

# **A Vision Shared**

## **The Movement for Innovation**

### **Second Anniversary Report**



Movement for  
Innovation  
M<sup>4</sup>I



**November 2000**

# Board & Team Members

## M<sup>4</sup>I Board

Alan Crane*	Chairman
Rab Bennetts*	Bennetts Associates Ltd.
Bill Bolsover	Aggregate Industries UK Ltd.
Mike Burt	European Career Systems
Clive Cain	Defence Estates Organisation
John Connaughton	Davis Langdon Consultancy
Martin Davis	Drake & Scull Eng. Ltd.
Deryk Eke	OGC Construction Team
John Emery	Hammerson Plc
David Fison*	Skanska Construction
Colin Harding	George & Harding Ltd.
Shonagh Hay*	Amey Plc
John Hobson	DETR
Tony Ingle-Finch	Railtrack Plc
John Kerman	The Highways Agency
Zara Lamont	Construction Best Practice Programme
Peter Lobban*	Construction Industry Training Board
Roderick Macdonald	Buro Happold
Allan McDougall	Shepherd Engineering Services Ltd.
Robin Nicholson	Edward Cullinan Architects
Abena Nsia	National Housing Forum
Richard Ogden	McDonald's Restaurants
Kate Priestley*	NHS Estates
Robert Shed	Bovis Lend Lease
Stef Stefanou*	John Doyle Group Plc
Martin Sykes	DETR
Brian Thompson	Babtie Electrical and Mechanical
David Trapnell	Etex Group
Bob White*	Mace Ltd.
Andrew Wolstenholme*	BAA

## The M<sup>4</sup>I Team

David Crewe*	Executive Director
Ian Pannell	Deputy Director
Adrian Blumenthal	Crown House Engineering
Wayne Callender	Drake & Scull Eng. Ltd.
Charles Gjertsen	Wates Construction
Ali Mafi	M <sup>4</sup> I Team Member
John Mead	Construction Industry Council
Tim Penrose	Mace Ltd.
Neil Rennison	Taylor Woodrow
Peter Runacres	M <sup>4</sup> I Team Member
Charles Stirling	BRE Scotlab
Adrian Terry	CITB
Tim Warren	Buro Happold
Jane Mitchell	Administrator

\* Members of the Executive Management Group (EMG)



# Contents

Chairman's Review. . . . .	2
Demonstration Projects . . . . .	9
• <i>Purpose</i> . . . . .	9
• <i>Process</i> . . . . .	10
• <i>Regional Clusters</i> . . . . .	11
• <i>Performance Measurement</i> . . . . .	13
• <i>Statistical Review</i> . . . . .	15
A Structured Review of Demonstration Projects (University of Reading Interim Report) . . . . .	17
Case Histories. . . . .	29
Working Groups . . . . .	49
• <i>Partnering the Supply Chain</i> . . . . .	49
• <i>KPIs and Benchmarking</i> . . . . .	50
• <i>Education, Training and Research</i> . . . . .	50
• <i>Respect for People</i> . . . . .	51
• <i>Sustainability</i> . . . . .	54
• <i>Knowledge Exchange</i> . . . . .	56
Glossary . . . . .	58





# Chairman's Review

**Two years ago I was asked to take on the Chairmanship of the Movement for Innovation Board. The Board had been set up to implement the recommendations set out in 'Rethinking Construction', the report of Sir John Egan's Construction Task Force.**

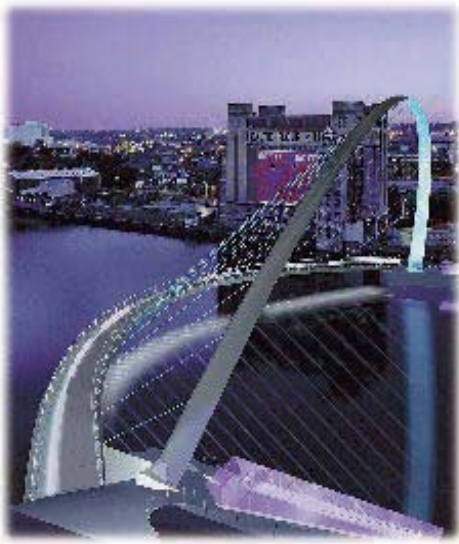
The Board brought together leading figures from all parts of the construction industry and its clients. What everyone had in common was a deep commitment to the industry and its people and a shared belief that, by working together, the recommendations for radical change and the improvement targets set out in 'Rethinking Construction' could not only be delivered but in many cases improved on.

Over the last two years my Board, with support from our Team of secondees from industry and Government, has put in a tremendous amount of hard work to manage the work programme that has been developed to implement 'Rethinking Construction'. In this task we have received unstinting support from all parts of the industry, from the industry's trade and professional organisations and from clients. I would like to take this opportunity to thank everyone who has helped achieve what is generally acknowledged as exceptional progress in a remarkably short time.

'Rethinking Construction' was the landmark report that built on the earlier work of Sir Michael Latham. The report delivered an honest analysis of the state of the UK construction industry and rightly flagged up the vast potential for the industry to become significantly more efficient and, at the same time, deliver substantial improvements in quality and value for money. Other industries had already made major progress through the application of 'world class' best practices in management competences and manufacturing practices and there was absolutely no reason why the construction industry and its clients should not achieve the same results.



The key to success was for the industry at large to learn from the innovations and best practices that were already being introduced by our leading companies and clients and through performance measurement and benchmarking to strive for continuous improvement. Such action would lead to the identification and elimination of those practices that add costs but no additional value. In a very real sense the application of the principles of 'Rethinking Construction' will make a significant contribution to the development of a much more sustainable construction industry.



The report included a set of challenging targets against which the industry and the clients could measure improvement at both company and industry level. The sharing of information on innovation and best practices would be through Demonstration Projects and the vehicle for radical change would be the Movement for Innovation.

**M<sup>4</sup>I has achieved much in two years but perhaps the most significant features include:**

## **Demonstration Projects**

To date some 170 projects with a combined value of more than £4 billion have been accepted into the programme. These cover all types and sizes of construction project with participation from right across the UK. These projects have been accepted on the basis that the project team and client have incorporated innovative practices to improve efficiency and quality. Many of these projects feature new forms of partnering that have been developed to manage rather than pass on risk and to integrate the project partners at the earliest planning stage to maximise the opportunities for value engineering and lean thinking. Partnering has also led to the adoption of forms of contract that encourage innovation and provide commercial incentives for project partners to work together to add value.



# Chairman's Review

Demonstration Projects commit themselves to carry out performance measurement and to share their results. The levels of performance improvement being recorded by the Demonstration Projects are significantly better than the result for the industry at large. This provides the clearest possible evidence that applying the principles of 'Rethinking Construction' is not just about good practice but also very good for business and for profits. The details of innovations and best practices from completed projects are being published as M<sup>4</sup>I Case Histories. Thirty two have already been published with nine more included in this report. In turn the Case Histories are being shared with the rest of the industry through the Construction Best Practice Programme.

As projects are completed we need to constantly refresh the programme. This also gives us the opportunity to target recruitment to ensure that all sectors and regions are represented and the supply chain is fully represented. Currently we are looking to recruit additional projects or construction processes that include innovations developed by manufacturers and specialist contractors, together with innovations based on design excellence.

**If you would like to discuss proposing a Demonstration Project do please contact the M<sup>4</sup>I Team on 01923 664820.**

## Regional Cluster Groups

We have set up a network of nine regional Clusters at which representatives of the Demonstration Projects meet regularly to share information on their projects, their innovations and best practices and the associated business benefits. The sharing of information can be very important in further developing the new techniques and in identifying opportunities for their subsequent application.





The Clusters are developing links with local Universities, Trade and Professional bodies, Regional Development Agencies and local 'Rethinking Construction' Best Practice Clubs. Through these contacts the Clusters are playing an increasingly significant role as regional centres of excellence for construction innovation and the promotion of management competencies.



## Key Performance Indicators

The M<sup>4</sup>I has led the development of a set of headline indicators which, for the first time, have provided the construction industry with the tools to measure performance improvement against the targets set out in 'Rethinking Construction' and to publish the results. In addition an expert working group has recently developed a set of six tools to help organisations and construction

project teams to monitor organisational and project performance on key elements of the hugely important Recruitment, Retention and Respect for People agenda. A pilot programme to trial these innovative tools is now under way.

I think we all appreciate that the future success and profitability of the industry and of our own companies is totally dependent on recruiting and retaining the best people. There is much that companies of all size can do to significantly improve conditions and methods of working in order to make the industry a more attractive and exciting place in which to work. These tools will be invaluable in helping to measure current levels of performance and to monitor the pace of progress.

**The M<sup>4</sup>I Board is keen to attract additional Demonstration Projects and Organisations that would like to take part in the trialing of these important new tools. If you would like to be involved please contact Adrian Terry on: [terrya@m4i.org.uk](mailto:terrya@m4i.org.uk) or Mob:0777 0841 814**



# Chairman's Review

## Website and Knowledge Exchange

The M<sup>4</sup>I maintains a comprehensive website [www.m4i.org.uk](http://www.m4i.org.uk) which we use to keep people informed about our fast developing work programme. From the outset the Board has supported the development of a Knowledge Exchange which brings together a number of websites and which serves as a 'one stop shop' to report progress on all 'Rethinking Construction' initiatives. The Knowledge Exchange can be accessed on

[www.knowledgeexchange.co.uk](http://www.knowledgeexchange.co.uk)

## National Conferences

In July 1999 and again in May this year we organised national M<sup>4</sup>I conferences. Each conference attracted almost 800 delegates and were among the best supported events ever to take place within this industry. In addition to reporting progress on the implementation of 'Rethinking Construction' we also used the conference to report on the practical outputs - the innovations and best practices from the Demonstration Projects themselves.

At this year's conference we were able to publish the first results obtained using the Key Performance Indicators and to invite industry views on the future direction of M<sup>4</sup>I.

It is to the credit of the project teams and their clients that for every measure the performance achieved by the Demonstration Projects was significantly better than the industry average.





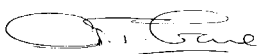
## M<sup>4</sup>I Membership Scheme:

In response to significant demand from the industry we have recently launched a membership scheme through which companies not directly involved in Demonstration Projects can participate directly in the work programme of the Movement at both regional and national level. This is an important new development which will support the M<sup>4</sup>I Board's ambition to significantly increase awareness of 'Rethinking Construction' and encourage wider involvement in the work of the Movement. It will, I believe, also help bring about the self-sustaining commitment to continuous improvement that is so essential if this industry is to become truly world class.



In this introductory report I have set out to provide you with a brief overview of some of the key achievements of the Movement for Innovation. Much more information is set in this brochure and I encourage you to take time to study the contents. I think you will be impressed with what has already been achieved and our plans for future development. If you are already active in the Movement I hope you will continue to give us your support. For those of you who are not currently involved I urge you to consider what you may be missing out on. What the Movement is offering is a unique opportunity for companies and organisations to network with the UK's most innovative and forward thinking businesses and to be at the forefront of new ideas and business practices.

The Movement for Innovation does not belong to me nor to my Board. It belongs to all those in this industry who want to take part. I hope that you will want to become involved and to work with others in the Movement for a better and more profitable industry.



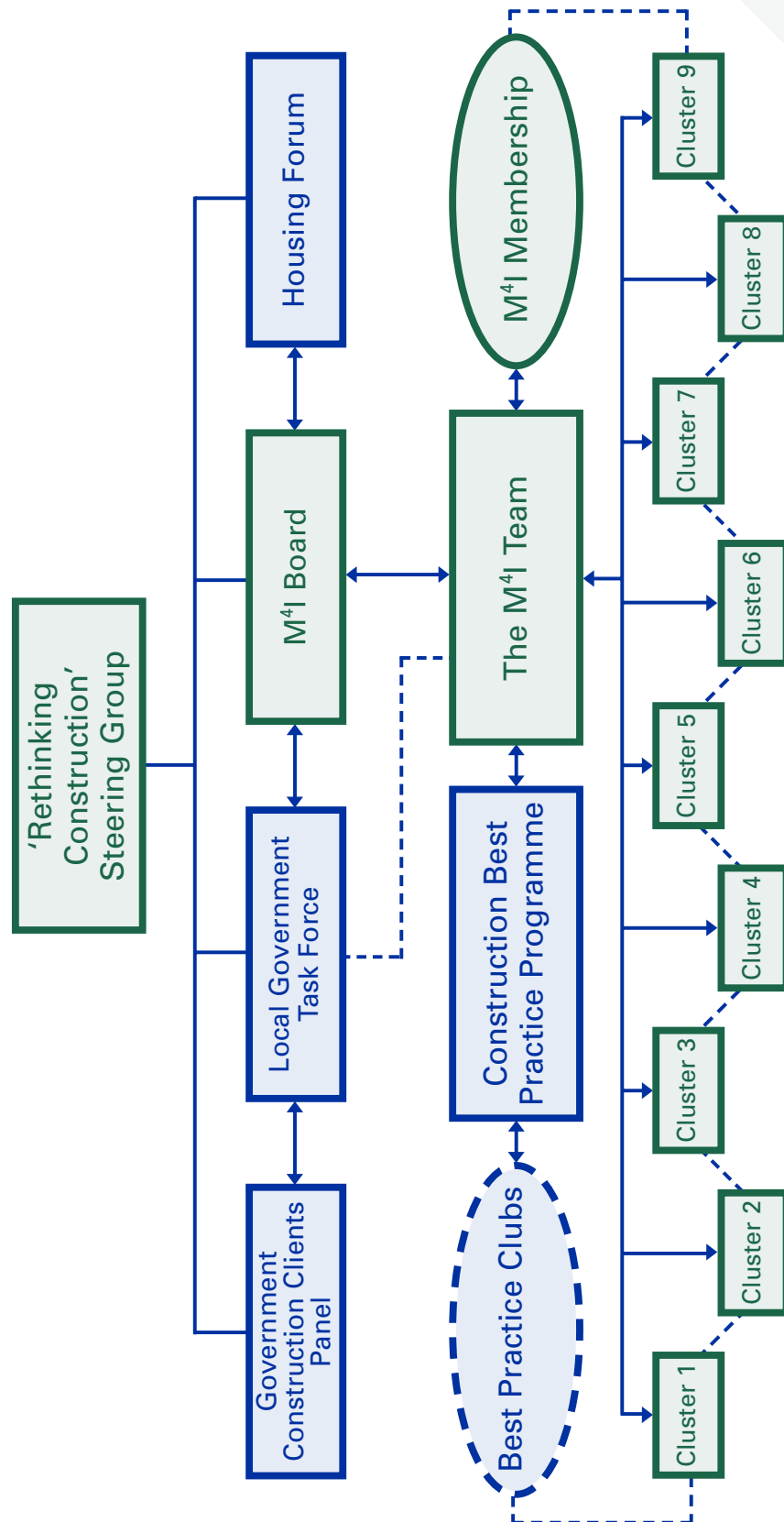
Alan Crane  
Chairman of the Movement for Innovation

Movement for  
Innovation  
M<sup>4</sup>I



# Chairman's Review

## 'Rethinking Construction' - The Structure

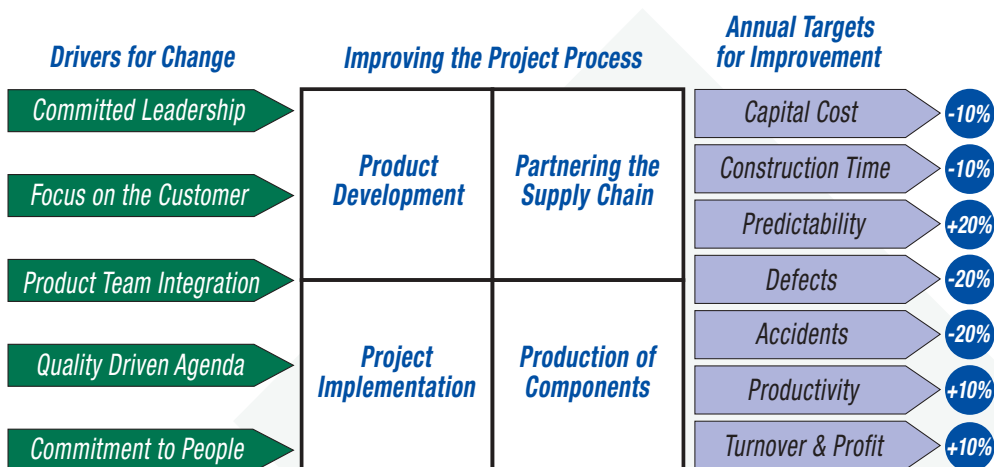


# Demonstration Projects

## Purpose

The 'Rethinking Construction' report contained the clear message that the industry would not significantly improve unless it embarked upon radical change. It stressed the need for Demonstration Projects to be held up as examples of the benefits to be gained from changing the way in which the industry works.

The report identified five key drivers required to implement change and develop substantial improvement to the project process. These drivers for change require the team to review closely the processes within a typical project to identify new innovations and working methods to achieve continuous improvement.



In order to demonstrate the effectiveness of the changes, it is necessary to set clear targets for improvement and to apply a performance measurement system to aid benchmarking and facilitate year on year improvement.





# Demonstration Projects

## Demonstration Process

The process of demonstration by the projects is facilitated by the M<sup>4</sup>I Team and reviewed by the regional Cluster members from the Demonstration Projects. Innovations are presented to the Cluster in two ways:

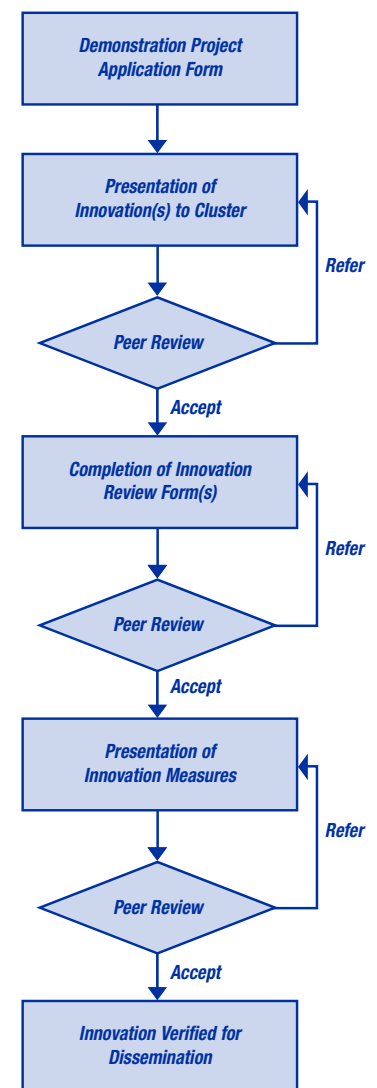
### Anecdotal Evidence

The description of the process, its application and implementation is captured in the Demonstration Project application, this is presented to the Cluster and then further refined and detailed in the Innovation Review Form.

### Tangible Evidence

The measurement of the tangible benefits for the project demonstrate the specific area of business benefit the innovation has produced. These measures are made up of innovation specific measures and/or headline KPIs.

All of the evidence presented by a Demonstration Project is rigorously examined at the Cluster meetings where the peer review of both the anecdotal and tangible evidence is carried out. Only on satisfying the Cluster members of the value of the innovation will it be published as an M<sup>4</sup>I Case History and disseminated to the wider industry.



The innovations that have been captured have all been tried and tested and their benefits measured. It is therefore with confidence that these improvement techniques are recommended to industry by the Movement for Innovation.

## Regional Clusters

The M<sup>4</sup>I regional Cluster groups have been set up to enable Demonstration Project teams to meet regularly to share information on the innovations and best practices from their projects. The Clusters provide the participants with a unique opportunity to test and plan new ideas and to further refine the innovations and best practices.



There are nine Clusters serving the UK. Building on their local knowledge and expertise each Cluster is well placed to identify and engage with priority issues for the industry at local level and to take account of local economic factors.

The Clusters are also well placed to engage with local initiatives by other organisations including the Construction Industry Training Board, Construction Best Practice Programme, Chambers of Commerce, Universities and Regeneration Agencies.



# Demonstration Projects

## Increasingly the Clusters are expanding the range of their activities to include:

- The introduction, application and implementation of new tools and techniques - sometimes drawn from other industries including automotive, manufacturing, aerospace and retail - to improve management and business performance;
- Sharing experience and expertise on the use of performance measurement and benchmarking techniques in order to improve project, company and individual performance;
- Sharing new ideas and practices with potential supply chain partners as well as competitors in a non-commercial, non-confrontational facilitated forum;
- Identifying staff development, training and related matters in order to recruit and retain the best staff;
- Liaising with other organisations seeking to improve the performance of the industry and its clients;
- Communication with Construction Best Practice Clubs and other local networks;
- Identifying gaps in skills to implement 'Rethinking Construction' and support continuous improvement;
- Bringing together all parts of the construction supply chain for a common goal;
- Working with others to deliver 'Rethinking Construction' in the regions.





# Performance Measurement

**Innovation and best practice can significantly improve business performance. This is the clear message that has emerged from the M<sup>4</sup>I Demonstration Project performance data. When assessed against the Egan targets and the construction industry as a whole these projects have recorded impressive results. Improved performance has led to increased margins and greater client satisfaction.**

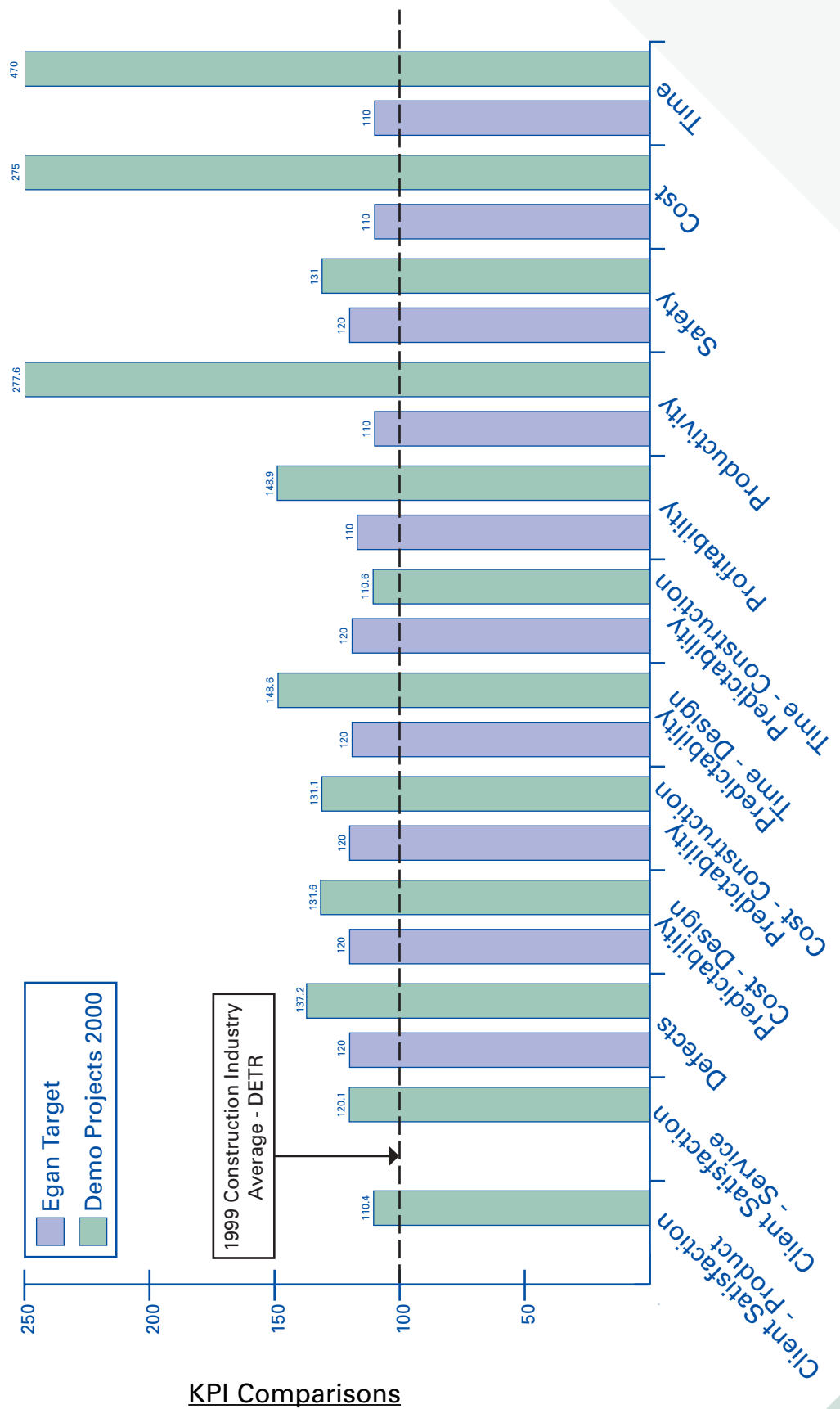
All M<sup>4</sup>I Demonstration Projects strive to out perform the 'Rethinking Construction' improvement targets. Performance is measured using the Key Performance Indicators (KPIs) developed by the M<sup>4</sup>I working group and published by the Construction Best Practice Programme. This allows projects not only to monitor progress on a regular basis it also provides the opportunity to benchmark against the rest of the industry.

The table below details the latest performance results from Demonstration Projects and demonstrates the significant improvement when compared to the industry average for 1999 and the Egan targets.

KPI	Measure	Egan Target	Industry 1999	M <sup>4</sup> I Result
Client Satisfaction - product	% scoring 8/10 or better	N/A	73%	<b>81%</b>
Client Satisfaction - service	% scoring 8/10 or better	N/A	63%	<b>76%</b>
Defects	% scoring 8/10 or better	78%	65%	<b>89%</b>
Predictability cost - design	% on target or better	77%	64%	<b>84%</b>
Predictability cost - construction	% on target or better	54%	45%	<b>59%</b>
Predictability time - design	% on target or better	44%	37%	<b>55%</b>
Predictability time construction	% on target or better	74%	62%	<b>69%</b>
Profitability	median profit before interest & tax	5.5%	5%	<b>7%</b>
Productivity	median turnover/employed	65	59	<b>164</b>
Safety	mean accident incident rate	830	1037	<b>716</b>
Cost	change compared with one year ago	-2.2%	-2%	<b>-6%</b>
Time	change compared with one year ago	2.7%	3%	<b>-8%</b>



# Demonstration Projects

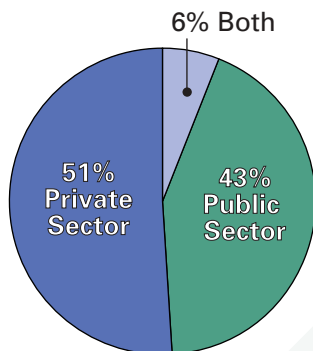


## Statistical Review

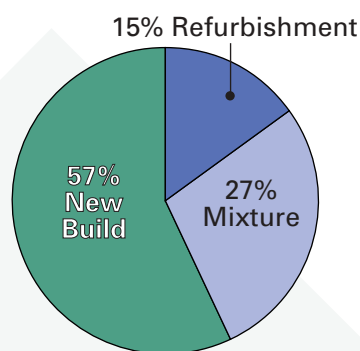
Since November 1998 over 170 projects have been accepted into the Movement for Innovation's Demonstration Programme. The following charts provide an overview on regional distribution, cost of project, industry sectors represented, project type, and nominating companies.

Some key details highlighted by these charts are:

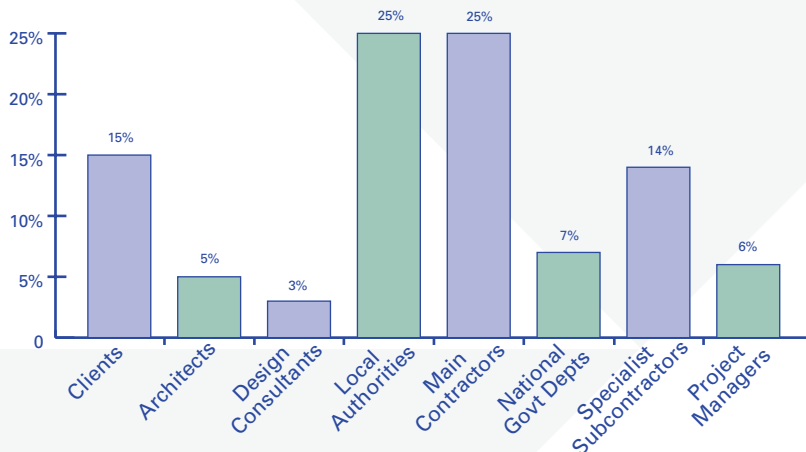
- New build projects are in the majority;
- Total cost of projects is approximately £4 billion;
- Education, transport and water sectors account for half of all projects;
- Public and private sector projects are equally represented;
- Half of all projects have been nominated by local authorities or main contractors.



Mix of Private & Public Sector



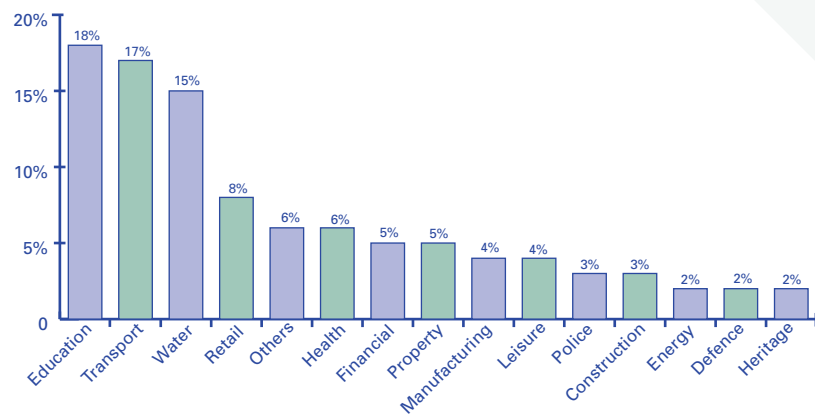
New Build vs Refurbishment



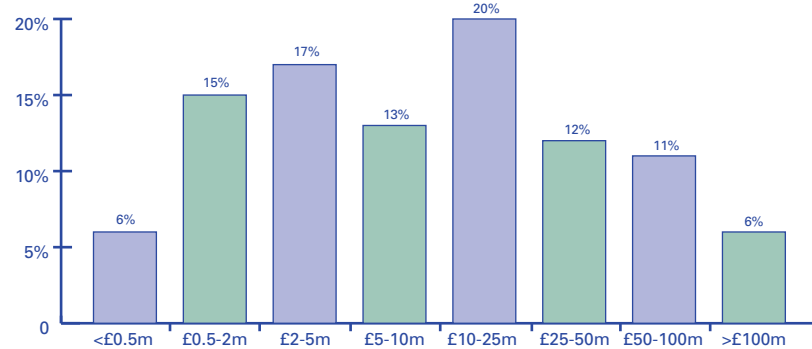
Nominating Companies (% of Projects)



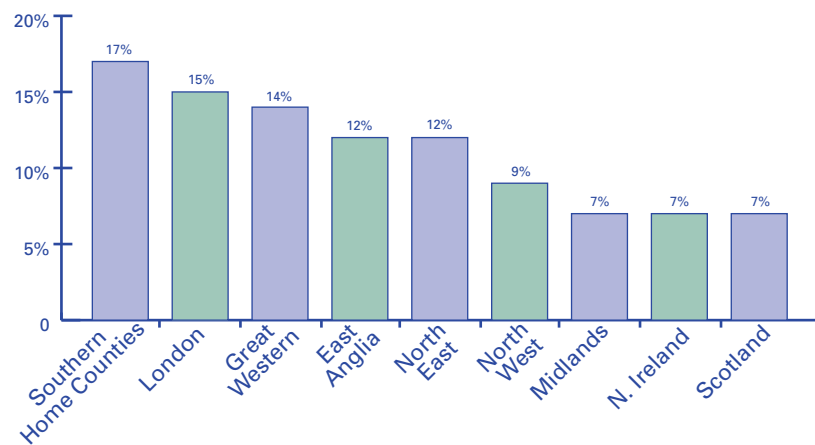
# Demonstration Projects



Client Industry Sectors (% of Projects)



Project Cost (% of Projects)



Regional Distribution (% of Projects)

# **A Structured Review of Demonstration Projects**

## **Introduction**

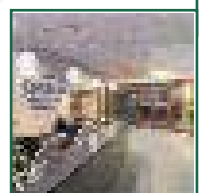
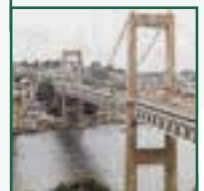
**Earlier this year the Movement for Innovation's Education and Training working group commissioned University of Reading to carry out research into the demonstration process. The aim of the research is to obtain information that will supplement the further development of the Demonstration Project programme and downstream to help in the development of a proposed larger project to create a 'Project Team Training Simulator'. The first stages of the research will facilitate data collection for the development of the simulator.**



### **There are four stages to the research:**

- Literature analysis and background study;
- Face-to-face interviews of project representatives;
- Targeted focus group sessions;
- An objective analysis of the findings and final report.

**The findings published in this report are provisional and based upon the results obtained from sixteen face-to-face interviews conducted out of the proposed twenty five. The final report is scheduled for publication in March 2001.**



# A Structured Review of Demonstration Projects

## Executive Summary

**The benefits from involvement in the Demonstration Project Programme are seen as:**

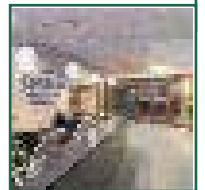
- An opportunity to learn from other Demonstration Projects;
- A willingness of project teams to openly discuss their innovations with others;
- The creation of project teams that work together more efficiently;
- The provision of mechanisms to reward successful outcomes;
- The ability to measure the value and effectiveness of the innovations and best practices;
- The improvements in performance achieved from innovation;
- Learning from previous experiences;
- An increased willingness to propose further projects for Demonstration Project status.

**Areas that need to be looked at carefully in the future include:**

- Participation needs to be expanded to bring more consultants into the Movement as well as encouraging small and medium sized companies to become more involved;
- More effort should be given to involve projects that have a significant research and development dimension;
- Attention needs to be given to the sharing of knowledge between the whole membership of M<sup>4</sup>I and not just within individual Clusters.



**Although only provisional, the findings from the research are most encouraging. The full report, to be published in March 2001, will provide a more detailed analysis with conclusions and recommendations for the future direction of the Demonstration Project process and for the Movement for Innovation in general. The provisional findings do provide a level of confidence that the Movement is making an effective contribution in encouraging the industry to think and act in new and more positive ways. What remains to be seen is whether this change in attitude and performance can be reproduced throughout the industry.**



## Research Aims

The research has the following aims:

- Establish what innovation and best practice techniques have been used on the Demonstration Projects and to categorise them;
- Determine how these techniques are implemented on different types of demonstration project;
- Identify the obstacles to the successful implementation of the techniques;
- Determine how these obstacles can be resolved successfully whilst minimising resource expenditure within the M<sup>4</sup>I framework.



# A Structured Review of Demonstration Projects

## Provisional Findings from the Research

The research is just over half way through the interview stage and although the work is incomplete some provisional observations can be made. The literature analysis is complete and will form part of the final report. This will build on the provisional findings listed below and will contain a greater depth of analysis and a full and detailed list of recommendations.

The adoption of a semi-structured approach to interviews with Demonstration Project teams allowed the researcher to delve into the specifics of the Demonstration Projects. Being able to reference the responses back to an underlying framework permitted a degree of comparison to be made between the projects. In identifying the underlying frameworks six areas of the participants' experience were explored:

- The benefits of nominating a Demonstration Project;
- The benefits to the project team from involvement;
- The Demonstration Project process;
- The effect of the innovation on the Demonstration Project and other projects in the regional Clusters;
- The performance improvement and lessons learned from the implementation of the innovation;
- The benefits to the supply chain.



**The interim findings from the research are described below and give an interesting insight into the development of the demonstration process and the experiences of those involved.**

## **Success Factors Identified in the Demonstration Projects**



The research has identified a number of positive results including:

### **A willingness to learn from other Demonstration Projects**

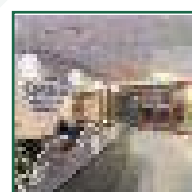
A number of organisations are appointing staff to manage the process of innovation and to learn from other Demonstration Project practitioners. These organisations are clearly demonstrating their commitment to the

'Rethinking Construction' principles and have already begun to change the way they work.

### **A willingness of project teams to openly discuss their innovations with others**

The representatives that come to Cluster meetings come to learn from each other's experiences. They appear to communicate as fellow practitioners rather competitors. There are numerous examples where lessons learnt on one Demonstration Project have been used to benefit another. Such examples have been possible as a result of direct communication and collaboration in the Cluster groups.

The majority of companies have given presentations about their project innovations and are willing to share their experiences both with their Cluster group members and with the wider membership at national M<sup>4</sup>I conferences. This is seen to have real value as it moves the industry forward.





# A Structured Review of Demonstration Projects

## **The creation of project teams that work together more efficiently**

The innovation process has by its very nature fostered a greater level of co-operation. This has encouraged project teams to communicate and to better understand their needs whilst moving towards a common goal. Examples include projects where major problems have occurred but instead of the recriminations and blame culture usually associated with the construction industry, project teams have taken joint responsibility to resolve the problems.

## **The provision of mechanisms to reward successful outcomes**

A critical measure of the success for any industry is the ability to make money. If a project partner fails to make money on a project where an innovation is judged to be a success by others, questions need to be asked as to the validity of the claim. This realisation is becoming apparent on a number of Demonstration Projects where the need for all partners to win has become an explicit objective.

## **The ability to measure the value and effectiveness of the innovations and best practices**

Standardised techniques for performance measurement are being used to evaluate innovations and new methods of working, with indicators appearing to show significant performance and productivity improvements. Measures, which have traditionally been internal company measures, can be applied to allow comparisons to be made against the 'Rethinking Construction' targets. Less experienced organisations who have not previously measured their performance have a basis for the creation of their own measures.



Measurement is seen as beneficial to the project teams especially when the process is formalised. It has been found that although some organisations apply performance measures, they do not necessarily reflect the nationally recognised Key Performance Indicators published by Construction Best Practice Programme (CBPP).



*"The measurement process was a revelation as it allowed actual performance to be measured in a useful and effective manner" - Project team member.*

### **The improvements in performance achieved from innovation**

The interviews have revealed actual business benefits from having put forward Demonstration Projects. The benefits in the majority of cases involved increased value to the participants involved.

The targets set out in the 'Rethinking Construction' report are in the majority of cases seen as reasonable targets, which are achievable if the industry pulls together. However, similar year on year increases are seen as unrealistic.

*"I don't think I would measure success in terms of profitability, but when you talk with the other members of the project team, the thing that comes out most strongly is the continuity and the fact that you're getting a good relationship with your clients and fellow team members who want to work together in the future"- Project team member.*

### **Learning from previous experiences**

The innovations proposed by most project teams are generally something that one of the project team's participants may have tried before and therefore not entirely new. However, in the majority of cases the application is sufficiently original as to be called an innovation.





# A Structured Review of Demonstration Projects

## A willingness to propose further Demonstration Projects

A significant number of project teams that have completed their Demonstration Projects plan to submit additional projects as they see definite benefits from doing so. This is encouraging because it highlights a measure of success for the companies involved and also their desire to try further innovation in support of continuous improvement.

## Future Challenges

As well as identifying some positive findings about the Demonstration Projects the interview process has also uncovered areas where more attention is required. These areas include:

### The number of professional disciplines involved in the Demonstration Project process needs to be increased

It would appear from an analysis of the Demonstration Projects that only a limited number of innovations have been proposed by construction professionals. The reasons for this are unclear at present, however it is clear that more effort needs to be directed at gaining a greater level of participation and leadership from these groups.

### The number of smaller organisations involved in the Demonstration Projects needs to be increased

Small and medium sized enterprises (SMEs) need to be targeted better with more Demonstration Project proposals received from companies further along the supply chain. Encouragement needs to be given that benefit can be derived from the demonstration process and that it is not merely a 'club' for the larger companies in the industry.



*"The Movement for Innovation has started the ball rolling, to keep it rolling, M<sup>4</sup>I needs to encourage the SMEs of the industry to participate further, otherwise the Movement will ultimately fail" - Project team member.*

**The nature of the innovations proposed on the Demonstration Projects needs to be explored further to ensure novelty and uniqueness.**



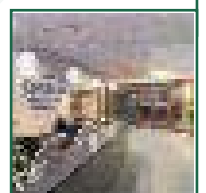
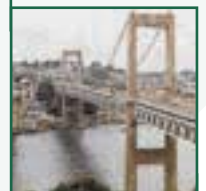
There has been criticism from some that a number of the innovations used on Demonstration Projects are not unique and are merely a mechanism of applying established best practice rather than attempting to challenge the fundamental problems that still exist within the industry. The Movement needs to encourage its membership to put more emphasis on research and development rather than focusing application on the work of others.

**The ability for knowledge to be exchanged effectively between the regional cluster groups needs to be reviewed**

It has been suggested that only limited exchange of knowledge is occurring between Cluster groups. This is not surprising, as Cluster group members do not often attend the other Cluster meetings in other regions.

## **The Reasons for Proposing a Demonstration Project**

The reasons given for involvement in the initiative vary, most of the reasons given focus on the opportunity to innovate, but a significant number mention opportunities to promote the good work of their own company. Most of the companies expressing these reasons for joining report additional benefits in the form of the shared learning and experiences of their peers/competitors.



# A Structured Review of Demonstration Projects

## The Experiences of the Project Team

The Cluster membership is varied across the regional groups with the majority being from either main contractors or client bodies. The need for membership to be more representative of the supply chain has been noted.

*"The membership and involvement of industry is currently not wide enough and a fuller industry representation should be actively encouraged"* - Project team member.

It has been mentioned repeatedly that there is not enough involvement by suppliers, manufacturers, specialist contractors and professional disciplines. Some interviewees expressed concern about the need for additional obvious commitment from clients. M<sup>4</sup>I is continuing to take action in encouraging Demonstration Projects to engage their supply chains and recent calls for Demonstration Project nominations from these sectors are intended to ensure a more even balance.

*"We have brought the client along to one Cluster meeting and he was really interested but he did not come back"* - Project team member.

Another area for concern that has been raised is the level of commitment shown by some groups in the industry.

*"It is pointless for us the contractor to talk about different ways of working when at the end of the day, the person who controls the money or the person who creates the design, doesn't want to know"* - Project team member.

Concern has been expressed at the policies used by some organisations to transfer responsibility to others without understanding or wanting to understand the process.



*"Everyone talks about buildability but it's lip service. Rather than the architect designing with the builder, the architect thinks I better issue this to the builder but only does so two weeks prior to starting on site" - Project team member.*

## The Demonstration Project Process

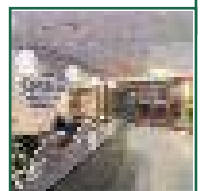
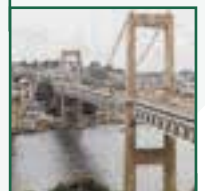
In order to quickly gain momentum M<sup>4</sup>I initially set the barriers to entry for Demonstration Projects lower than they are at present. Projects from the early rounds have described how the current process that has evolved with their participation is robust with systems in place to measure the benefits of innovations and best practices and to capture the learning through peer review and dissemination to the wider industry.

## The Effect of Innovation on the Project

The impediment to the successful implementation of new and innovative practices is a reluctance or inability to use the knowledge gained quickly enough.

In some cases it was discovered that not all of the innovations proposed at the start of the project had been taken through to completion. Sometimes the innovation was proving too difficult or there had been a lack of commitment by others. The honesty of the projects in highlighting these failures has enabled others to avoid similar problems and has served as a valuable lesson.

*"I think it would be fair to say that those innovations not successfully demonstrated were the ones where we had to work with other groups and they let us down rather than anything else" - Project team member.*





# A Structured Review of Demonstration Projects

## The Performance Achieved from Innovation

In the majority of cases the new innovations employed by the Demonstration Projects seem to bring the project team closer together and improve the level of teamwork.

## Benefits to the Wider Supply Chain

From the interviews it appears that most organisations are receptive to improving their processes, although the further along the supply chain one goes the more difficult it can be to generate enthusiasm.

*"Expecting specialist contractors and suppliers to believe the honest intentions of some employers when they are still being nailed by others is difficult"* - Project team member.

*"It is appropriate for risk to be transferred to those who are best able to manage it, avoiding the common practice of passing it to the next in line whenever possible"* - Project team member.

There are of course significant obstacles that need to be overcome; building trust between parties where there has traditionally been suspicion and questioning of motives undoubtedly takes time. Involving all parties in the innovation process would seem to break down some of these barriers, so long as the rewards are shared.

*"The process improvements mean that the supply chain's importance is recognised and their views are taken into consideration"* - Project team member.

The interviews are revealing that the Cluster meetings facilitate networking as well as providing an opportunity to understand and employ the innovations practiced by others through a joint learning process.

# Case Histories

**Innovations from the M<sup>4</sup>I Demonstration Projects are being captured in the form of published Case Histories. The Case Histories describe the details of the particular project and its innovations, in addition to the business and operational benefits that these have contributed.**

Further information for those interested in applying the innovations to their own projects is available either from the named project contact or via the Movement for Innovation website on [www.m4i.org.uk](http://www.m4i.org.uk).

The first batch of thirty two Case Histories was published for the recent M<sup>4</sup>I conference in May. Future Case Histories will be published at regular intervals when the benefits of additional innovations from the rolling Demonstration Project Programme have been established.

Case Histories are being made available to the industry at large through the Construction Best Practice Programme. The next batch of nine Case Histories are summarised as follows:

## **Demonstration Project 7** **Dawlish and Sidmouth Sewage Treatment Plants**

*'Partnering success at South West Water'*

Framework agreements provide supplier commitment to reducing capital and operating costs in exchange for long term involvement in the construction programme.

## **Demonstration Project 106** **BNFL Silo B38, Sellafield**

*'Windfall from negotiated contractor appointment'*

The alliance management team solve difficult project problems.

## **Demonstration Project 112** **Forton Lake Opening Bridge, Gosport**

*'Integrating design and construction in one-off projects'*

New procurement strategy using a novel Project Delivery Process proves a success with new pedestrian bridge.



Movement for  
Innovation  
M<sup>4</sup>I



# Case Histories



## **Demonstration Project 116** **European Concrete Building Project**

*'Formwork struck in just 19 hours'*

Full scale tests on a seven-storey concrete framed building give concrete a new edge when competing with steel framed buildings.

## **Demonstration Project 120** **Safeway, Chelsea**

*'Teamworking - the last frontier for measurement'*

Measurement of the soft issues surrounding team performance encourages innovation.

## **Demonstration Project 128** **Livingston Drive-Thru Restaurant**

*'Restaurant relocation record'*

Standardisation and modular construction is key to McDonald's spectacular rate of growth.

## **Demonstration Project 150** **Drumglass High School, Northern Ireland**

*'Roles reversed in successful PFI school'*

Architect takes the lead role in a Private Finance Initiative (PFI) school in Northern Ireland.

## **Demonstration Project 174** **Dudley Southern Bypass**

*'Rethinking contamination'*

Bypass partners save £1m by reusing contaminated soil on inner city ringroad project.

## **Demonstration Project 185** **Proof House Junction Remodelling**

*'19 day blockade at Proof House Junction'*

The logistical challenges associated with remodelling a critical Birmingham rail junction benefit from Railtrack's Alliance Team approach.





NOVEMBER 2000

# Partnering success at South West Water

## Joined up design by competing consultants

Devon based design managers Babbie Group and Pell Frischmann normally compete for work from South West Water Ltd (SWWL). But they have been assisting each other to successfully complete two similar sewage treatment plants. Other partners are M J Gleeson (civils) and Paterson Candy (process). The £27m project provides two new plants serving Dawlish and Sidmouth, three underground storage tanks, pumping stations and re sewerage works. The two schemes were combined so that similarities could be exploited by adopting similar designs. The result is that with the combined project now 80% complete the projected cost is 12% less than the agreed target cost. Large savings have also been achieved on other partnered SWWL schemes. The partners developed outline designs and then applied value engineering methods to drive down the cost. SWWL's programme leader Kim Vanstone says: "We agreed the target cost only when we had reviewed all the savings and made favourable comparisons with our own benchmarks."

## Benefits of partnering at Dawlish and Sidmouth

**Reduced capital cost** – The forecast cost of the combined projects is 12% less than the agreed target cost.

**Construction time and predictability** – This project, supported by results of other SWWL partnered projects, demonstrates the ability to complete on time and well within budget. This is despite delays due to planning constraints and unforeseen ground conditions. There have also been several items of work added to the project.

**Turnover and profit** – The designers and constructors are benefiting from long term framework agreements and improved margins. Babbie's Mike Briggs explains why: "This shared pain/gain means we all have a direct interest in cost saving innovations. We're more aware of overall costs, not just our own."

## CASE HISTORY



“By partnering and combining the projects we are on course to save about 12% on the agreed target cost”

Kim Vanstone, South West Water Ltd



Dawlish (top) and Sidmouth sewage treatment plants



## CREDITS

Client – South West Water  
Design Manager (Dawlish) – Babbie Group  
Design Manager (Sidmouth) – Pell Frischmann  
Civils Contractor – M J Gleeson  
Process Designer/Contractor – Paterson Candy

## Partnering success at South West Water

### The challenge

Big seasonal load variations and a low population base make the economics of waste water treatment particularly difficult in the south west of England. Industry regulator Ofwat insists that despite tough European quality standards, large cost efficiencies must be found in capital programmes. South West Water Ltd has an ambitious partnering initiative to help achieve this.

### Solving problems

The essence of SWWL's **framework agreements** is supplier commitment to reducing capital and operating costs in exchange for involvement in the long term construction programme.

Two sewage treatment plants to be constructed at about the same time in Dawlish and Sidmouth presented an opportunity to achieve economies if the two schemes could be run together. SWWL had already appointed separate design managers, so a **unique partnering formula** was devised to enable the two projects to be linked in one financial pot with an agreed target cost. M J Gleeson are doing the civils work at both sites, with Paterson Candy designing and installing the process equipment. Design managers Babbie (Dawlish) and Pell Frishmann (Sidmouth) work together to maximise the benefits of similar schemes, sharing design ideas, innovations, drawings, and calculations. In some instances site differences lead to design compromises.

The partners used **value engineering workshops** to arrive at the agreed target cost. With one agreed target cost, the design managers and other partners have a financial stake in both projects, through a **pain/gain agreement**.

Early risk assessment using statistical methods led to a **budgeted sum for risks** in the agreed target cost, available to the partners should any risk items occur. The team jointly manages the risks, keeping risk expenditure to a minimum.

### Future development

SWWL's future partnering arrangements will include provision for linking projects by geography or type, standardising designs and details, developing client specific key performance indicators, and providing continuity of work for the partners. Keeping teams together is considered essential to sustain continuous improvement.

### Innovation case history

*This case history is a snapshot of just one innovation making construction in the UK more profitable for the supply chain and the Client. Further details will be found in the Knowledge Exchange or you should contact the Innovator*

### How to make this radical change in your business

- Carefully select partners with a view to long term programmes not merely individual projects
- Run similar schemes together and use value engineering to achieve economy in the combined agreed target cost
- Encourage economy in rates with long term commitments to suppliers
- Encourage efficiency by devising a pain/gain system and spread incentives widely
- Budget for risks and establish clear responsibilities for management.

### Contact the innovator

Mr Kim Vanstone  
Programme Leader  
South West Water  
Telephone: 01392 443495  
E-mail: kvanstone@south-west-water.co.uk

### Links

South West Water: [www.south-west-water.co.uk](http://www.south-west-water.co.uk)  
Babbie: [www.babbie.com](http://www.babbie.com)  
Pell Frishmann: [www.pellfrishmann.com](http://www.pellfrishmann.com)  
M J Gleeson: [www.mjgleeson.com](http://www.mjgleeson.com)  
Paterson Candy: [www.patersoncandy.com](http://www.patersoncandy.com)

### Related Topics



Visit the Construction Best Practice Programme:  
[www.cbpp.org.uk/cbpp/themes/theme\\_list.html](http://www.cbpp.org.uk/cbpp/themes/theme_list.html)

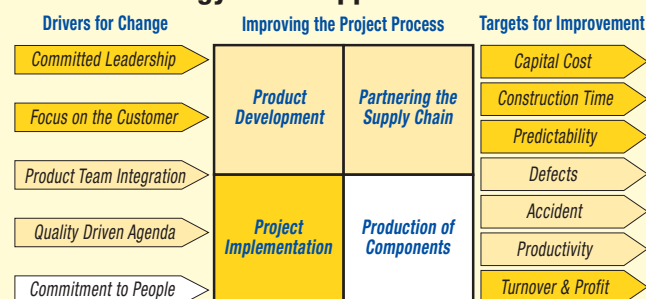
## Our vision

is for the whole UK construction industry to create self-sustaining continuous improvement leading to **world class performance and better profitability**



**M4I**, Building 9, BRE, Garston,  
Watford WD2 7JR,  
Telephone: 01923 664820;  
E-mail: [support@m4i.org.uk](mailto:support@m4i.org.uk); [www.m4i.org.uk](http://www.m4i.org.uk)

### The M4I Strategy Model applied to this innovation

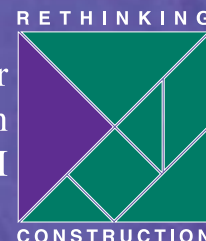






PROJECT 106

Movement for  
Innovation  
M<sup>4</sup>I



NOVEMBER 2000

## Windfall from negotiated contractor appointment

### BNFL-Fairport in alliance management deal

Procurement managers at British Nuclear Fuels Ltd. (BNFL) have slashed the cost of precision steelwork by negotiating directly with their preferred contractor instead of comparing competitive tenders. They had budgeted £1.6m for the 500t steel structure that is required for decommissioning nuclear waste storage silo B38 at their Sellafield site in Cumbria. BNFL's design manager Tony Testa estimated that they saved about £300k by bringing Fairport and their machinist subcontractor Tees Components Ltd. into the design team early. "It was their advice on buildability that gave us confidence," he says. "Bringing a contractor in during the design stage seemed to offer the best value all round."

The project manager on this alliance style contract is also the man responsible for building it – Jonathan Thompson of contractor Fairport Steelwork Ltd. Thompson said: "Our memorandum of understanding created the right atmosphere for non-adversarial cooperation."

The structure consists of two parallel sets of 700mm deep rail beams to support a sophisticated 400t mobile plant. It has a massive anchorage system to resist 0.25g seismic load. Decommissioning the silo includes the removal of radioactive swarf (stripped off magnesium casings of spent uranium fuel rods from Magnox power stations). Tight functional requirements demand a rail level tolerance of typically  $\pm 0.5\text{mm}$  in 7m.

### Benefits of alliance management at Sellafield

The alliance management team made the substantial cost savings while avoiding programme overruns but without sacrificing quality or taking shortcuts on safety.

**Capital cost** – Early contractor involvement made a real difference to buildability and hence the construction cost. Examples include rethinking how to build the turning area between the tracks and relaxing less critical tolerances without affecting operations. Testa reckons: "The move [to early contractor involvement in the design] has saved us some 20% in overall costs."

**Construction time** – Timely completion of the project was threatened by two major problems. Delays in Fairport's

### CASE HISTORY



“The alliance management team found solutions where a more contractual stance would have failed”

Jonathan Thompson,  
Fairport Steelwork



Rail beam system for Silo B38, Sellafield

supply chain were offset by BNFL rescheduling the design. Similarly, Fairport brought forward unaffected construction work to enable a change in BNFL's survey programme. Alliance actions pulled back a potential 40% overrun in time and the project was completed on time.

Summarising the key to their success, Thompson says: "The alliance management team found solutions where a more contractual stance would have failed."



FAIRPORT



#### CREDITS

Client - British Nuclear Fuels PLC  
Fabricator - Fairport Steelwork Ltd  
Machinist - Tees Components Ltd



## Windfall from negotiated contractor appointment

### The challenge

The rail system was bound to be a technically demanding project. Fairport Steelwork had undertaken similar work for BNFL before, but selected on the basis of competitive tenders. This time, Fairport proposed that their services be negotiated before the design was fixed as they believed they could deliver substantial economies by their involvement in design.

### Solving problems

Following their previous experience of teambuilding and mutual respect, a partnering relationship was formed. BNFL engineers were not entirely confident that their initial proposals could be manufactured within the specified tolerances. Early discussions with Fairport and their machinist gave them confidence that a buildable solution would be found together with substantial cost savings.

Possibly the best examples of alliance problem solving are found in mitigating the effects of delays that would have extended the 15-month project by a further six months. Steel sourced by Fairport from Germany was held up by a plant breakdown and a survey of the silo at Sellafield commissioned by BNFL was delayed because access could not be secured at the preferred time. Both these problems affected critical path activities, but the alliance partners shuffled both the design and construction programmes to accelerate other activities to compensate.

### Implementation

Key points in the implementation included: focusing on technical meetings to improve the economy and buildability of design instead of lengthy progress meetings, fixing certain key appointments (such as project manager) for the full term, a pain/gain formula based on an agreed target cost with guaranteed maximum cost, self-certification of the steelwork by the contractor and a neutral cash flow mechanism based on payment for forecast deliverables to be reconciled in the next payment assessment.

### Future development

This alliance agreement is not contract specific and will be used by BNFL to procure further work. Fairport is keen to secure further alliance style contracts.

### Innovation case history

*This case history is a snapshot of just one innovation making construction in the UK more profitable for the supply chain and the Client. Further details will be found in the Knowledge Exchange or you should contact the Innovator directly or M<sup>4</sup>I.*

## How to make this radical change in your business

### To form a successful alliance:

- Choose your partner carefully, this applies to both the client and the contractor
- Look for a proven track record of success without confrontation
- Clients need to select their contractor partner early in the procurement process to gain the buildability benefits
- A suitable pain/gain formula is essential to create incentives for success
- Work hard at developing a 'no blame' culture.

### Contact the innovator

Mr Jonathan Thompson  
Project Manager  
Fairport Steel Ltd  
Telephone: 01257 484000  
E-mail: jthompson@fairport.co.uk

### Links

BNFL: [www.bnfl.com](http://www.bnfl.com)  
Fairport Steelwork: [www.fairport.co.uk](http://www.fairport.co.uk)  
Tees Components: [www.teescomponents.co.uk](http://www.teescomponents.co.uk)

### Related Topics



Visit the Construction Best Practice Programme:  
[www.cbpp.org.uk/cbpp/themes/theme\\_list.html](http://www.cbpp.org.uk/cbpp/themes/theme_list.html)

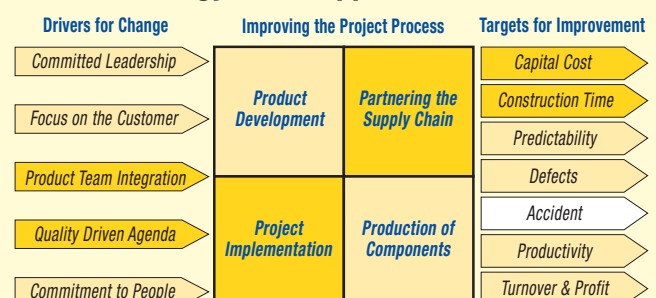
## Our vision

is for the whole UK construction industry to create self-sustaining continuous improvement leading to **world class performance and better profitability**



**M<sup>4</sup>I**, Building 9, BRE, Garston,  
Watford WD2 7JR,  
Telephone: 01923 664820;  
E-mail: [support@m4i.org.uk](mailto:support@m4i.org.uk); [www.m4i.org.uk](http://www.m4i.org.uk)

## The M4I Strategy Model applied to this innovation





PROJECT 112

Movement for  
Innovation  
M<sup>4</sup>I



NOVEMBER 2000

## Integrating design and construction in one-off projects

### New procurement strategy is a winner

Gosport, located on the West Side of Portsmouth Harbour, celebrates the opening of a stylish footbridge across Forton Lake. The project demonstrates how to integrate design and construction in a one-off project, without a partnering/framework agreement. The novel Project Delivery Process was devised jointly by Gosport Borough Council and the Business Engineering Group (BEG) at the University of Southampton. This process unleashed the joint creativity of the successful bidders Maunsell Limited and May Gurney Group Limited. One example of integrated design and construction was manufacturing the concrete shells (that contain insitu placed structural concrete) under factory conditions to obtain a consistent white finish.

Designers and constructors were preselected by asking potential bidders to complete a questionnaire designed specifically for this project. "We worked with BEG to gain an understanding of the client's objectives and to determine the profile of the organisations we would like to work with," says Gosport's engineer Terry Garvey. "It was important to be sure we had as close a fit as possible."

The critical issue was getting the design and construction people working together. BEG's civil engineer David Brown recalls: "When we looked at problems with similar one-off bridge projects we found that the common thread was the absence of integrated design and construction." The essence of the innovation was the design workshop in the tendering phase leading to a fixed price from each bidder based on their bespoke design.

### Benefits of the Project Delivery Process

**The client** goes through a rigorous process to prioritise the objectives of the project.

**The key objectives** are explained to potential designers and constructors at an early stage and they are informed about the client's objective definition process that makes change unlikely.

**During selection** each party develops an alternative engineering solution, suiting individual expertise and reducing risk through clarification of specifications.

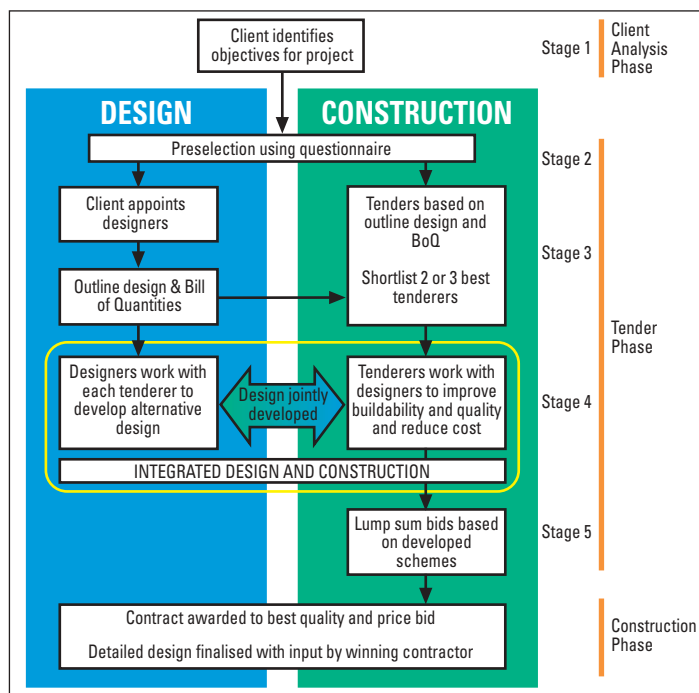
**Cost** – During the process, the successful bidder's price was reduced by over 20% while maintaining quality and programme.

## CASE HISTORY



“When we looked at problems with similar one-off bridge projects we found that the common thread was the absence of integrated design and construction.”

David Brown,  
Business Engineering Group



Re-engineered Project Delivery Process



### CREDITS

Consultants – Business Engineering Group, University of Southampton  
Client – Gosport Borough Council  
Engineer – Maunsell Limited  
Contractor – May Gurney Group Limited

## Integrating design and construction in one-off projects

### The challenge

In 1997, Gosport Borough Council proposed a 170m pedestrian bridge across Forton Lake, with an opening section for navigation. It had to be of "millennial" quality and completed during 2000 with limited funding. Research into other opening bridges showed that all had suffered either cost or time overrun and many had problems with the opening mechanisms. It was an unusual project for Gosport and the risk of not fulfilling the Millennium Commission's grant requirements was high. Gosport teamed up with the Business Engineering Group at the University of Southampton for a new procurement solution.

### Solving problems

The strategy was to focus on achieving best value instead of lowest cost. The procurement team sought innovative processes by integrating design and construction. A five-stage procurement process was devised to guarantee early contractor involvement.

**Stage 1: Identify and prioritise client's objectives.** This ensured that parties with goals and objectives in common with the client could be selected for the project.

**Stage 2: Preselect designers and constructors using bespoke questionnaires.** Potential bidders were selected by matching responses with the preferred profile of cultural values and attitudes.

**Stage 3: Traditional tender using client's design and bill of quantities.** Three tenderers bid just over £1.8m and progressed to stage 4.

**Stage 4: Confidential contractor/consultant meetings.** Alternative solutions were developed to take advantage of particular expertise and to gain constructor input into the design.

**Stage 5: Lump sum bids.** Two tenderers made lump sum bids, each based on their own preferred solution. May Gurney's £1.4m bid was the best value, more than 20% lower than their prices based on the initial design.

### Future development

The questionnaire, whilst bespoke for the project, will be examined to minimise some inconsistencies found in this first trial.

BEG believe the process can be refined to enable a culture change that will deliver one-off projects costing 30% less than traditional procurement methods.

### Innovation case history

*This case history is a snapshot of just one innovation making construction in the UK more profitable for the supply chain and the Client. Further details will be found in the Knowledge Exchange or you should contact the Innovator directly or M<sup>4</sup>I.*

## How to make this radical change in your business

- Apply the Project Delivery Process in the public or private sector
- The process does not rely upon long term partnering agreements
- Rigorously investigate the client's objectives.
- Preselect designers and constructors using bespoke questionnaires devised by BEG
- Hold design workshops to develop designs and achieve best value
- The best quality and price bid wins!

### Contact the innovator

Mr David Brown  
Civil Engineer  
Business Engineering Group  
Telephone: 023 8059 2134  
E-mail: beg@soton.ac.uk

### Links

Business Engineering Group: [www.beg.soton.ac.uk](http://www.beg.soton.ac.uk)  
Gosport Borough: [www.gosport.gov.uk](http://www.gosport.gov.uk)  
Maunsell: [www.maunsell.co.uk](http://www.maunsell.co.uk)  
May Gurney: [www.maygurney.co.uk](http://www.maygurney.co.uk)

### Related Topics



Visit the Construction Best Practice Programme:  
[www.cbpp.org.uk/cbpp/themes/theme\\_list.html](http://www.cbpp.org.uk/cbpp/themes/theme_list.html)

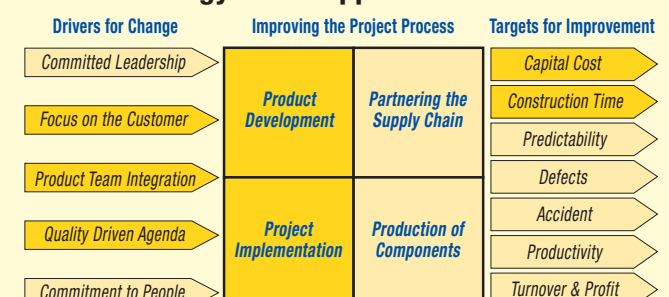
## Our vision

is for the whole UK construction industry to create self-sustaining continuous improvement leading to **world class performance and better profitability**



**M<sup>4</sup>I**, Building 9, BRE, Garston,  
Watford WD2 7JR,  
Telephone: 01923 664820;  
E-mail: [support@m4i.org.uk](mailto:support@m4i.org.uk); [www.m4i.org.uk](http://www.m4i.org.uk)

## The M4I Strategy Model applied to this innovation







PROJECT 116

Movement for  
Innovation  
M<sup>4</sup>I



NOVEMBER 2000

# Formwork struck in just 19 hours

## Concrete challenges steel for economy

Full-scale tests on a seven-storey concrete framed building give concrete a new edge when competing with steel framed buildings. Testing at BRE's large building testing facility took 15 weeks and is part of a three-year £1.5m research project. The research consortium included BRE Centre for Concrete Construction, British Cement Association, Reinforced Concrete Council, researcher Construct and specialist contractor Byrne Brothers.

Dr Pal Chana heads the client team, the European Concrete Building Project (ECBP). Chana is delighted with the innovations identified and tested. "We're particularly pleased with the early striking breakthrough. We knew present practice was conservative and now we have the figures to prove it," he claims.

Construct project manager Julian Maw says their early striking method uses an insitu strength testing technique, Lok-test, which they have now validated. "We were pushing the boundaries and we're very pleased we were right."

Byrne Brothers' technical manager Tim Hill is responsible for innovation. "At the moment we are constrained by engineers' specifications," he explains, "but with the launch of the new [National Concrete Structural] Specification, specialist contractors will have more freedom to innovate."

## Benefits of early striking using Lok-test to monitor concrete strength

The European Concrete Building Project shows how to improve the efficiency and competitiveness of in situ concrete frame construction, particularly when using flat slabs. The tangible benefits need to be measured in trials against the ECBP benchmark and earlier projects.

**Construction time** – By striking supports as early as 19 hours instead of 4-10 days after casting the slab, the floor construction cycle time can be reduced by 30%.

**Cost** – Savings of 30-50% should be made in formwork and falsework as well as reduced labour and equipment requirements.

**Productivity** – The expected substantial reduction in man-hours means the value added for each concrete construction worker will increase markedly.

**Turnover and Profit** – This research offers the best opportunity in a long time for the concrete frame industry to make the step change in efficiency needed to reverse its declining share of the building frame market.

## CASE HISTORY



*"We were pushing the boundaries and we're very pleased we were right"*

Julian Maw, Construct



Large Building Testing Facility, BRE Cardington



## CREDITS

Client – European Concrete Building Project  
Contractor – BRE Centre for Concrete Construction  
Partners – British Cement Association, Reinforced Concrete Council, Construct  
Frame Contractor – Byrne Brothers Ltd

# Formwork struck in just 19 hours

## The challenge

Concrete has lost considerable market share to steel frames in the last 20 years. The European Concrete Building Project was conceived to identify and validate innovations that would reverse this trend. It was widely believed that concrete construction was unduly conservative, leading to waste. Following a review of the processes, using *lean thinking* methods, ECBP concluded that 30% reduction in cycle time and 45% reduction in man-hours were achievable. Earlier striking would be a key innovation, but it meant challenging current practices.

## Solving problems

The basic concern was that early striking would lead to excessive deflections. The project tackled this by establishing striking criteria based on serviceability (deformation) rather than strength. It was found that the flat slab frame would sustain self-weight and construction load much earlier than previously thought and that there was no significant effect on subsequent serviceability.

The project developed a **spreadsheet** that enables the contractor to optimise back propping and striking, based on serviceability criteria. But they still needed a quick and reliable method of determining strength as the concrete cured.

The **Lok-test** has been used empirically in North America and Scandinavia. It consists of implants typically 40mm dia. embedded in the concrete surface. When pulled out, a cone of concrete is removed. The pull out load is proportional to strength. The project validated the Lok-test to give a quick and reliable guide to concrete strength, adequate to fix striking time.

## Implementation

The project is producing Best Practice Guides and the new "National Structural Concrete Specification" includes provisions for applying the early striking principles from this research. Copies are available at the Concrete Bookshop.

## Future development

The concrete frame industry needs to quantify the benefits of this innovation by comparing project performance against the ECBP benchmark and earlier projects. Case histories are required to demonstrate that the concrete frame can again compete with steel in terms of economy of construction.

## Innovation case history

*This case history is a snapshot of just one innovation making construction in the UK more profitable for the supply chain and the Client. Further details will be found in the Knowledge Exchange or you should contact the Innovator directly or M<sup>4</sup>I.*

## How to make this radical change in your business

### Specialist concrete contractors:

- Use early striking techniques allowed under the new "National Concrete Structural Specification"
- Apply the Best Practice Guide "Early striking for efficient flat slab construction" to cut cycle times and man-hour
- Apply the Best Practice Guide "Early age strength assessment of concrete on site" to confidently strike early
- Use the spreadsheet developed by ECBP to take advantage of spare capacity of slabs and optimise back propping and striking arrangements.

## Contact the innovator

Mr Julian Maw  
Consultant  
CONSTRUCT  
Telephone: 020 8428 1756  
E-mail: julianmaw@compuserve.com

## Links

Concrete Bookshop: Tel. 01344 725704  
European Concrete Building Project:  
[www.bre.co.uk/construct/ecbp](http://www.bre.co.uk/construct/ecbp)  
BRE: [www.bre.co.uk](http://www.bre.co.uk)  
Construct: [www.construct.org.uk](http://www.construct.org.uk)  
Reinforced Concrete Council:  
[www.rcc-info.org.uk](http://www.rcc-info.org.uk)  
Byrne Bros: [www.byrne-bros.co.uk](http://www.byrne-bros.co.uk)

## Related Topics



Visit the Construction Best Practice Programme:  
[www.cbpp.org.uk/cbpp/themes/theme\\_list.html](http://www.cbpp.org.uk/cbpp/themes/theme_list.html)

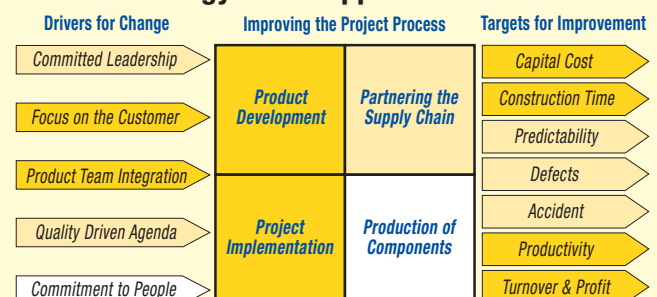
## Our vision

is for the whole UK construction industry to create self-sustaining continuous improvement leading to **world class performance and better profitability**



**M<sup>4</sup>I**, Building 9, BRE, Garston,  
Watford WD2 7JR,  
Telephone: 01923 664820;  
E-mail: [support@m4i.org.uk](mailto:support@m4i.org.uk); [www.m4i.org.uk](http://www.m4i.org.uk)

## The M4I Strategy Model applied to this innovation





PROJECT 120

Movement for  
Innovation  
M<sup>4</sup>I



NOVEMBER 2000

# Teamworking – the last frontier for measurement

## Team Climate Inventory fosters innovation

Team effectiveness is one of the last measurement frontiers, according to Pearce Retail's head of HR, Roger Leveson. Most people are familiar with the somewhat puzzling psychometric tests used to select suitable candidates for jobs, but the Team Climate Inventory (TCI) used to measure team performance is a relatively new tool in the construction industry. Pearce Retail used TCI in Safeway's demanding £1.5m redevelopment in Chelsea. "Climate means the shared perception of how people feel about decisions, communications, practices etc," explains Leveson. "The TCI shows us areas where there may be weaknesses"

The TCI uses a questionnaire that may be completed by team members as frequently as they deem necessary. It asks about the atmosphere in the team, how people tend to work together, how frequently they interact, their objectives, and how much practical support is given towards the implementation of new and improved ways of doing things.

Pearce Retail's key account manager Mark Giltsoff admits they borrowed the idea from the oil industry and NHS management teams. "Use of tools like TCI will bring us into line with other sectors where measurement of soft issues is done routinely," he argues. "The industry needs more hard and soft measurements if we are to raise our game, and that means gathering accurate data, and acting on it."

## Benefits of measuring performance with TCI

As a soft measure, the real benefits of using the TCI are in relation to understanding, behavioural change and attitude development.

**Team vision** – The team has a clear sense of purpose and understands it's collective strengths and areas for improvement.

**Structured feedback** – Team members have received structured feedback on their performance and on the atmosphere based on their aggregated self-assessments.

**Innovation is encouraged** – For example, the Safeway Chelsea team needed a radical solution to overcome a logistics headache at this congested inner city site.

"Assessing the team climate inventory particularly with the site foremen in the pre-start workshop really got the whole team working to solve this," agrees Sherwood Interiors'

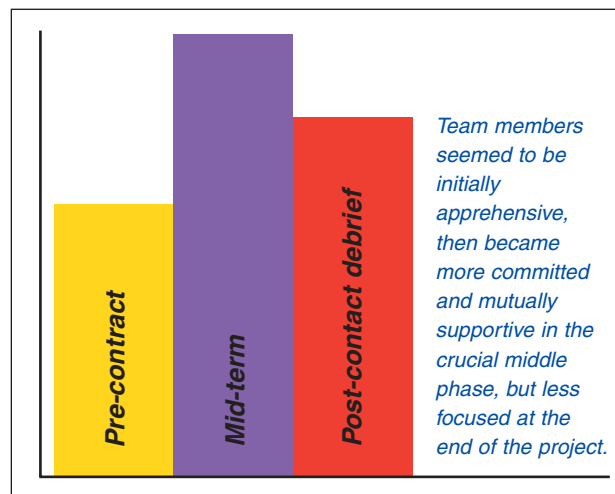
senior contracts manager Darren Killeen. "I'd like to do this on more projects but you need an innovative main contractor like Pearce to drive it."

## CASE HISTORY



*"Team effectiveness is one of the last measurement frontiers. Firms that pay attention to this issue can differentiate themselves in our market"*

Roger Leveson, Pearce Retail



Aggregated climate scores at Safeway, Chelsea



Sherwood Interiors



PSA Training & Development Ltd  
(Manager Development and Consultancy)



## CREDITS

Contractor – Pearce (Retail Services) Ltd

Client – Safeway plc

Fit out contractor – Sherwood Interiors

Facilitator – PSA Training and Development

TCI Publisher – ASE, a division of NFER-NELSON



## Teamwork – the last frontier for measurement

### The challenge

As some of the team has worked together before and were likely to do so again, there was a real desire to improve their effectiveness as a unit. The Team Climate Inventory was introduced as a measure of how well they should work together and identify areas for improvement.

### Solving problems

There was initial scepticism about the value of TCI in the construction team. However, this was largely dispelled at the pre-start workshop. Virtually all the key people were present, but for best results 100% attendance would have been preferred. An experienced, accredited facilitator was used to give the process maximum scientific credibility at the outset.

Unavailability of key people in subsequent assessments inevitably led to some skewing of the results. Pearce will be making greater efforts in future to get maximum attendance at critical team meetings where assessments are made.

### Implementation

TCI complements measurements in place for hard issues such as finance, quality, safety and programme. It was implemented in three stages, thus producing a longitudinal study over the whole project life:

1. Pre-start workshop led by PSA facilitator – questionnaires completed by 12 key members, including consultants and contractors
2. Again at mid-term
3. Finally at post-contract debriefing.

### Future development

Pearce is experimenting with a range of hard and soft measurements with a view to implementing measurement sets as appropriate to each project. Psychometrics will extend to key individual relationships in the team. By maintaining a consistent supply chain, joint training and development initiatives will be applied to develop the whole team's performance.

### Innovation case history

*This case history is a snapshot of just one innovation making construction in the UK more profitable for the supply chain and the Client. Further details will be found in the Knowledge Exchange or you should contact the Innovator directly or M<sup>4</sup>I.*

## How to make this radical change in your business

**Use psychometrics to show a client that you are committed to team working and that you take it seriously:**

- Subjective opinion CAN be translated into objective data
- Teams need a framework for dialogue and a proven methodology – it does not just happen
- Use a trained facilitator
- All project teams should be encouraged to self-assess their effectiveness
- Stick at it!

### Contact the innovator

Mr Roger Leveson  
Head Of HR  
Pearce Retail Services Ltd.  
Telephone: 0117 923 6500  
E-mail: levesonr@pearce.co.uk

### Links

Pearce Retail: [www.pearcegroupplc.com](http://www.pearcegroupplc.com)  
Safeway: [www.safeway.co.uk](http://www.safeway.co.uk)  
ASE: [www.ase-solutions.co.uk](http://www.ase-solutions.co.uk)

### Related Topics



Visit the Construction Best Practice Programme:  
[www.cbpp.org.uk/cbpp/themes/theme\\_list.html](http://www.cbpp.org.uk/cbpp/themes/theme_list.html)

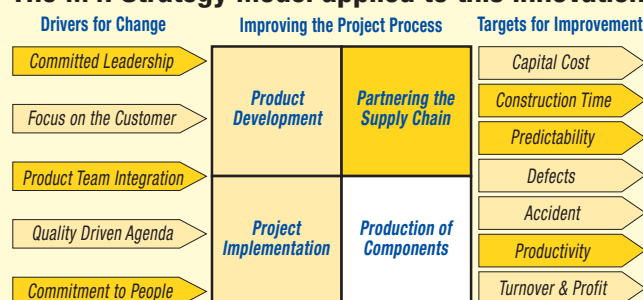
## Our vision

is for the whole UK construction industry to create self-sustaining continuous improvement leading to **world class performance and better profitability**



**M<sup>4</sup>I**, Building 9, BRE, Garston,  
Watford WD2 7JR,  
Telephone: 01923 664820;  
E-mail: [support@m4i.org.uk](mailto:support@m4i.org.uk); [www.m4i.org.uk](http://www.m4i.org.uk)

## The M4I Strategy Model applied to this innovation





PROJECT 128

Movement for  
Innovation  
M<sup>4</sup>I



NOVEMBER 2000

# Restaurant relocation record

## Britspace system is the key to McDonald's spectacular rate of growth

The British show no signs of losing their appetite for fast food with McDonald's commissioning a new store somewhere in the UK every week. The average modular restaurant construction programme is a mere four weeks and the relocation of the Livingston drive-thru restaurant in just seven days highlights another benefit of modular construction. How do they do it? Their success maps remarkably well to the 4P's in Sir John Egan's report *Rethinking Construction*.

**Product development** – McDonald's and their construction partner Britspace have devised a generic modular solution that meets consumer needs.

**Partnering the supply chain** – Britspace contracts manager Jim Butler explains: "We're at the head of an incentivised chain of suppliers who feed innovations into the continually evolving McDonald's product."

**Project implementation** – McDonald's regional construction manager Stephen Douglas sees Egan's pointers everywhere: "We have strong leadership, process mapping, measurement, eliminating waste, pre-planning, training and learning, the lot."

**Production of components** – Douglas observes quality benefits from in-factory building. "Would you buy a car that had been built in a muddy field?" he asks.

## Benefits of their product

McDonald's building product:

- Standardises design and reduces professional fees
- Fulfils operational requirements and meets customer expectations
- Has a consistently high quality due to factory controlled conditions
- Enables the contractor to negotiate improvements and savings down the whole supply chain
- Radically reduces construction programmes
- Improves cost predictability.

## CASE HISTORY



“Would you buy a car that had been built in a muddy field?”

Stephen Douglas,  
McDonald's Restaurants



McDonald's Livingston relocation (new site in background)

Measured benefits in the Livingston relocation include:

**Cost** – Traditional construction would have increased the cost of the relocation from £400k to £700k.

**Time** – Traditional construction would have increased restaurant closure time from one week to twelve weeks with substantial revenue implications.

**Predictability** – The final cost of the relocation was within 1% of that predicted by the project manager.



## CREDITS

Contractor – Britspace Modular Building Systems

Client – McDonald's Restaurants

## Restaurant relocation record

### The challenge

McDonald's already had a modern drive-thru style restaurant in Livingston, Scotland. But they needed it moved about 80 metres. While they were at it, they wanted to expand the customer seating area, upgrade the kitchen and revamp the internal design. And they wanted it done very quickly!

### Solving problems

The critical issue would be time. Fortunately the building was modular, one of dozens of similar structures manufactured for McDonald's by Britspace Modular Building Systems. Britspace were well used to McDonald's expectations of speed in construction of new restaurants and they rose to the challenge of relocating this one, devising a seven-day programme for the whole job.

While McDonald's had long recognised the economy of modular buildings, they quickly realised the added value the system gave for demolition or relocation. Had the existing and proposed stores been built conventionally, the cost of relocation and store closure time would have rocketed.

### Implementation

- Day 1: Decommission and dismantle existing building
- Day 2: Move modular building and roof sections in one lift from existing to new site and install additional bay in seating area
- Days 3 to 6: Fit out ceilings, light fittings and features, floor tiling, wall finishes, furniture package and counter, upgrade kitchen equipment and install additional till
- Day 7: Clean up and recommission
- Day 8: *I'd like a Big Mac meal, please!*

### Future development

McDonald's will undoubtedly need to relocate other modular restaurants in the future and this project is a blueprint for how to do it successfully. Lessons learned for improving the building system include extending the modular approach to the mansard roof construction, scope for further reduction in packaging and reducing traffic on local roads by combining trades.

### Innovation case history

*This case history is a snapshot of just one innovation making construction in the UK more profitable for the supply chain and the Client. Further details will be found in the Knowledge Exchange or you should contact the Innovator directly or M<sup>4</sup>I.*

### How to make this radical change in your business

#### Successful construction with modular units requires:

- Open and honest involvement of the key supply chain members
- Standard specifications for each part of the supply chain
- Maintenance of standards by continuous review
- A continuous workload for the contractor
- Process mapping to improve site activities
- Pre-planning to ensure timely deliveries
- Measurement against benchmarks for continuous improvement.

### Contact the innovator

Mr Stephen Douglas  
Regional Construction Manager  
McDonald's Restaurants  
Telephone: 0141 207 6000  
E-mail: [sdouglas@uk.mcd.com](mailto:sdouglas@uk.mcd.com)

### Links

McDonald's: [www.mcdonalds.com/corporate](http://www.mcdonalds.com/corporate)  
Britspace: [www.bms.co.uk](http://www.bms.co.uk)

### Related Topics



Visit the Construction Best Practice Programme:  
[www.cbpp.org.uk/cbpp/themes/theme\\_list.html](http://www.cbpp.org.uk/cbpp/themes/theme_list.html)

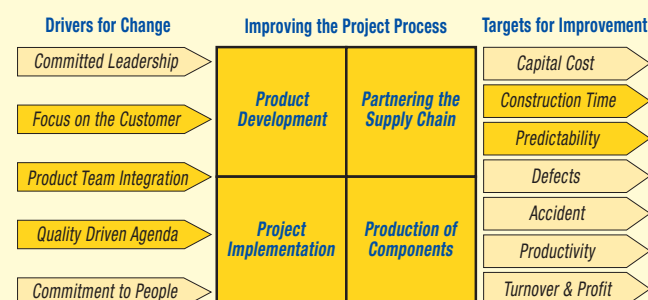
## Our vision

is for the whole UK construction industry to create self-sustaining continuous improvement leading to **world class performance and better profitability**



**M<sup>4</sup>I**, Building 9, BRE, Garston,  
Watford WD2 7JR,  
Telephone: 01923 664820;  
E-mail: [support@m4i.org.uk](mailto:support@m4i.org.uk); [www.m4i.org.uk](http://www.m4i.org.uk)

### The M4I Strategy Model applied to this innovation







PROJECT 150

Movement for  
Innovation  
M<sup>4</sup>I



NOVEMBER 2000

## Roles reversed in successful PFI school

### Designers take the lead in supply chain

When the Private Finance Initiative (PFI) was conceived, construction's response was to put contractors in the driving seat, but Building Design Partnership (BDP) has bucked the system with their wholly owned PFI company Campus Projects Ltd. BDP shows designers how to take on PFI projects with their stunningly successful Drumglass High School at Dungannon in Northern Ireland. The £6m school for up to 500 pupils was designed and built in just 14 months.

Drumglass High School is one of six pathfinder PFI education projects in Northern Ireland, for which bids were invited in 1997. Drumglass is the first to be built and operating. Project manager for the client, Southern Education and Library Board, Ronnie Gregg attributes the success at Drumglass to the stakeholders having a shared vision of *Drumglass 2000*. BDP director David Johnston argues: "Our consortium was deliberately small and single minded about getting on with it."

The project is a showcase for what can be achieved when design drives the result. Buildings are pre-wired for the next generation of IT facilities to be installed under the Classroom 2000 initiative. The separate public wing contains assembly, sports, music and lecture facilities that can be used for education or isolated for community activities.

### Benefits of design led PFI

**Construction time** – The Drumglass team is at least one year ahead of the other projects launched in 1997. Buildability was critical in achieving this result. Principal teacher Derek Wilson says: "It was design-led. That's why we're a year ahead of the other schools," recalling his dealings with Campus Projects. Gregg adds: "It's amazing what was achieved in 14 months."

**Capital cost** – Assessment of bids includes comparing the net present worth of the proposed 'whole life' costs against the Public Sector Comparator (the model of equivalent costs under traditional procurement). While not revealing the figures, Gregg is clearly satisfied that he got good value for money, adding: "Planning was cleverly handled with the public spaces separated in one block."

## CASE HISTORY



“Our consortium was deliberately small and single minded about getting on with it”

David Johnston,  
Building Design Partnership



Drumglass High School, Dungannon

**Turnover and profit** – This is BDP's first experience as a PFI contractor and they are developing their supply chain to deliver more turnkey PFI projects. Managing director of contractor H&J Martin, William Martin, is keen to work again for the designers. "Campus forced it through," he comments; due praise from a hard-nosed contractor.



### CREDITS

Designer – Building Design Partnership  
PFI Contractor – Campus Projects Ltd.  
Client – Southern Education and Library Board  
Contractor – H&J Martin Ltd.  
Facilities Manager – Martin Facilities Management

## Roles reversed in successful PFI school

### The challenge

Claiming to be Europe's leading firm of architects, engineers and cost consultants, Building Design Partnership believed they were well qualified to take a leading role in Private Finance Initiative projects. The appeal was that PFI would provide a route to immediate work creation linked to an operational interest over 25 years. This opportunity in the education sector was the trigger.

### Solving problems

BDP required a separate legal entity to execute the PFI contract so they established Campus Projects Ltd. to head the supply chain.

The contract included all furniture, equipment and some consumables, but these were not clearly agreed prior to contract, resulting in the negotiation of a change order. In future BDP will insist on schedules being confirmed on a room by room basis. The development of an asset register in parallel with room layouts is also essential.

Disposal of surplus land that was affected by Rights of Way was also part of BDP's brief. They learned lessons in the importance of dealing with these issues early, as the interests of other parties are many and invariably complex.

### Implementation

The supply chain, headed by designers, included finance from Equity Bank (an enthusiastic and active supporter), legal advice from Mason Solicitors and construction and facilities management by local contractor H&J Martin.

### Future development

BDP's school out performs its peers by almost all criteria set by the local education authority. It is a tested product ready for marketing to other education sector clients. This is what Egan was about – delivering product families. BDP's Northern Ireland office is now pursuing other PFI education contracts and is shortlisted for schools in the neighbouring Irish Republic.

### Innovation case history

*This case history is a snapshot of just one innovation making construction in the UK more profitable for the supply chain and the Client. Further details will be found in the Knowledge Exchange or you should contact the Innovator directly or M4I.*

## How to make this radical change in your business

### Designers in the PFI hotseat:

- Play to your strengths in developing the brief and delivering what clients need
- Beware the steep PFI learning curve
- Get good legal and financial advice
- Success lies in getting the project built quickly to trigger the revenue stream
- Getting it built quickly relies on a designer-led decision making process.
- Recognise the risks and how to mitigate them
- Prepare for the long haul!

## Contact the innovator

Mr David Johnston  
Director  
Building Design Partnership  
Telephone: 028 9024 3394  
E-mail: dhr-johnston@bdp.co.uk

## Links

Building Design Partnership: [www.bdp.co.uk](http://www.bdp.co.uk)  
Southern Education and Library Board: [www.selb.org](http://www.selb.org)  
H&J Martin: [www.hjmartin.co.uk](http://www.hjmartin.co.uk)

## Related Topics



Visit the Construction Best Practice Programme:  
[www.cbpp.org.uk/cbpp/themes/theme\\_list.html](http://www.cbpp.org.uk/cbpp/themes/theme_list.html)

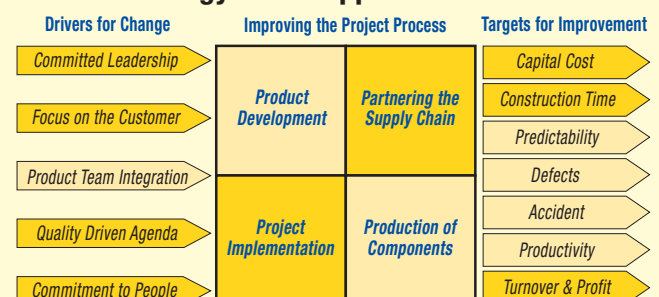
## Our vision

is for the whole UK construction industry to create self-sustaining continuous improvement leading to **world class performance and better profitability**



**M4I**, Building 9, BRE, Garston,  
Watford WD2 7JR,  
Telephone: 01923 664820;  
E-mail: [support@m4i.org.uk](mailto:support@m4i.org.uk); [www.m4i.org.uk](http://www.m4i.org.uk)

## The M4I Strategy Model applied to this innovation





PROJECT 174

Movement for  
Innovation  
M<sup>4</sup>I



NOVEMBER 2000

# Rethinking contamination

## CASE HISTORY

### Bypass partners save £1m by reusing contaminated soil

Dudley's £17m Southern Bypass partners Dudley Metropolitan Borough Council and Kvaerner Construction have shared 50:50 in massive earthworks savings. Some 50,000m<sup>3</sup> of contaminated soil was originally scheduled for removal and tipping at a designated site. An extensive programme of testing, design and negotiation with the Environment Agency enabled the material to be either adjusted to suit site conditions or diluted. As a result, extensive landfill tipping and increased lorry traffic on local roads were avoided.

Dudley MBC's head of engineering John Anderson is delighted with the results: "The key was the engineering solution to overcome Environment Agency fears about leachates entering watercourses." He recalls the intense negotiations that surrounded the embankments they proposed to construct using marginally contaminated soil: "Once we satisfied them that runoff from the embankments would actually be relatively clean, we unlocked objections and got on with it."

The initial idea for reusing the contaminated soil was in Kvaerner's alternative tender. Project manager Tim Sharples says the innovative reuse of contaminated soil was affected by a major variation in embankment design. "Had we not been working as partners the whole issue would have resulted in a claim under standard civils contract conditions."

### Benefits of reusing "contaminated" soil

**Cost** – Not removing the soil to an approved tip also meant not having to replace it with clean fill, saving £1m overall. "It was a very big project by our standards and we would not have completed within budget without this big saving on the contaminated soil," admits Anderson.

**Profit** – Under the equitable 50:50 pain/gain agreement, each partner pocketed £500k as a result of this innovation. "Without the right financial incentives, it would be much harder to get everyone pulling together to achieve this result," argues Sharples.

**Reduction in traffic** – Avoiding 25,000 wagon movements improved programme time and simplified site logistics for the contractor. "But the biggest benefit was to local residents, road users and the local road maintenance



“Without the right financial incentives, it would be much harder to get everyone pulling together to achieve this result”

Tim Sharples, Kvaerner



Embankment with ex-contaminated fill Dudley Southern Bypass

budget," claims Anderson. "We have estimated that the original proposal would have increased local traffic by 8% over the six month haulage operation."

**Landfill** – In addition to the financial savings in haulage and landfill tax, the innovation relieved the local waste authority of the headache of placing the 50,000 m<sup>3</sup> of contaminated soil in a safe landfill site. That is equivalent to about ten football pitches filled one metre deep.

KVÆRNER™



#### CREDITS

Contractor – Kvaerner Construction Ltd

Client – Dudley Metropolitan Borough Council

Regulator – The Environment Agency



## Rethinking contamination

### The challenge

The route of the Dudley Southern Bypass crosses land formerly occupied by a gas works. Consequently, the site was widely believed to be contaminated, requiring the removal and replacement of 50,000m<sup>3</sup> of soil. It was bound to be a difficult contract with problematical ground conditions. The client knew from the outset that substantial claims should be expected. Kvaerner proposed an alternative tender which included a partnering deal with Dudley MBC, value engineering to fix a target cost, and radical proposals to avoid disposal of the contaminated soil.

### Solving problems

The partnering framework was agreed, including a 50:50 pain/gain formula. This set in place the best contractual environment to foster innovation.

Tests commissioned during the tender phase established that the soil was physically suitable for reuse in embankments.

The Environment Agency was represented at the first partnering workshop, demonstrating their great interest in the project and desire to actively support the construction team. Consultation led to a rigorous schedule of testing in critical areas. The results were so voluminous that the partners prepared edited summaries to enable EA staff to make their assessment within a reasonable time. Negotiations took some months as the strategy evolved. Agreement on leachate values and their effects on watercourses was eventually reached.

Because the contaminated soil was concentrated in the vicinity of large retaining structures, the testing and negotiations around the soil reuse question led to a delay in retaining wall construction. The partners and their subcontractors worked constructively around a problem that might otherwise have led to a substantial claim.

The result was that material originally classified as contaminated was able to be reused, saving the cost of removal and replacement as well as substantially reducing the ill effects of the road hauling operation on the local environment.

### Future development

Dudley MBC and Kvaerner would apply a similar approach in future projects where soil contamination is marginal. They regard partnering as an essential ingredient because it gives all parties the sense of ownership necessary to get the best value for money solution.

### Innovation case history

*This case history is a snapshot of just one innovation making construction in the UK more profitable for the supply chain and the Client. Further details will be found in the Knowledge Exchange or you should contact the Innovator directly or M<sup>4</sup>I.*

## How to make this radical change in your business

### Removing contaminated soil is not always the answer:

- Question the original design, find out why the remove/replace solution was adopted
- Check that the contaminated soil is geophysically suitable for reuse
- Consult the Environment Agency early to benefit from their experience
- Establish an agreed testing programme, collate the evidence and present your arguments
- Partnering with pain/gain incentives is an ideal environment to solve soil contamination problems
- If you can avoid removing it, it will cost nothing to replace it!

## Contact the innovator

Mr Tim Sharples  
Project Manager  
Kvaerner Construction  
Telephone: 01923 423768  
E-mail: kcl@woden.com

## Links

Kvaerner: [www.kvaerner.com](http://www.kvaerner.com)  
Dudley MBC: [www.dudley.gov.uk](http://www.dudley.gov.uk)  
Environment Agency:  
[www.environment-agency.gov.uk](http://www.environment-agency.gov.uk)

## Related Topics



Visit the Construction Best Practice Programme:  
[www.cbpp.org.uk/cbpp/themes/theme\\_list.html](http://www.cbpp.org.uk/cbpp/themes/theme_list.html)

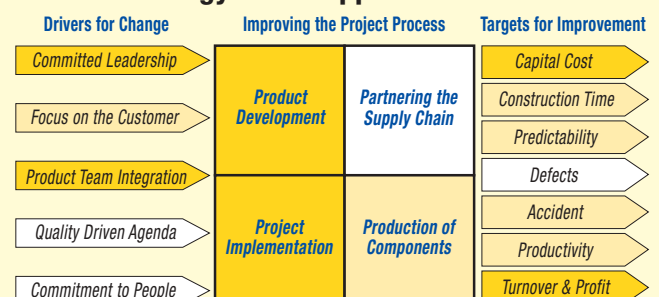
## Our vision

is for the whole UK construction industry to create self-sustaining continuous improvement leading to **world class performance and better profitability**



**M<sup>4</sup>I**, Building 3, BRE, Garston,  
Watford WD2 7JR,  
Telephone: 01923 664820;  
E-mail: [support@m4i.org.uk](mailto:support@m4i.org.uk); [www.m4i.org.uk](http://www.m4i.org.uk)

## The M4I Strategy Model applied to this innovation





PROJECT 185

Movement for  
Innovation  
M<sup>4</sup>I



NOVEMBER 2000

# 19 day blockade at Proof House Junction

## Alliance team eradicates bottleneck

Modernising an ageing railway sometimes demands a complete shutdown to make radical changes. The North Midlands Alliance has earned the acclaim of the West Midlands Passenger Transport Authority's Chair Councillor Worrall who says: "Congratulations on the awesome way in which the Proof House Junction remodelling was planned and carried out." The £36m project just south of Birmingham New Street station was allowed just 19 days complete possession to reconstruct this critical junction of four main routes.

Alliance project manager Mark Cutler of Carillion underlines the difficulty of working on a live railway: "With 800 trains a day through Proof House Junction and only four-hour closures on Saturday nights, safe access for enabling works is incredibly limited. So we have to plan thoroughly and hit it hard." Key to the success was Railtrack's decision to abandon adversarial procurement in favour of an alliance approach, partnering with designer and signalling contractor WS Atkins and principal contractor Carillion. Cutler is pleased with the results: "The Alliance culture achieved cost savings, assured delivery and provided excellent quality."

Tony Fletcher, general manager of Railtrack's West Coast Route Modernisation programme agrees: "Not only have you removed one of the region's worst bottlenecks but you have also delighted our customers."

## Benefits of the Alliance

**Getting a predictable result** is the outstanding achievement of the Alliance. Cutler says: "It was critical that we completed within the negotiated 19 days blockade. Every extra day would cost us £600k in compensation so overrunning was not an option."

The remodelling was delivered **free of operational defects**, applying the Alliance's right first time philosophy.

Alliance partners **forecast savings of 1-2% of the target cost**, to be shared using a pain/gain formula.

Comparison with a similar sized remodelling project in Manchester Victoria two years before shows that the **accident frequency ratio** at Manchester was 3.96 reportable accidents per million hours worked. The Alliance's target was set at 0.45 but the result was zero

## CASE HISTORY



"The Alliance culture achieved cost savings, assured delivery and provided excellent quality"

Mark Cutler,  
Proof House Junction Alliance



Proof House Junction, Birmingham

reportable accidents. **Absenteeism** during the blockade was a mere 0.2% compared to 2.8% in Manchester.

The Alliance enjoyed a 50% **reduction in administration** costs by sharing facilities and resources and **reduced man marking** (duplication of roles) by 80%.

The Alliance incurred **penalties for possession overruns** that were about 90% less than in Manchester.



## CREDITS

Client – Railtrack PLC  
Alliance Partners – Carillion PLC,  
W S Atkins Rail Ltd and Railtrack PLC

# 19 day blockade at Proof House Junction

## The challenge

Past rail contracts had usually been short-term and quite adversarial with cost and time overruns, poor customer/supplier relationships, mistrust, disputes and communication breakdown. For the West Coast Route Modernisation, Railtrack resolved to bring the best in the industry together and do away with the adversarial attitudes. The North Midlands Alliance with Carillion and WS Atkins was formed for initially two projects, the £36m Proof House Junction remodelling and a £60m resignalling scheme in North Staffordshire.

## What went wrong

Despite an 18-month design lead-in, the blockade itself was an enormous logistical challenge. The Alliance dealt flexibly with the usual resource shortages by sharing the partners' resources and getting support from other projects.

Problems that are peculiar to railway projects included signal sighting issues that caused late design changes and short night time possessions for enabling works that affected productivity and caused staff fatigue.

## Implementation

There were three phases in the project:

1. Outline design, alliance formation and setting cost targets
2. Detailed design and construction
3. Handback, snagging, health and safety file and learning lessons.

The Alliance used team workshops to foster a no blame culture, used *best man for the job* principles to select key personnel in the joint management team and *located the partners in one facility* sharing office, network and administration resources.

## Future development

Learning points for future rail projects include:

- Responding to the views of individuals on the Proof House Junction project
- Involving subcontractors even earlier
- Carrying over the nucleus team to enhance continuous improvement.

## Innovation case history

*This case history is a snapshot of just one innovation making construction in the UK more profitable for the supply chain and the Client. Further details will be found in the Knowledge Exchange or you should contact the Innovator directly or M4I.*

## How to make this radical change in your business

**Alliance contracting will deliver results provided that you:**

- Remember it is not an easy option
- Recognise that maintaining full accountability for the performance and commercial success of each partner cannot be done without disagreements along the way
- Understand the strengths and weaknesses of the partners, including your own organisation
- Assess the risks and have manageable solutions for foreseeable eventualities
- Control development of the design
- Above all, learn to trust your partners.

## Contact the innovator

Mr Mark Cutler  
Alliance Project Manager  
Carillion Rail  
Telephone: 0121 654 2293  
E-mail: [mlcutler@carillionplc.com](mailto:mlcutler@carillionplc.com)

## Links

West Coast Route Modernisation: [www.wcrm.co.uk](http://www.wcrm.co.uk)  
Railtrack: [www.railtrack.co.uk](http://www.railtrack.co.uk)  
Carillion: [www.carillionplc.com](http://www.carillionplc.com)  
WS Atkins: [www.wsatkins.com](http://www.wsatkins.com)

## Related Topics



Visit the Construction Best Practice Programme:  
[www.cbpp.org.uk/cbpp/themes/theme\\_list.html](http://www.cbpp.org.uk/cbpp/themes/theme_list.html)

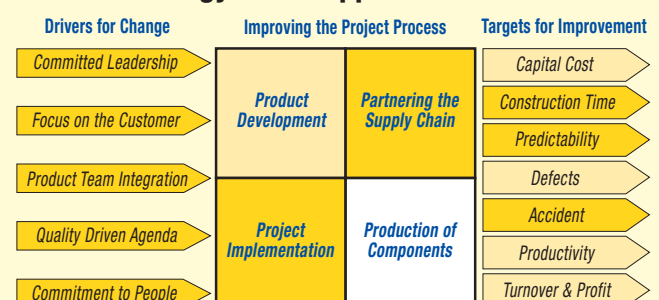
## Our vision

is for the whole UK construction industry to create self-sustaining continuous improvement leading to **world class performance and better profitability**



**M4I**, Building 9, BRE, Garston,  
Watford WD2 7JR,  
Telephone: 01923 664820;  
E-mail: [support@m4i.org.uk](mailto:support@m4i.org.uk); [www.m4i.org.uk](http://www.m4i.org.uk)

## The M4I Strategy Model applied to this innovation





# Working Groups

**The M<sup>4</sup>I Board has established a number of expert working groups to develop policy and practice in order to implement the recommendations set out in 'Rethinking Construction'.**

Where appropriate these working groups have developed toolkits to measure and improve key aspects of performance. The six working groups comprise:

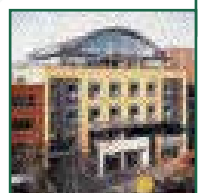
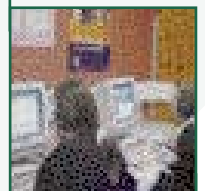
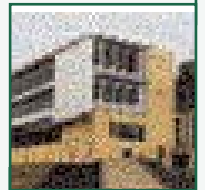
- Partnering the Supply Chain;
- KPIs and Benchmarking;
- Education, Training and Research;
- Respect for People;
- Sustainability;
- Knowledge Exchange.



## Partnering the Supply Chain

Effective partnering is essential if all parties are to be able to make a maximum contribution to project planning and execution and there is to be equity in the allocation of risks and rewards.

A M<sup>4</sup>I working group (chaired by Shonagh Hay) has been developing an original approach to partnering involving the setting up of a 'virtual company' to manage the process. This model scheme known as 'Trust and Money' is about to be trialed on a number of projects. The model sets out a methodology for creating a virtual company based on trust, in which the partners assemble and the appointment arises by consensus. Confirmation of the project team only occurs after the agreement of reward. The model seeks to engender 'no blame' culture in which parties act in good faith and project insurance covers all partners and suppliers.



## KPIs and Benchmarking

The first ever standard set of Key Performance Indicators (KPIs) for the construction industry was developed by an M<sup>4</sup>I working group chaired by Alan Crane. The original set of 10 indicators was published in May 1999 through the Construction Best Practice Programme. A set of diagnostic and process performance indicators was published last January. The Headline KPIs are being used to measure the performance of the UK construction industry at large and to monitor improvements.

All M<sup>4</sup>I Demonstration Projects are required to measure performance which, in turn, provides the basis for monitoring progress against the targets for improvement set out in 'Rethinking Construction'.

The Movement is participating in a national benchmarking forum to further improve and simplify the use of performance measurement and benchmarking as a business improvement tool.

## Education Training and Research

A research sub group (chaired by Robin Nicholson) is responsible for identifying and articulating Board requirements and contributions to research in support of the principles and improvement targets of 'Rethinking Construction'. In particular it co-ordinates research undertaken into the Demonstration Projects. Areas of research required by the industry are identified and the sub group informs funding organisations such as CRISP.

In support of education and training initiatives the working group (chaired by Peter Lobban) is developing networks to support communications with universities and centres for further and higher education. The working group has published a wall chart promoting improved knowledge, appreciation and awareness of career opportunities provided by the construction industry which has been distributed to all UK schools. In addition a wall chart has been sent to all significant construction sites promoting the importance and practical benefits of actions to improve conditions and opportunities for those employed in the industry and also the benefits for the wider community arising from the implementation of the Respect for People agenda.

## Respect For People

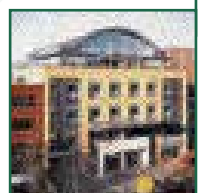
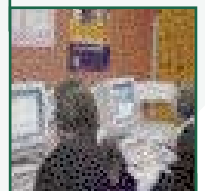
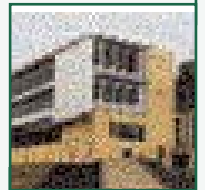
**Recent surveys indicate that the construction industry lags behind most others in its effectiveness in dealing with the people issues that underpin the move to continuous improvement. This has been highlighted recently in recent CITB surveys showing that construction managers generally lack the skills to support business growth and forecasting a potential shortage in construction workers of 371,300 over the next five years. The HSE's own figures show that the construction industry contributes to 16% of all workplace fatalities far exceeding any other industry by proportion.**



One of the most important themes of 'Rethinking Construction' was its emphasis on the alignment of cultural values and management practices to the achievement of strategic business goals for the construction industry. In doing so it recognised the need for radical reform if the human capital of the industry is to be released and harnessed. The recent press reports of a poor response by the industry to this initiative are raising the pressure to progress in this field, as it is vital to the overall change programme for the industry.

In response the M<sup>4</sup>I established a Respect for People working group chaired by Alan Crane. Seven sub-groups were established and they have now reported their interim results to the Deputy Prime Minister. The seven themes of the report are:

- Diversity in the workplace;
- Site welfare and working environment;
- Health;
- Safety;





# Working Groups

- The off-site working environment;
- Behavioural issues;
- Career development & lifelong learning.

The report acknowledges that many of the action areas are addressed through the Investors in People standard and encourages construction firms to commit to it (those eligible for support by CITB are entitled to a supporting grant). The report's recommendations have the support of many industry bodies notably all strands of 'Rethinking Construction', the CIB and CITB.

Building on the work of the Site Welfare Checklist, launched at the May conference, each of the theme areas of the report provides:

- a business case;
- performance measures;
- a toolkit for improvement;
- recommendations for further work.

A project manager has now been appointed to co-ordinate benchmarking and testing of these tools, supported by the work of the Respect for People Benchmarking Club, which was recently established and led by the Construction Industry Research and Information Association. The work of this group involves the M<sup>4</sup>I, the Local Government Task Force, the Construction Best Practice Programme and Government Construction Clients Panel.



It is hoped that suitable demonstrations will be found from all of these to provide perhaps the most shining example of collaborative effort to change the Industry.

If you wish to assist the industry to make a vital step-change in this fundamental area there are several options available:

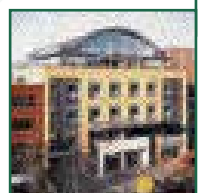
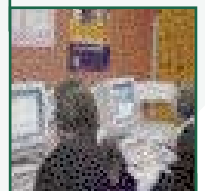
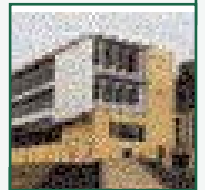
- Join in the tests of the performance measures and tools;
- Identify an innovation against this theme and demonstrate it through the M<sup>4</sup>I;
- Seek out best industrial practice and pursue it;
- Commit to Investors in People.



Some of the existing demonstration projects (BAA's ACTA initiative for example) are making headway and showing the value of concentrated effort to improve the industry's performance.

A demonstration organisations programme is being established to provide a forum through which these organisational developments can be measured and evaluated with the results captured for dissemination to all by the M<sup>4</sup>I Team.

The greatest barrier to recruitment has been shown by many surveys to be the industry's own image represented best by how it treats its people. A valued, well-managed, motivated and well-trained, steady workforce can contribute greatly to bottom line performance. The industry has an opportunity to begin to invest substantially in the 3Rs of Recruitment, Retention and Respect for People and it owes it to itself to make the investment now.



## Sustainability

**Sustainability is represented by what is referred to as 'the triple bottom line' that combines social i.e. local/ community issues, leading to national and international concerns; economic i.e. local employment, businesses, national GDP etc; and environmental factors. The M<sup>4</sup>I working group was tasked to create a set of indicators for the industry that addressed the environmental issues.**

Developed after wide consultation with interested parties and in collaboration with other industry and Government bodies, these indicators, when weighted appropriately, will form one part of a single sustainability indicator for all construction projects.

Currently, the working group (chaired by Rab Bennetts) is collating the necessary data with its partners and putting together the relevant toolkits for an industry that is clearly keen to adopt this latest M<sup>4</sup>I output.

The six indicators and their unit of measurement are:

### **Operational Energy - KWh per year (or CO<sup>2</sup>) per m<sup>2</sup> of building.**

The energy used for the day-to-day operation of the building or structure.

Ways of reducing this include controlling solar gain, value engineering internal heat gains, maximising good day-lighting and the use of passive engineering techniques, such as thermal mass.





### **Embodied Energy -**

**Gj (or CO<sup>2</sup> ) per m<sup>2</sup> of construction.**

The energy used in the creation of the materials used in the construction.

Lean construction/prefabrication/right first time, avoidance of waste in design and manufacture, use of local materials and suppliers and avoidance of CO<sup>2</sup> intensive materials are techniques for energy reduction.

### **Transport Energy -**

**CO<sup>2</sup> per m<sup>2</sup> of construction.**

The amount of energy used to deliver materials and staff to site, for example sourcing local materials, promote green travel plans for site employees, car sharing, minibuses etc.

### **Waste -**

**m<sup>3</sup> per m<sup>2</sup> of construction.**

Reducing the amount of waste created through improved logistics, construction practices and recycling.

### **Water -**

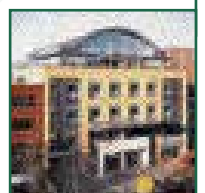
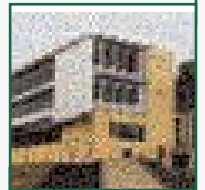
**m<sup>3</sup> per person or m<sup>3</sup> of construction.**

The amount of water used in the process of construction.

### **Biodiversity -**

**Species index per hectare.**

Maintaining, protecting and improving the existing flora and fauna on site, by use of site surveys, enhancement programmes and the avoidance of pollution.



## Knowledge Exchange

Everyone has a part to play in 'Rethinking Construction'. Information on the work of the Movement for Innovation and of the other organisations working to support the implementation of 'Rethinking Construction' is available through the Knowledge Exchange at

[www.knowledgeexchange.co.uk](http://www.knowledgeexchange.co.uk).

The Knowledge Exchange (KX), launched at the May 2000 M<sup>4</sup>I conference has now been expanded to include more portals and more web sites of those committed to promoting 'Rethinking Construction'. The site is the result of close collaboration between the M<sup>4</sup>I, Construction Best Practice Programme, the Construction Industry Board, the Housing Forum, the Government Construction Clients Panel and the Local Government Task Force. The M<sup>4</sup>I working group is chaired by Bob White.

Following an extensive survey to find out what information the industry needs, the Knowledge Exchange now includes a range of new features including:

**Search:** A powerful, single point search facility pointing to all web sites within the KX. You can search for information by key word or 'theme' across all portals or just a selection.

**Directory:** A listing of those organisations actively contributing to 'Rethinking Construction'. Access to web sites is via a range of portals. Current web sites include:

- |   |                       |
|---|-----------------------|
| ■ 'Rethinking Construction' organisations                   | ■ Trade Associations  |
| ■ Research in practice organisations                        | ■ Professional Bodies |
| ■ The Learning Network (training & education organisations) | ■ Government          |

**The Knowledge Exchange is now calling for commercial organisations who are demonstrating 'Rethinking Construction' to join the Knowledge Exchange. Find out how to join by visiting the site or contacting Amanda Wain at**

**awain@mace.co.uk or 0207 554 8119**



**News:** A single point access to all industry news, searchable by key word or 'hot topic'.

**Community:** You can contribute to the Knowledge Exchange by participating in an on-line survey to provide feedback to help us develop the services to meet your business needs. Future development may

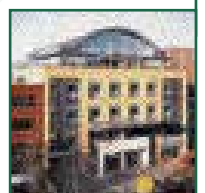
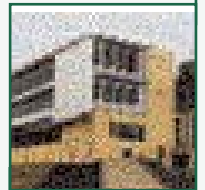
include features such as career information, on-line experts, discussion forums and other useful services, which you request.

**Newsletter:** The Knowledge Exchange will offer a monthly newsletter containing information about how 'Rethinking Construction' affects you and your business. Sign up to receive your newsletter by email.

**Events:** Search all events happening around the UK on 'Rethinking Construction'.

**The Knowledge Exchange really is worth a visit at**

**[www.knowledgeexchange.co.uk](http://www.knowledgeexchange.co.uk)**





# Glossary:

There are some new words, phrases and abbreviations used in developing the work programmes of M<sup>4</sup>I. The following is a list of some of the more commonly used terms and acronyms:

**Construction Best Practice Programme** - CBPP is jointly supported by the Department of the Environment, Transport and the Regions and the Construction Industry Board. It publicises and supports the take up of improved business and management practices by the UK construction industry. As part of the 'Rethinking Construction' initiative, CBPP works alongside the Movement for Innovation in disseminating the innovations and lessons from the Demonstration Projects to a wider construction audience.

**Clusters** - the nine regional groups of M<sup>4</sup>I Demonstration Project teams and others which meet regularly to share knowledge and experiences, aimed at improving the industry performance through knowledge transfer.

**Demonstration Projects** - projects nominated from across all sectors of the construction industry that seek to innovate or employ best practice in working relationships, construction techniques/processes, or development of components. Demonstration Projects commit themselves to measure their performance using recognised indicators and to share their results with others in the Movement.

**Egan Report** - in 1998 the Construction Task Force set up by the government, under the chairmanship of Sir John Egan, published a report called 'Rethinking Construction', often referred to as the Egan Report.

**Egan Targets** - targets set out in 'Rethinking Construction' for improved efficiency, reducing both the cost and time of construction, reducing defects and site accidents, improving quality and increasing productivity, profitability and predictability.

**Executive Management Group (EMG)** - a group chaired by the M<sup>4</sup>I Chairman which has delegated authority from the M<sup>4</sup>I Board to decide on matters relating to the implementation of Board policy. It mainly consists of the Directors of the Movement for Innovation Ltd.

**Government Construction Clients Panel** - GCCP is a body of 50 Government Client Departments and Agencies applying modern management practices, in order to become best practice construction clients.

**Housing Forum** - set up to promote the principles of 'Rethinking Construction' to the new build and repair/maintenance/improvement housing sectors. Demonstration Projects are used to promote examples of innovation and best practice in both public and private housing projects.

**Knowledge Exchange (KX)** - the industry's on-line resource which brings together information on the range of activities that support the implementation of 'Rethinking Construction'.

**Key Performance Indicators (KPIs)** - the nationally agreed headline indicators used to measure various aspects of industry performance. KPIs are being used to assess the industry's progress against the improvement targets set out in 'Rethinking Construction'.

**Lean Construction** - the management and improvement of the construction process to maximise profitability while best meeting customers' needs using less resources and improving quality.

**Local Government Task Force (LGTF)** - the Management Board set up to implement the principles of 'Rethinking Construction' to local government procurement.



# Glossary:

---



**Movement for Innovation (M<sup>4</sup>I)** - the Management Board set up to promote the implementation of 'Rethinking Construction' throughout the construction industry. Central to its task is the promotion of innovations and best practices through Demonstration Projects.

**Partnering** - a label used for a variety of approaches to managing relationships between organisations in the supply chain. Partnering aims to move beyond contractual confrontation that is so often associated with traditional contract-led project relationships. The most effective forms of partnering provide for risk management, no blame culture, sharing rewards and long term collaboration between the parties.

**Prime Contracting** - a systematic and managed approach to the procurement and maintenance of facilities, based on the integration of all the activities of a pre-assembled supply chain under the control of a single point of responsibility known as a prime contractor.

**Respect for People** - an initiative that includes recruitment, retention as well as respect for people. The scope includes diversity, welfare, health and safety, training, and issues relating to employee development. A set of process improvement tools have been developed by an M<sup>4</sup>I working group and a pilot programme involving organisations and project teams is underway.

**'Rethinking Construction' Steering Group** - the group which is chaired by the Construction Minister, Nick Raynsford, and includes the Chief Secretary to the Treasury, Andrew Smith. It has overall responsibility for all the complementary strands of 'Rethinking Construction'.

**Supply Chain** - the sequence of processes and activities involved in the specification, design, manufacture, construction, commissioning and maintenance of a project. It includes specialist contractors, material suppliers, design consultants, main contractors and clients.



**Sustainability** - a term used in describing the environmental impact of a project in conjunction with social and economic factors. A sustainable project avoids waste by better planning and management, uses renewable or recyclable materials, minimises generated energy use and restricts any negative social impact.

**Value Management (VM)** - a structured multidisciplinary methodology for improving value to the Client by analysing the costs incurred and benefits delivered by the component elements of a construction project.

**Value Engineering (VE)** - involves making use of the expertise of specialist contractors to deliver the Client's requirements and utilising more cost effective processes and systems.

**Whole Life Costing** - a tool to assist in assessing the performance and function of a building in use at the construction stage. This is aimed at facilitating choices, as a means of achieving the client's objectives, by reviewing initial costs and subsequent operational costs.

**Working Groups** - these groups are responsible for developing agreed M<sup>4</sup>I policy and initiatives. The topics covered by these groups include KPIs and Benchmarking, the Knowledge Exchange, Partnering the Supply Chain, Education Training and Research, Sustainability and Respect for People.



Movement for  
Innovation  
M<sup>4</sup>I



**Building 9, BRE  
Garston, Watford  
Herts WD2 7JR**

**Tel: 01923 664820  
Fax: 01923 664822  
Support@m4i.org.uk  
www.m4i.org.uk**