessary time that would be eliminated in a well organised project.

### *Added risks to health and safety*

Unnecessary products stored on site inevitably bring with them additional potential hazards. Additional manual handling (either because product is in the wrong part of the site, or because the right equipment is not available) adds to the health risks to those on site. Secondary working of material also brings risks and research has shown that a number of accidents on site occur as a result of workers tripping over discarded material arising from secondary working.

## **What are the potential benefits from improving Logistics?**

The fragmented nature of the construction industry and the lack of transparent costings make it very difficult to estimate exactly what the potential savings would be if all these issues were addressed. There is, however, a widespread belief that substantial savings are achievable, and estimates range from those who believe costs could be reduced by 10%, to those who see savings of up to 30% being achieved.

One well documented case study is the Mid – City Place development in Central London. On this project a strategy was developed to reduce multi-handling and repeated moving of materials. This improved logistics led to some 35% less material waste than benchmark sites, distribution of material with one less pair of hoists, and almost 100% performance in materials being distributed in the right time and place. This all contributed to the project being completed 11 weeks ahead of the planned programme, with a build rate 60% ahead of the industry benchmark, building cost 80% of industry benchmark, and 675,000 hours worked without a single reported accident.

In another case study undertaken as part of the CITB ConstructionSkills research '*Accelerating change through Supply Chain Management*' a programme was developed for delivering 10,000 kitchens to a housing refurbishment programme on a 'just in time' basis on small trucks rather than in larger volumes with much bigger vehicles. This resulted in a considerable reduction of waste, storage, and double handling of materials. All those involved saw the considerable benefit arising from this, although measuring these benefits has proved more difficult because of the lack of a 'business as normal' model against which to compare the improvements that have been achieved.

Case studies have a part to play in helping to demonstrate the benefits that arise from improved logistics, but the particular circumstances of a project limit, in many people's eyes, the extent to which lessons are transferable. Nevertheless, it is hard to disagree that reduction in transport movements, less money tied up in stock, less waste, and the more efficient use of skilled craftsmen, will reduce the costs of projects, reduce construction time, improve quality, reduce risks to health and safety of those who operate on them, and generally improve the image of the industry. The challenge is to produce the information that convinces all parts of the industry that things need to be done differently in order to improve logistics.

## **What is preventing the industry from addressing Logistics?**

A number of factors of the construction industry prevent it from effectively addressing logistics problem.

- There is no real incentive to tackle this because it is difficult to identify who benefits. Those who may be required to do things differently do not necessarily benefit
- Every construction job is seen as a 'one-off', with a team built up for a short period of time and then disbanded afterwards. It is therefore difficult to engineer the system to optimise logistics in the way that is possible in a manufacturing or retail environment.

- This is further hindered by the fragmented nature of the construction industry with contractual arrangements that get in the way of a holistic approach to things like logistics. Lack of direct employment also hinders this
- Advance planning and design of projects is generally inadequate, as are lead times
- There is a lack of transparency in costs throughout the construction process. Decisions are often based on cash flow. The way costs are recorded does not help identify the potential savings from improved logistics
- Unlike other industries, the information provided in construction is generally an 'estimate' rather than an exact science
- There is a general lack of understanding of the constraints of the supply chain. There is also a lack of trust and confidence that the supply chain will actually deliver when required. Can projects rely on a 'just in time' delivery of products?
- Clients (and others) believe that project cost already allows for appropriate resources to be committed to logistics on the project

The Action Plan which follows attempts to address many of these.

## **ACTION PLAN**

### **Support for other initiatives that will contribute towards improving logistics.**

#### *Development of Integrated Project Teams and Supply Chains*

One of the recurring themes in the Group's discussion is that logistics will not be adequately addressed until the construction industry works in a more integrated way, with all parts of the supply chain, including specialist contractors and key manufacturers / suppliers, involved at the outset of projects. The development of integrated teams and supply chains is already a key priority for the Strategic Forum, with a target that 50% of projects by value are undertaken in an integrated way by the end of 2007. In terms of improving logistics, a more integrated approach will help break down the barriers that the current contractual relationships impose and help encourage greater cost transparency on projects. The Group is therefore keen to see this integrated approach to projects developed as quickly as possible and welcomes the recent National Audit Office Report '*Improving Public Services through better construction*' which highlights the benefits to be gained from this.

#### *Off – site manufacture and Modern Methods of Construction*

One of the reasons why logistics is so important in construction is the fragmented nature of the industry and the wide range of products and systems that need to be put together, invariably in an unpredictable outside environment. The increasing attention that is being given to off-site manufacture and modern methods of construction is helping to reduce the number of individual products that need to be delivered to, and assembled on site.

Whilst in some respects this is helping to make the logistics on a project easier, the importance of good logistics is even greater if the benefits that these new systems have

to offer in terms of productivity on site are to be achieved. The Group is therefore keen to see that organisations such as BuildoffSite and the Housing Forum, which are highlighting the benefits of off-site manufacture and modern methods of construction, ensure proper attention is given to logistics on the projects where such systems are used.

## **Programme for improving logistics**

No one part of the construction industry can deliver improved logistics on its own. The benefits will come from the different parts of the industry inter-acting in a different way – planning together, sharing information, and exposing the real cost of activities in a way that is currently not typical. In order to bring about this change, the Group has identified the contribution that it wants to see each part of the industry make, not because it wants to see the different parts of the industry working in isolation, but because it is the easier way to hold each sector responsible for bringing about change.

### **1. Clients**

Clients have every reason to expect the supply side to deliver their projects efficiently and to ensure that proper attention is given to logistics so that the benefits referred to earlier are delivered. Clients can help in this by making clear to those they appoint that they expect them to prepare a Logistics Plan at an early stage in their projects, and that all the key players in the supply chain have signed up to this Plan.

The Group would, therefore, like to see:

- *The Client's Charter refer to the expectation that a Logistics Plan is prepared at an early stage in every project*
- *A Best Practice Guide prepared to help clients understand what they can expect from the supply side on logistics*

### **2. Design Professionals**

Design Professionals need to be more aware of the part they play in ensuring good logistics, particularly at the scheme design stage. Logistics will be greatly helped if the design professionals draw up a Process Map at an early stage in the design. In addition as part of the Logistics Plan for the project, a Bill of Materials should be prepared. This should look at, for example, the flow of materials needed on a project and ways of minimising stockholding. Which of the professional members of the supply chain should be responsible for this, needs to be discussed, but the quantity surveyors with their background in measurement and costing might have the appropriate skills for this; alternatively it could require the input of logistics specialists. Manufacturers, suppliers and distributors clearly need to make an input to this Plan.

The various professional bodies responsible for the design professions in the construction industry – RIBA, ICE, IStruct E, and CIBSE on design issues, and RICS on measurement and costing– are in the best position to highlight the importance of logistics to their current membership as well as in the training of those seeking to join the profession. In the short term this can be achieved through awareness guidance as part

of continuing professional development. In the medium term, the importance of logistics needs to feature in the initial education and training of those preparing for a career in one of the construction professions.

The Group would, therefore, like to see:

- *Design professionals prepare a Process Map for each project as part of the Scheme Design*
- *The professional institutions representing the design professions develop advice and offer briefing to members on the role they have to play in project logistics*
- *The professional team needs to prepare a Bill of Materials as part of the Logistics Plan*
- *The professional institutions consider ways in which the role of their profession in project logistics can be incorporated in initial education and training.*

### 3. Main Contractors and specialist contractors

Many see the construction manager as the key player in co-ordinating the logistics on a construction project, but the conclusions reached earlier suggest this is not a function that is being carried out as effectively as it should be across the construction industry. As a result, logistics specialists are being involved in some of the major projects. Irrespective of who carries it out, the responsibility for project logistics must rest with the main contractors, and it is essential they drew up a Logistics Plan in consultation with the rest of the supply chain at the outset of a project. The Bill of Materials will be an important input to this and the specialist contractors should each prepare that sub-set of the Logistics Plan relevant to their specialist input including how they will be making optimum use of the skilled labour on site.

Those responsible for the logistics on a project must have the right skills to perform the function and CITB Construction Skills is asked to recommend how logistics skills can be developed in the industry.

The Group would, therefore, like to see:

- *Main contractors prepare a Logistics Plan in consultation with the rest of the Supply Chain at the outset of each project. This Plan should include the input to the project from the specialist contractors and the key manufacturers and suppliers.*
- *CITB Construction Skills review the need for logistics skills in the industry and recommend what needs to be done to address this.*

### 4. Manufacturers, Suppliers, and Distributors

A key part of logistics for a construction project is to ensure that the products and materials arrive on site at the time and in the quantities that are required. This does not just depend on the efficiency of the supply network, but it also relies on the pre-planning of those on the construction site, as well as the quality of the communication between those planning the project and those supplying the products and materials. Manufacturers and suppliers can make a significant contribution to the efficiency of the

logistics on a project if they are involved early enough in the process and, in particular, if they can make an input to the Logistics Plan through the preparation of the Bill of Materials.

On the transport side, there may be an opportunity to look at ways of developing best practice and learning from other industries through the Department for Transport's Sustainable Distribution programme. This has not so far given any attention to construction and it is hoped that the Department can be persuaded to remedy this.

As part of its wish to see greater transparency of cost in the construction process, the Group would like to see manufacturers and suppliers reflect the true cost of distribution in their pricing policies.

The development of the Consolidation Centre at Heathrow Airport was an innovative approach to the particular challenges faced by working in that kind of environment. For a variety of reasons, this particular approach is not applicable throughout the industry, but there may be lessons for the way products are supplied to other large projects. Manufacturers and suppliers are encouraged to see what these lessons might be.

The Group would, therefore, like to see:

- *The Department for Transport's Sustainable Distribution programme include work on transport in the construction industry.*
- *Key manufacturers, suppliers, and distributors input to the Bill of Materials being prepared as part of the Logistics Plan for each project*
- *Manufacturers, suppliers, and distributors reflect the cost of distribution in their pricing policies*
- *Manufacturers, suppliers, and distributors work with contractors to see how lessons from the Consolidation Centre approach might be transferred to other significant construction projects and programmes*

## 5. Information Technology

The Group did not believe that the industry was using electronic communications as effectively as other industries were to help in improving logistics throughout the supply chain. In particular, the industry was not utilising bar coding for product ordering, or E-tagging for tracing products throughout the process, to the extent that seemed appropriate. A case study was being developed as part of a CITB ConstructionSkills research project in order to trial bar coding on the panes of glass required on a major project. Unfortunately, the case study could not be completed because of the difficulty of co-ordinating those parts of supply chain involved in this – manufacturers, distributors, main contractors and specialist contractors. This is symptomatic of many of the difficulties in the industry, and the Group would, therefore, like to see further case studies developed to address these difficulties and to demonstrate the benefit that bar coding has to offer.

In the time available to the Group, they were not able to look into the issue of information technology to the extent they would have liked. They are convinced, however, that there is much the industry could do to take advantage of these new technologies in a way that

will make a significant input to improving logistics. This needs much more consideration and it is felt that some of the DTI programmes focusing on wider use of IT should be able to help in this.

The Group would, therefore, like to see:

- *The industry work with DTI to focus part of that Department's work on information technology towards the way this can be used to help improve logistics in the construction industry.*
- *As part of this programme, two case studies developed to show the potential benefits of bar coding. These case studies should each focus on a specific product being used on a major project.*

## 6. Case Studies

Members of the Group and those who attended the workshop were keen to see case studies developed to help demonstrate the benefits that can arise from improved logistics. Previous case studies such as Mid – City Place and the Heathrow Consolidation Centre have helped to demonstrate what can be achieved when specific attention is paid to logistics, and a suggested case study on the wider potential for bar coding is put forward in an earlier section of this Action Plan.

What the Group would, therefore, like to see is:

- *The development of a 'model project' to help understand the information flows that are needed to create an efficient Logistics Plan and address the existing shortcomings on logistics in construction projects..*
- *Some sector / product specific case studies showing how the logistics surrounding the supply of certain products can be improved. This would include, for example, establishing what information is needed at the outset of projects to allow manufacturers to organise better the supply of their products. The mechanical and engineering sector was one where the Group felt that such a case study might be particularly appropriate.*

## 7. Learning from other industries.

Earlier in the report, comparison was made between the construction industry and the progress that has been made towards improving logistics in other industry sectors. There is clearly much that construction can learn from the way other industries approach logistics and it is hoped that in taking forward various of the proposals identified earlier, those responsible will, where appropriate, seek to tap into the experience of other industries on these issues. One particular project funded by the EPSRC is being undertaken at Cardiff Business School and is looking at '*Mass, Customised, and Collaborative Logistics*'. The sectors being studied as part of this project are steel, retail, and construction. The researchers see a common interest in many of the messages emerging from this work for the Strategic Forum and would like to see how they can help take this forward.

## **Taking the Action Plan forward**

A summary of these actions with an indication as to who should be responsible for taking them forward is attached at *Appendix 3*. To ensure progress is monitored, there needs to be a single point of responsibility for co-ordinating the follow up to this report and the Group recommends that this should be taken on by Constructing Excellence in the Built Environment with the appropriate input from each member of the Strategic Forum. A report should then be presented to the Strategic Forum in the spring of 2006 on the progress that has been made in taking forward the Action Plan.

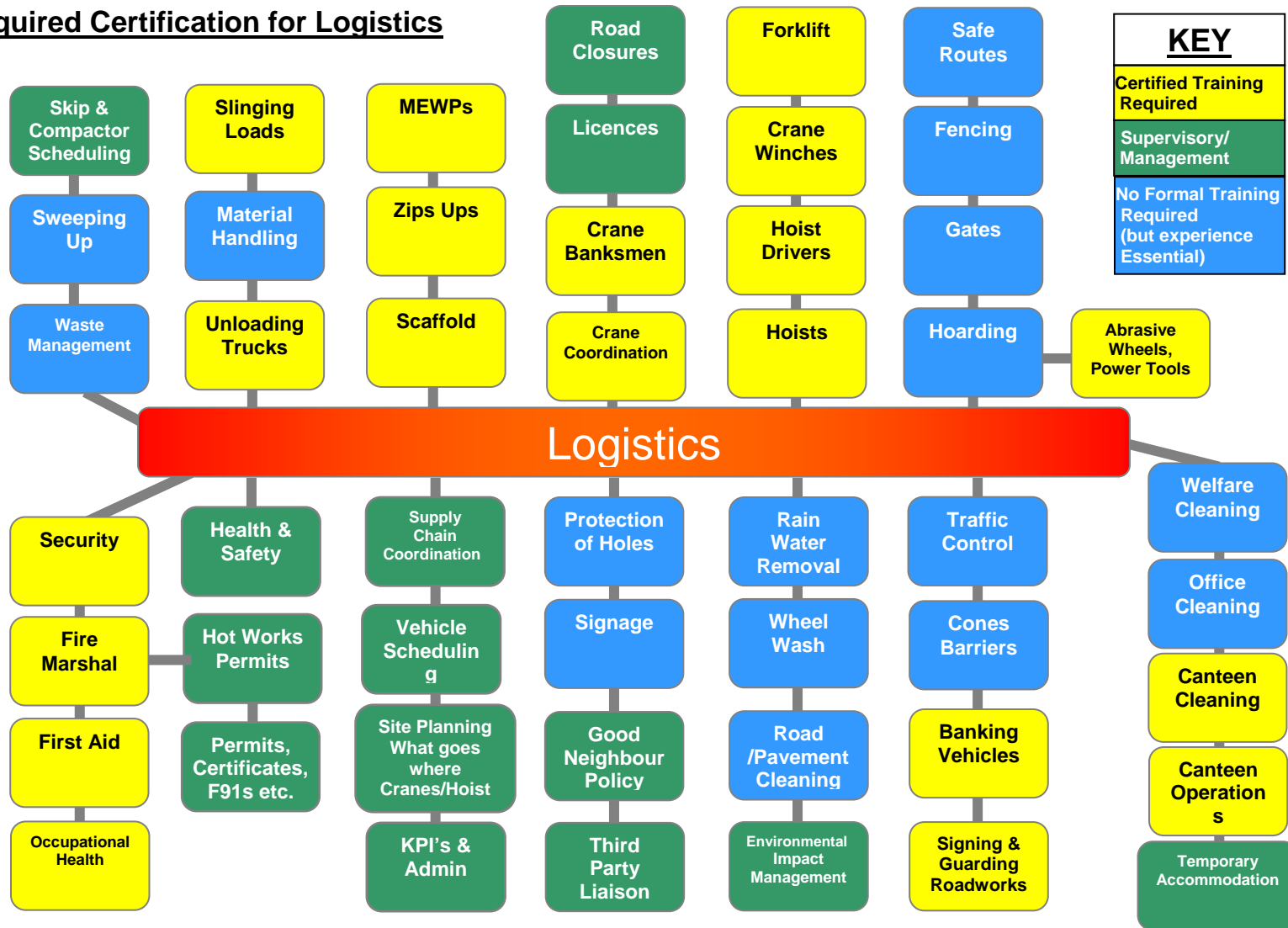
## **Appendix 1 Members of the Strategic Forum Logistics Task Force**

Chairman	Mike Eberlin	Castle Cement
Members	Rick Ballard John Brooks John Connaughton Chris Ctori Paul Fenlon John Hobson Phil Holden Mike Holley Gary Sullivan Michael Ankers	The Logistics Business MACE Davis Langdon Consultancy BAA NHS Estates Management of Change Pascall and Watson Excel Wilson James Construction Products Association
Secretary	Kate Dunne	Strategic Forum for Construction

The Group also received support from Brian Moone and Ian Pannell when they were part of the Constructing Excellence team

Appendix 2

**Required Certification for Logistics**



Appendix 3

**SUMMARY OF ACTION PLAN**

Action Directed to	Action Required	Lead Organisation (s)
<b>Clients</b>	<ul style="list-style-type: none"> <li>• <i>Client's Charter to refer to the expectation that a Logistics Plan is prepared at an early stage in every project</i></li> <li>• <i>Best Practice Guide to be prepared to help clients understand what they can expect from the supply side on logistics</i></li> </ul>	<p>Construction Client's Group</p> <p>Construction Client's Group in co-operation with other umbrella bodies on Strategic Form</p>
<b>Design Professionals</b>	<ul style="list-style-type: none"> <li>• <i>Design professionals to prepare a Process Map for each project as part of the Scheme Design</i></li> <li>• <i>Professional institutions representing the design professions to develop advice and offer briefing to members on the role they have to play in project logistics</i></li> <li>• <i>Professional institutions to consider ways in which the role of their profession in project logistics can be incorporated in initial education and training.</i></li> <li>• <i>Professional team prepare a Bill of Materials as part of the logistics plan.</i></li> </ul>	<p>CIC in Partnership with RIBA, ICE, IStructE, and CIBSE</p>
<b>Main Contractors and Specialist Contractors</b>	<ul style="list-style-type: none"> <li>• <i>Main contractors to prepare a Logistics Plan in consultation with the rest of the Supply Chain, at the outset of each project.</i></li> <li>• <i>CITB ConstructionSkills to review the need for logistics skills in the industry and recommend what needs to be done to address this.</i></li> </ul>	<p>Construction Confederation in co-operation with Construction Products Association, National Specialist Contractors Council and Specialist Engineering Contractors Group</p> <p>CITB ConstructionSkills in co-operation with Summit Skills and with support of Construction Confederation, NSCC and SEC Group</p>

<b>Manufacturers and Suppliers</b>	<ul style="list-style-type: none"> <li>• <i>Department for Transport's Sustainable Distribution programme to include work on transport in the construction industry.</i></li> <li>• <i>Key manufacturers and suppliers to input to a Bill of Materials as part of the Logistics Plan for each project</i></li> <li>• <i>Manufacturers, suppliers and distributors to reflect the cost of distribution in their pricing policies</i></li> <li>• <i>Manufacturers, suppliers and distributors to work with contractors to see how lessons from the Consolidation Centre approach might be transferred to other significant construction projects and programmes</i></li> </ul>	<p>Department for Transport</p> <p>Construction Products Association</p> <p>Construction Products Association</p> <p>Construction Products Association together with Construction Confederation, NSCC and SEC Group</p>
<b>Whole Industry</b> <ul style="list-style-type: none"> <li>- Information Technology</li> <li>- Case Studies</li> <li>- Learning from other industries</li> </ul>	<ul style="list-style-type: none"> <li>• <i>The industry work with DTI to focus part of that Department's work on information technology towards the way this can be used to help improve logistics in the construction industry.</i></li> <li>• <i>As part of this programme two case studies developed to show the potential benefits of bar coding. These case studies should each focus on a specific product being used on a major project.</i></li> <li>• <i>The development of a 'model project' to help understand the information flows that are needed to create an efficient Logistics Plan and address the existing shortcomings on logistics.</i></li> <li>• <i>Sector / product specific case studies showing how the logistics surrounding the supply of certain products can be improved.</i></li> <li>• <i>The industry work with Cardiff Business School as part of their 'Mass, Customised, and Collaborative Logistics' Project to see what lessons can be learnt from other industries</i></li> </ul>	<p>Constructing Excellence and DTI with support from other Strategic Forum umbrella bodies.</p> <p>Constructing Products Association, DTI and Construction Excellence with support from other Strategic Forum umbrella bodies</p> <p>Construction Excellence with support from other Strategic Forum umbrella bodies and possible event sponsorship from one of the industry journals.</p> <p>Construction Products Association / manufacturing sector trade associations in partnership with Construction Confederation and specialist contractor associations</p> <p>Constructing Excellence with support from other umbrella bodies on Strategic Forum</p>

