KPI Report for The Minister for Construction

By The KPI Working Group
dated January 2000

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Department of the Environment, Transport and the Regions

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In publishing the KPI Report, the Department of the Environment, Transport and the Regions acknowledges the work of the KPI Working Group, its seven Sub-Groups and in particular the tireless efforts of its chairman Alan Crane.

The KPI Working Group was made up from a broad spectrum of members representing all sides of the Construction Industry and its Clients.

This report represents the groups collective views on the measurement of the industry's performance and is the direct response to Sir John Egan's report *Rethinking Construction* called for by the Minister for Construction.

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FOREWORD

by Nick Raynsford, Minister for Construction

Sir John Egan's report, ***Rethinking Construction***, challenged the industry to measure its performance over a range of its activities and to meet a set of ambitious improvement targets.

This is the KPI Working Group's answer to that challenge. It sets out a comprehensive framework which construction enterprises can use to measure their performance against the rest of the industry, and has been designed to be used by organisations, large or small, specialist or supplier, designers or constructors.

It builds on the ***Key Performance Indicators*** pack released earlier this year. The KPI Pack presents the construction industry's range of performance using ten headline measures, but omits the more detailed elements of performance. This report addresses that need, by presenting organisations with a framework to benchmark activities both at a broad level, and at a level much closer to the 'coal face' - such as rectifying defects and meeting clients' expectations.

I urge organisations to use this framework to examine their performance and compare it with others within benchmarking clubs. Only by doing this, can the construction industry truly demonstrate that it is successfully improving its performance. I believe that this framework has surpassed Sir John's challenge, and is another major step forward in making the industry truly first class in every sense.

I am grateful to the industry at many levels for responding so positively to the challenge Sir John and I have set them.

Nick Raynsford
Minister for Construction

CONTENTS

Introduction

The Purpose of the KPIs

Clients of the construction industry want their projects delivered:

- on time
- on budget
- free from defects
- efficiently
- right first time
- safely
- by profitable companies[1]

Regular clients expect continuous improvement from their construction team to achieve year-on-year:

- reductions in project costs
- reductions in project times

The purpose of the Key Performance Indicators (KPIs) is to enable measurement of project and organisational performance throughout the construction industry. This information can then be used for benchmarking purposes, and will be a key component of any organisation's move towards achieving best practice.

Clients, for instance, assess the suitability of potential suppliers for a project, by asking them to provide information about how they perform against a range of indicators. Some information will also be available through the industry's benchmarking initiatives, so clients can see how potential suppliers compare with the rest of the industry in a number of different areas.

Construction supply chain companies will be able to benchmark their performance to enable them to identify strengths and weaknesses, and assess their ability to improve over time.

While individual organisations have been measuring their performance for many years, there has been little consistency in the data, and the way it has been published. This report is another step in rectifying this deficiency, which builds on the foundation of the Construction Industry KPIs[2] by detailing a comprehensive framework for measurement.

1 Contractors' inability to make a profit was identified as a major reason for project cost and time over-runs in Sir Michael Latham's report 'Constructing the Team'.

2 The Construction Best Practice Programme has published the *Construction Industry Key Performance Indicators 1998 – Project Delivery and Company Performance*, which contains the industry's performance in ten areas across the industry's sectors; tel: 0845 605 5556.

The Department of the Environment, Transport and the Regions, the Construction Industry Board, and the Movement for Innovation will, through the Construction Best Practice Programme, continue to publish annual wallcharts for the headline KPIs. Where available, operational and diagnostic data will also be published. However, the primary application of this report is for individual firms or benchmarking clubs to adopt a common framework as the basis for understanding in more depth their relative performance against the headline KPIs, confident that others will be using the same common definitions.

The working group recommends that the most effective tool for analysing all aspects of an organisation's operations is the EFQM (Business) Excellence Model promoted in the UK by the British Quality Foundation. This enables comparison with other firms and with other industries.

The KPI Groups

The KPI framework consists of seven main groups:

- Time
- Cost
- Quality
- Client Satisfaction
- Client Changes
- Business Performance
- Health and Safety

Within these groups, a range of indicators has been developed to analyse either project or company performance, or both.

The Key Project Stages

In order to define the KPIs throughout the lifetime of a project, five key stages have been identified:

A. Commit to Invest – the point at which the client decides in principle to invest in a project, sets out the requirements in business terms and authorises the project team to proceed with the conceptual design.

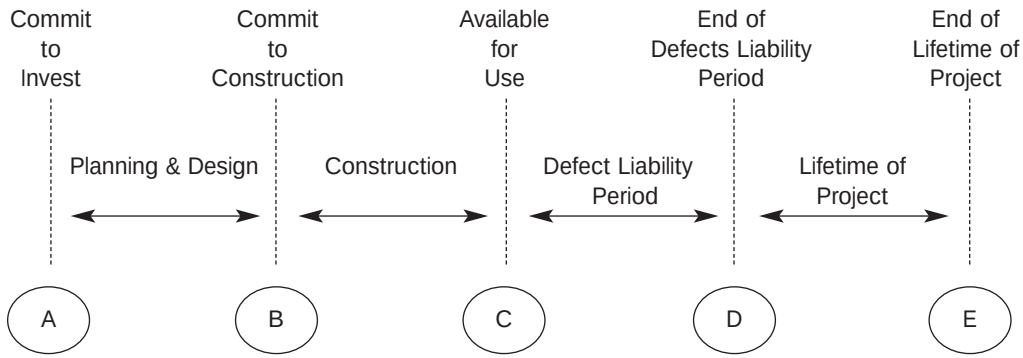
B. Commit to Construct – the point at which the client authorises the project team to start the construction of the project.

C. Available for Use – the point at which the project is available for substantial occupancy or use. This may be in advance of the completion of the project.

D. End of Defect Liability Period – the point at which the period within the construction contract during which the contractor is obliged to rectify defects ends (often 12 months from point C).

E. End of Lifetime of Project – the point at which the period over which the project is employed in its original or near original purpose ends. As this is usually many years after the project's completion, this is a theoretical point over which concepts such as *full life costs* can be applied.

Key Project Stages



Interpretation of the Key Project Stages

For the most common systems of procurement, experience of the first year's use of the Construction Industry KPIs suggests the following common interpretations of the five key stages. However, given the diversity of modern procurement systems, and the many variations in practice, it may be appropriate or necessary to adopt different interpretations.

Procurement System	Typical Milestone at Key Point/Stage				
	A	B	C	D	E
Traditional (designer-led)	Appointment of lead designer	Appointment of lead (main) contractor	Handover of built facility for use; payment of all non-retention monies	End of defects liability period (often 12 months); payment of any retention monies	End of useful life
Design & Build	Appointment (if any) of consultants prior to main contract	Appointment of lead D&B contractor	Ditto	Ditto	Ditto
Construction Management	Appointment of lead designer	Appointment of construction manager	Ditto	Ditto	Ditto
PFI	Appointment of 'Special Purpose Vehicle'	Appointment of lead contractor (if different), or sanction to proceed with construction phase	Handover of built facility for use	End of defects liability period if relevant	End of concession useful life; on-going payment to contractor

The KPIs

The KPI groups and their associated indicators are shown in the table below.

The definitions for these indicators and guidance on their use is given in the section KPI Definitions and Guidance.

Group	Indicators	Level
Time	1. Time for Construction	Headline
	2. Time Predictability – Design	Headline
	3. Time Predictability – Construction	Headline
	4. Time Predictability – Design & Construction	Operational
	5. Time Predictability – Construction (Client Change Orders)	Diagnostic
	6. Time Predictability – Construction (Project Leader Change Orders)	Diagnostic
	7. Time to Rectify Defects	Operational
Cost	1. Cost for Construction	Headline
	2. Cost Predictability – Design	Headline
	3. Cost Predictability – Construction	Headline
	4. Cost Predictability – Design and Construction	Operational
	5. Cost Predictability – Construction (Client Change Orders)	Diagnostic
	6. Cost Predictability – Construction (Project Leader Change Orders)	Diagnostic
	7. Cost of Rectifying Defects	Operational
	8. Cost In Use	Operational
Quality	1. Defects	Headline
	2. Quality Issues at Available for Use	Operational
	3. Quality Issues at End of Defect Rectification Period	Operational
Client Satisfaction	1. Client Satisfaction Product – Standard Criteria	Headline
	2. Client Satisfaction Service – Standard Criteria	Headline
	3. Client Satisfaction – Client-Specified Criteria	Operational
Change Orders	1. Change Orders – Client	Diagnostic
	2. Change Orders – Project Manager	Diagnostic
Business Performance	1. Profitability (company)	Headline
	2. Productivity (company)	Headline
	3. Return on Capital employed (company)	Operational
	4. Return on Value Added (company)	Operational
	5. Interest Cover (company)	Operational
	6. Return on Investment (client)	Operational
	7. Profit Predictability (project)	Operational
	8. Ratio of Value Added (company)	Diagnostic
	9. Repeat Business (company)	Diagnostic
	10. Outstanding Money (project)	Diagnostic
	11. Time taken to reach Final Account (project)	Diagnostic
Health and Safety	1. Reportable Accidents (inc fatalities)	Headline
	2. Reportable Accidents (non-fatal)	Operational
	3. Lost Time Accidents	Operational
	4. Fatalities	Operational

The Level of KPIs

Headline Indicators provide a measure of the overall, rude state of health of a firm.

Operational Indicators bear on specific aspects of a firm's activities and should enable management to identify and focus on specific areas for improvement.

Diagnostic Indicators provide information on why certain changes may have occurred in the headline or operational indicators and are useful in analysing areas for improvement in more detail.

The indicators are identified as applicable at project and/or company levels. In some cases the company indicator is the average value of that company's project indicators.

The indicators are identified as appropriate to the various members of the supply chain to which they could be applied.

For all indicators an organisation may have to use estimated, predicted or actual data depending on the stage of progress on the project.

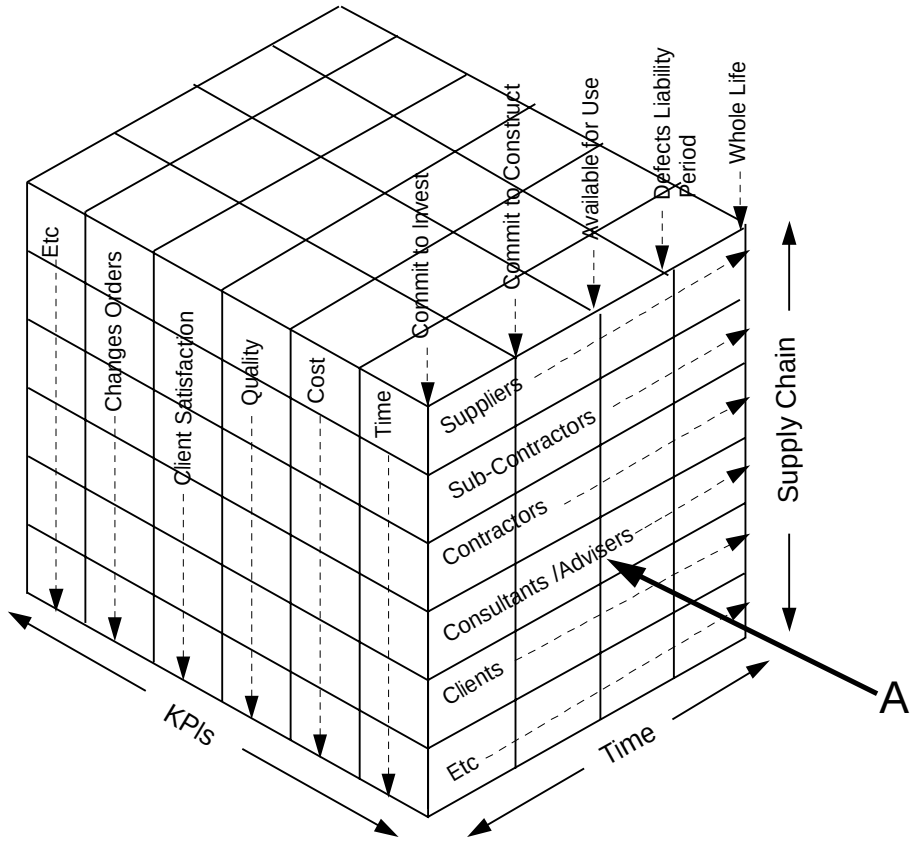
The Supply Chain Cube

The indicators presented in this report are designed to be applied at a project or a company level, depending on the indicator in question. However, the working group also considered extending the application of the key performance indicators to the different parts of the construction supply chain. This creates a network of suppliers and clients. An organisation will be either client or supplier depending on which part of the supply chain the organisation lies within, and with whom that organisation is dealing. This section briefly outlines how these indicators can be extended throughout this supply chain.

The diagram on the next page indicates in the form of a cube the inter-relationships between the parts of the supply chain and the key performance indicators. Each of the individual building blocks represents a different component of the KPIs. As it is three dimensional, the analysis will depend on the dimension in which the performance is analysed: by supply chain component; by time period; or – when viewed in the dimension of arrow A – by KPI.

In the diagram, the first face of the cube analysed in the direction of arrow A would be time. Here, the materials supplier is above the contractor in the supply chain, so the latter is, in this case, the client. Therefore, the key performance indicators used for the contractor as a client of the materials supplier will be similar, but not the same as for the whole project's client.

Supply Chain Cube



For example among the main satisfaction considerations that a contractor, as a client to a materials supplier might have, are the following:

1. defects
2. delivery time
3. ability to deliver straight to site
4. cost of materials
5. payment terms

The project's client is also interested in the defects, not only of the materials, but those that come about from workmanship. Similarly, the project's client is interested in delivery times and costs, but of the whole project, not for individual items. Manufacturers' ability to deliver materials straight to site will not be an explicit consideration for the project's client, but will have a bearing on the final completion time and cost. Payment terms will be of interest to the client, but again, will be for the whole project, not the individual materials.

Of course, because the cube is three dimensional, it can be 'sliced' in different dimensions. Instead of having each face as a separate KPI, it can, for instance, be analysed for a separate part of the supply chain or a different point in the project cycle by cutting it in a different dimension.

The working group believe that the framework is flexible enough for companies to take the individual KPIs and adapt them in a way which will suit their specific needs, regardless of whether they are materials suppliers, advisers, contractors, sub-contractors or clients. It challenges the industry to tailor the framework so that it fully integrates it throughout the whole supply chain.

The KPI Definitions and Guidance

Time

OBJECTIVE

Provide a suite of KPIs which facilitate measures of time performance improvement on a project by project basis, either within a single company or within a market sector.

INDICATORS

Indicator	Type	Definition
1. Time for Construction	Headline	Change in the current normalised construction time of a project at Commit to Construct (point B) compared with one year earlier, expressed as a percentage of the one year earlier time.
2. Time Predictability – design	Headline	Change between the actual design time at Commit to Construct (point B) and the estimated design time at Commit to Invest (point A), expressed as a percentage of the estimated design time at Commit to Invest (point A).
3. Time Predictability – construction	Headline	Change between the actual construction time at Available for Use (point C) and the estimated construction time at Commit to Construct (point B), expressed as a percentage of the estimated construction time at Commit to Construct (point B).
4. Time Predictability – design & construction	Operational	Change between the actual design and construction time at Available for Use (point C) and the estimated design and construction time at Commit to Invest (point A), expressed as a percentage of the estimated design and construction time at Commit to Invest (point A).
5. Time Predictability – construction (client change orders)	Diagnostic	Change, attributable to client approved change orders originating from the client / client representative, between the actual construction time at Available for Use (point C) and the estimated construction time at Commit to Construct (point B), expressed as a percentage of the estimated construction time at Commit to Construct (point B).
6. Time Predictability – construction (project manager change orders)	Diagnostic	Change, attributable to client approved change orders originating from the project manager, between the actual construction time at Available for Use (point C) and the estimated construction time at Commit to Construct (point B), expressed as a percentage of the estimated construction time at Commit to Construct (point B).
7. Time to rectify defects in maintenance period	Operational	The Contractors time taken to rectify all defects in the maintenance period between Available for Use (point C) and End of the Contractually Agreed Period for Rectifying Defects (point D), expressed in weeks.

GUIDANCE

Time information for some KPIs will be difficult to obtain, particularly “estimates of time at point A” and “time taken to rectify all defects between points C and D”. It is recommended that all parties to the project agree at the start of a project to disclose the necessary data to allow such measures to be made.

Within market sectors, it is suggested that target time periods, change levels and predictability levels are agreed for repetitive or comparable projects. These will serve as benchmark targets against which performance is measured (ie the target to better).

It should be noted that the definitions include the effect of client changes in the headline “Time Predictability” KPIs 2, 3 & 4.

KPIs 5 & 6 seek to diagnose the responsibility for the Time Predictability performance measure between the estimated construction time at Commit to Construct (point B) and the actual construction time at Available for Use (point C) in line with the Client Change KPIs.

The definition of what time should or should not be included in each of the parameters is important. It is the working party’s view that specific definitions are restrictive and that, where necessary, those using the measures should adapt the definitions to suit their particular industry/application. This would not present a problem for an individual organisation, however, where comparisons across projects are being made, care should be taken to ensure uniform definitions (this is especially important in benchmarking groups). If sector or industry wide comparisons with the Construction Industry KPIs published by the Construction Best Practice Programme are being made, the definitions described in the KPI Handbook should be used.

Example calculations of Time KPIs are contained at Appendix 1.

Cost

OBJECTIVE

Provide a suite of KPIs which facilitate measures of cost performance improvement on a project by project basis, either within a single company or within a market sector.

INDICATORS

Indicator	Type	Definition
1. Cost of Construction	Headline	Change in the current normalised construction cost of a project at Commit to Construct (point B) compared with one year earlier, expressed as a percentage of the one year earlier cost.
2. Cost Predictability – design	Headline	Change between the actual design cost at Available for Use (point C) and the estimated design cost at Commit to Invest (point A), expressed as a percentage of the estimated design cost at Commit to Invest (point A).
3. Cost Predictability – construction	Headline	Change between the actual construction cost at Available for Use (point C) and the estimated construction cost at Commit to Construct (point B), expressed as a percentage of the estimated construction cost at Commit to Construct (point B).
4. Cost Predictability – design & construction	Operational	Change between the actual design and construction cost at Available for Use (point C) and the estimated design and construction cost at Commit to Invest (point A), expressed as a percentage of the estimated design and construction cost at Commit to Invest (point A).
5. Cost Predictability – construction (client change orders)	Diagnostic	Change, attributable to client approved change orders originating from the client / client representative, between the actual construction cost at Available for Use (point C) and the estimated construction cost at Commit to Construct (point B), expressed as a percentage of the estimated construction cost at Commit to Construct (point B).
6. Cost Predictability – construction (project manager change orders)	Diagnostic	Change, attributable to client approved change orders originating from the project manager, between the actual construction cost at Available for Use (point C) and the estimated construction cost at Commit to Construct (point B), expressed as a percentage of the estimated construction cost at Commit to Construct (point B).
7. Cost to rectify defects in the maintenance period	Operational	The Contractors cost of rectifying all defects in the maintenance period between Available for Use (point C) and End of the Contractually Agreed Period for Rectifying Defects (point D), expressed as a percentage of construction cost at Available for Use (point C).
8. Cost-in-Use	Operational	The annual operating and maintenance cost following Available for Use (point C), expressed as a percentage of the actual design and construction cost at Available for Use (point C).

GUIDANCE

Cost information for some KPIs will be difficult to obtain, particularly “estimates of cost at point A”, “costs of rectifying all defects between points C and D”, and “annual operating and maintenance costs after point C”. It is recommended that all parties to the project agree at the start of a project to disclose the necessary data to allow such measures to be made.

Within market sectors, it is suggested that target costs, change levels and predictability levels are agreed for repetitive or comparable projects. These will serve as benchmark targets against which performance is measured (ie the target to better).

It should be noted that the definitions include the effect of client changes in the headline “Cost Predictability” KPIs 2, 3 & 4.

KPIs 5 & 6 seek to diagnose the responsibility for the Cost Predictability performance measure between the estimated construction cost at Commit to Construct (point B) and the actual construction cost at Available for Use (point C) in line with the Client Change KPIs.

The definition of what cost should or should not be included in each of the parameters is important. It is the working party’s view that specific definitions are restrictive and that, where necessary, those using the measures should adapt the definitions to suit their particular industry/application. This would not present a problem for an individual organisation, however, where comparisons across projects are being made, care should be taken to ensure uniform definitions (this is especially important in benchmarking groups). If sector or industry wide comparisons with the Construction Industry KPIs are being made, the definitions described in the KPI Handbook should be used.

Example calculations of Cost KPIs are contained at Appendix 1.

Quality

OBJECTIVE

Provide a suite of KPIs which can be used to measure quality improvements from the start of a project by measuring the number of ‘quality issues’.

INDICATORS

Indicator	Type	Definition
1. Defects	Headline	Impact, at the time of handover, caused by the condition of the facility with respect to defects using the 1 to 10 scale set out below.
2. Quality issues at available for use	Operational	The number of outstanding quality issues at Available for Use (point C).
3. Quality issues at end of defect rectification period	Operational	The number of outstanding quality issues at the End of the Contractually Agreed Period for Rectifying Defects (point D)

GUIDANCE

The headline Defects KPI is currently recorded on projects by the Construction Clients Forum (CCF) survey using the following scoring system.

10 = Apparently defect free

8 = Few defects no significant impact on client

5/6 = Some defects some impact on client

3 = Major defect major impact on client

1 = Totally defective

It is anticipated that this system should be used not only for the completed project but for elements within the project to be able to measure the performance of this indicator for all parts of the supply chain.

Quality is subjective and means different things to different people. At present there is no objective recognised method of measuring quality in the construction industry. The aim of the two operational Quality KPIs is to improve the visibility of quality issues on construction projects through the measurement of "quality issues". Therefore this measure should record all quality issues on all elements within the project from project commencement.

A Quality Issue is defined as:

> An issue that effects the project so that work needs to redone, modified or compromised to a lower standard than originally agreed.

As a result, a quality issue will encompass defects, but it is also a much wider measure which covers issues which would not normally be considered to be defects. For instance, a quality issue may include incorrect information on a drawing, defective materials, poor workmanship on site etc.

Definitions of the three types of quality issue are:

> *Rejected:* When a quality issue involves the work being completely restarted and all previous work deemed unusable, then the quality issue will be classified as rejected.
>
> *Reworked:* When a quality issue involves work that requires modification to return it to the agreed standard, then it should be classified as rework.
>
> *Compromised:* If the project team accept work below the agreed standard this will be classified as compromised.

When an agreed quality issue is identified it is recommended that details of quality issues are recorded in a project quality register. The quality register should be started at the start of the project and be maintained for the duration of the project.

A quality register proforma is contained at Appendix 2.

Client satisfaction

OBJECTIVE

Provide a suite of KPIs which measure client satisfaction on a project by projects basis which can be used throughout the supply chain. Use surveys to assess whether projects meet clients' expectations and whether they are satisfied with the results.

INDICATORS

Indicator	Type	Definition
1. Client Satisfaction Product – standard criteria	Headline	How satisfied the client was with the finished product using the score against the 1 to 10 scale set out below.
2. Client Satisfaction Service – standard criteria	Headline	How satisfied the client was with the service of the advisor, suppliers and contractors using the score against the 1 to 10 scale set out below.
3. Client Satisfaction – client-specified criteria	Operational	How satisfied the client was with certain client-specified criteria using the scores, against the 1 to 10 scale set out below, weighted together to determine their level of importance.

GUIDANCE

The two headline Client Satisfaction KPIs are currently recorded on projects by the Construction Clients Forum (CCF) survey for consultants and main contractors using the following scoring system.

10 = Totally satisfied

5/6 = Neither satisfied nor dissatisfied

1 = Totally dissatisfied

The two headline Client Satisfaction KPIs have been developed with standard criteria in order to make comparisons between projects

Customer satisfaction is by definition subjective, and as a consequence, is influenced by the individual customer's requirements. For this reason, a Client Satisfaction KPI has been developed which addresses the specific criteria which the client feels are important. It is recommended that the identification of the client-specified criteria and weightings be requested in pre-tender qualifications. Also, regular monitoring should be undertaken in open dialogue between the customer and supplier. This will ensure not only that the criteria and weightings attached to them are both relevant and understood but also that the resultant scores are understood, accepted and ultimately acted upon. The final score is then normalised to enable comparison between projects.

The indicators have been developed to assess client satisfaction with advisors, suppliers and contractors throughout the various parts of the supply chain.

A client satisfaction survey proforma is contained at Appendix 3.

Change orders

OBJECTIVE

Provide a suite of KPIs which facilitate measures of the extent to which a project has been affected by changing specifications during the construction phase, either within a single company or within a market sector.

INDICATORS

Indicator	Type	Definition
1. Change orders – client	Diagnostic	Number of individual change orders approved by the client/client representative between Commit to Construct (point B) and Available for Use (point C), originating from the client / client representative.
2. Change orders – project manager	Diagnostic	The number of individual change orders approved by the client/client representative between Commit to Construct (point B) and Available for Use (point C), originating from the project manager.

GUIDANCE

This indicator attempts to track the source of any change in a project's design. The type of project and type of contract will, therefore, determine whether a change order originates from the client/client representative or the reporting company. Under a traditional contract with the design contract separated from the construction contract, a change originating from the designer can be interpreted as a client representative order. With a design and build contract, however, the same change order from the designer would be interpreted as the project leader's order. As a result, careful interpretation is required in assessing this indicator.

Client representative includes the client's advisor. It will include designers under traditional contractual arrangements.

Project manager includes main contractor, sub contractor, and (occasionally) designers.

One Architect's Instruction may contain a number of change orders. It is the number of change orders, not the number of pieces of paper which should be recorded.

This indicator only serves to record the number of changes, and not the amount of re-working which these changes entail. A substantial amount of re-working as a result of the change orders will be picked up by the time and cost predictability indicators. Clients can call for any number of changes to the design and other items as permitted under the contract. Additionally, they can introduce, by agreement with the supply side, changes that are not covered under the contract.

There are of course many reasons why changes arise, ranging from general improvements to the contract, optimisation of design, errors, omissions, changed performance requirements, non-availability of products/materials, changes to overcome difficulties/problems that are discovered as the work proceeds etc.

Some changes will be unavoidable and others will be necessary through the optimisation process, but changes arising from unclear objectives at the start of the project or insufficient preplanning and pre investigation should be avoidable in most situations.

The cost of changes may not represent good value for money and may have other disadvantages like disrupting the programme and extending the contract period. As a general approach, it is suggested that client changes should only be instructed/introduced where they are necessary to maintain or add value to the clients' business case.

Zero change orders should be the target and would imply the design was 'right first time'. However, such a target should not be traded off against customer satisfaction and defects if improvements can be made by design changes throughout the construction process.

KPIs 5 & 6 in the Time and Cost sections seek to evaluate the responsibility for both the KPIs in this section.

Business performance

OBJECTIVE

Provide a suite of KPIs which facilitate measures of business performance on a project or company basis along the supply chain, either within a single company or within a market sector.

INDICATORS

Indicator	Type	Definition
1. Profitability	Headline	Company profit expressed as a percentage of turnover.
2. Productivity	Headline	Company value added per employee expressed in pounds.
3. Return on capital employed	Operational	Company profit expressed as a percentage of capital employed.
4. Return on value added	Operational	Company profit expressed as a percentage of value added.
5. Interest cover	Operational	Company profit (before interest and tax) expressed as a percentage of interest payable.
6. Return on investment	Operational	Comparison of estimated return on investment for the client at Commit to Invest (point A) to actual return on investment at End of the Contractually Agreed Period for Rectifying Defects (point D) expressed as a percentage.
7. Profit predictability* (project)	Operational	Change in final gross margin at available for use (point C) and End of the Contractually Agreed Period for Rectifying Defects (point D) expressed as a percentage of the planned gross margin at Commit to Construct (point B).
8. Ratio of value added	Diagnostic	Company value added expressed as a percentage of turnover.
9. Repeat business	Diagnostic	The value of repeat business expressed as a percentage of turnover.
10. Outstanding money	Diagnostic	Amount of the total final account outstanding at Available for Use (point C) and at End of the Contractually Agreed Period for Rectifying Defects (point D) expressed as a percentage of the total final account at Available for Use (point C).
11. Time taken to reach final account	Diagnostic	Time taken to reach final account from Available for Use (point C) expressed in weeks.

* profit predictability should be tracked throughout a project – see Management Accounting Practice below

GUIDANCE

Glossary of terms:

Profit	Profit before interest and tax.
Capital Employed	For a company is the sum of the shareholders funds and the bank debt and overdrafts. For a project is the participants own cash required to fund the project.
Final account	All moneys receivable on the contract, including retention.
Gross margin	Project profit, before any central overheads.
Moneys outstanding	The difference between the cash received and the final account.
Turnover	Sales from construction activities.
Value added	Turnover less all costs subcontracted to, or supplied by, other parties.
Return on Investment	The internal rate of return of the project, using the cost of acquiring the asset and the operating cashflows over the life of the asset.
Interest payable	Sum of interest paid minus interest received.
Repeat business	Proportion of the value of all business won from existing clients before End of the Contractually Agreed Period for Rectifying Defects (point D) on existing contracts.

MANAGEMENT ACCOUNTING PRACTICE

There are areas where the accounting practice may differ between companies, and which may have an impact on the ability to compare results between companies

The three most common ways of allocating overheads are to: cost overheads to jobs on a resource utilised basis; to cost overheads to jobs based on the contract turnover; or to bear all overheads centrally. The indicators attempt to reduce the impact of different treatments of overheads by looking at the percentage change in predicted gross margins, rather than the absolute value, wherever possible.

Due to the nature of a partnership the net profit will be calculated before taking account of any payments to the partners, including interest on any loans made by the partners. Due to the absence of costs for the most senior staff the profit figure is likely to be higher in a partnership. This does not impact the project specific indicators.

Health & safety

OBJECTIVE

Provide a suite of KPIs which facilitate measures of the frequency of lost time and reportable accidents and fatalities.

HEADLINE INDICATORS

Indicator	Type	Definition
1. Reportable accidents (inc fatalities)	Headline	Reportable accidents per 100,000 hours worked (inc fatalities)
2. Reportable accidents (non-fatal)	Operational	Reportable accidents per 100,000 hours worked (non-fatal)
3. Lost time accidents	Operational	Lost time accidents per 100,000 hours worked
4. Fatalities	Operational	Fatalities per 100,000 hours worked

GUIDANCE

On a properly measured site details of all accidents will be recorded in an accident book. Recorded accidents should include those involving third parties such as members of the public.

The indicators are the frequency rate per 100,000 hours worked. If data is not available for the number of hours worked on site, an estimate can be calculated by multiplying the average number employed on a site during the year by an estimate of the average number of hours worked. Where the construction period is for less than a year the figures need to be adjusted on a pro-rata basis.

Clients, consultants, contractors and sub-contractors should all be associated with the figures for all on-site accidents during the construction phase on projects with which they are involved. For example, if the contractor has an accident rate of 4.2, say, the Client, the Consultant and the sub-contractor will also have an accident rate of 4.2 for that particular project. This reflects the need to take a joint approach to tackling on-site health and safety issues.

Suppliers should calculate accident frequency rates at their own facilities. Due to the nature of the manufacturing process, these figures will usually relate to the total operation of the plant rather than the production of materials for a particular project.

APPENDIX 1

Example KPI Calculations

Time

Example data for the current project:

- Estimated design time at A. 60 weeks
- Actual design time at B. 68 weeks
- Estimated construction time at A. 65 weeks
- Construction contract period at B. 56 weeks
- Actual construction period at C. 60 weeks
- Additional time attributable to client change orders B-C. 3 weeks
- Additional time attributable to project managers change orders B-C. 1 weeks
- Actual time taken to rectify all defects between C-D. 6 weeks
- Higher specification than year earlier project (assessed). 8%
- Smaller than year earlier project (assessed). 10%

and for the year earlier project:

- Construction contract period at B. 59 weeks

Indicator 1

$$\text{Time for Construction} = \frac{(56\text{wks} - 8\% + 10\%) - 59\text{wks}}{59\text{wks}} \times 100 = -3.9\%$$

Indicator 2

$$\text{Time Predictability – design – A to B} = \frac{68\text{wks} - 60\text{wks}}{60\text{wks}} \times 100 = +13.3\%$$

Indicator 3

$$\text{Time Predictability – construction – B to C} = \frac{60\text{wks} - 56\text{wks}}{56\text{wks}} \times 100 = -7.1\%$$

Indicator 4

$$\text{Time Predictability – design \& construction – A to C} = \frac{(68\text{wks} + 52\text{wks}) - (60\text{wks} + 65\text{wks})}{(60\text{wks} + 65\text{wks})} \times 100 = -4.0\%$$

Indicator 5

Time Predictability – construction – client change orders – B to C = 3wks / 56wks X 100 = +5.3%

Indicator 6

Time Predictability – construction – pm change orders – B to C = 1wks / 56wks X 100 = +1.8%

Indicator 7

Time to rectify defects – C to D = 6 weeks

COST

Example data for the current project:

- Estimated cost of design at A. £500k
- Tendered cost for design A-B. £340k
- Tendered cost for design B-C. £150k
- Final cost of design at C. £490k
- Estimated cost of construction at A. £3,500k
- Tendered cost for construction at B. £3,400k
- Final cost of construction at C. £3,475k
- Additional cost attributable to client change orders B-C. £60k
- Additional cost attributable to project managers change orders B-C. £15k
- Rate per m^2 from tendered cost for construction at B. £930/m^2
- Higher quality than year earlier project (assessed). 5%
- More expensive region than year earlier project (assessed). 8%
- Resource costs have increased since year earlier project (published). 3%
- Cost of rectifying all defects between C-D. £150k
- Annual operating cost arranged over years complete after C excluding defect rectification cost. £100k

and for the year earlier project:

- Rate per m^2 from tendered cost for construction at B. £805/m^2

Indicator 1

$$\text{Cost of Construction} = \frac{(£930 - 5\% - 8\% - 3\%) - £805}{£805} \times 100 = -2.1\%$$

Indicator 2

$$\text{Cost Predictability – design – A to C} = \frac{£490k - £500k}{£500k} \times 100 = -2.0\%$$

Indicator 3

$$\text{Cost Predictability – construction – B to C} = \frac{£3{,}475k - £3{,}400k}{£3{,}400k} \times 100 = +2.2\%$$

Indicator 4

$$\text{Cost Predictability – design \& construction – A to C} = \frac{(£490k + £3{,}475k) - (£500k + £3{,}500k)}{(£500k + £3{,}500k)} \times 100 = -0.9\%$$

Indicator 5

$$\text{Cost Predictability – construction – client change orders – B to C} = \frac{£60k}{£3{,}400k} \times 100 = +1.8\%$$

Indicator 6

$$\text{Cost Predictability – construction – pm change orders – B to C} = \frac{£15k}{£3{,}400k} \times 100 = +0.4\%$$

Indicator 7

$$\text{Cost to rectify defects – C to D} = \frac{£150k}{£3{,}475k} \times 100 = +4.3\%$$

Indicator 8

$$\text{Cost in Use} = \frac{£100k}{(£3{,}475k + £490k)} \times 100 = +2.5\%$$

QUALITY

Example data for the current project:

	Criteria – Defects	Score (1 to 10)
1	Impact, at the time of handover, caused by the condition of the facility with respect to defects	6

Quality issues were raised during and after the construction process as follows:

Stages A to C:

- Defective joinery had to be reworked at a cost of £500 and took two days to complete
- Flooring covered with wrong material had to be replaced at a cost of £3000 and took five days to rectify
- Door handles were different from those originally specified, but client accepted these
- Design allowed insufficient ventilation space for boiler and had to be reworked at a cost of £200 and took ½ day
- Four other reworked quality issues due to damage on site caused by scaffolding collapsing at a total cost of £4000 and took five days to rectify

At stage C:

- Boiler failed to work properly due to a faulty valve. It cost £50 and took ½ day to repair

At stage D:

- Boiler deemed insufficiently powerful to properly heat the building. It was replaced at a cost of £10,000 and took two days to install replacement
- Leaking roof due to workmanship cost £3,000 and took four days to repair

Indicator 1

The score for defects = 6

Indicator 2

Quality issues at available for use: ⅛ x 100 = 12½%

Indicator 3

Quality issues at end of defect rectification period: ⅜ x 100 = 25%

The quality register will also produce the following additional data:

Summary

Rejected: 3 (flooring, boiler valve, boiler); cost: £13,050; time: 7½ days

Reworked: 7 (joinery, design, 4 additional issues, roof); cost: £7,700; time: 11½ days

Compromised: 1 (door handles): cost: £0; time: £0

Source of quality issues

Workmanship: 2 (joinery, roof)

Design/Specification: 4 (wrong flooring, door handles, boiler ventilation, boiler's power)

Defective Materials: 1 (valve)

Damage on Site: 4 (scaffolding-induced damage)

Other: none

CLIENT SATISFACTION

A client commissions an office block development, and the main concerns are to have low running costs and a good working environment which determine the Client Specified Criteria questionnaire.

The client indicates the following scores for the same office development:

Standard Criteria

	Criteria – Product	Score (1 to 10)
1	Finished product	6

	Criteria – Advisor	Score (1 to 10)
1	Overall performance	5
2	Design creativity	4
3	Ability to innovate	5
4	Speed and reliability of service	6
5	Co-ordination between team members	3
6	Overall value for money	7

	Criteria – Supplier and Contractor	Score (1 to 10)
1	Overall performance	6
2	Ability to keep to the price	6
3	Ability to keep to time	3
4	Build/quality of completed items	8
5	Resolution of defects	4
6	Trust/overall confidence in their ability	6

Client Specified Criteria

	Criteria – Client-Specified	Weight	Score (1 to 10)
1	Low running costs	10	7
2	Bright and spacious working space	9	4
3	Low maintenance costs	8	8
4	Comfortable temperature all year round	7	5
5	Good sound insulation	6	2
6	Built on time	5	3
7	Built within budget	4	7
8	Large meeting rooms	3	5
9	Company-coloured decoration	2	10
10	Defect free at 'available for use' stage	1	6

Indicator 1

The mean overall score for Satisfaction with the Product = $\underline{6}$

Indicator 2

The mean overall score for Satisfaction with the Service derived from the two parties are:

Advisor's score = $(5+4+5+6+3+7)\div6 = 30\div6 = \underline{5.0}$

Supplier and contractor's score = $(6+6+3+8+4+6)\div6 = 33\div6 = \underline{5.5}$

Overall score = $(5+5.5)\div2 = \underline{5.25}$

Indicator 3

Weighted score =
$(10x7)+(9x4)+(8x8)+(7x5)+(6x2)+(5x3)+(4x7)+(3x5)+(2x10)+(1x6)= 301$

Normalised score =
$301\div(1+2+3+4+5+6+7+8+9+10) = 301\div55 = \underline{5.47}$

CHANGES ORDERS

Using the following data for an example design and build project:

Change orders issued by clients representative/advisor: on 5 variation instructions	15 changes
Change orders issued by contractors design team project leader: on 24 variation instructions	72 changes

Indicator 1

Change orders client – B to C	=	15 change orders

Indicator 2

Change orders project leader – B to C	=	72 change orders

APPENDIX 2

Quality Register

A quality register proforma is shown below. It provides additional information on the implications to programme and cost, and the cause of the quality issues. This will also provide "trend" information that should form the basis of future programmes of Continuous Improvement. It will also be valuable objective data for monthly project reviews and at the completion of the project.

Additional fields on the quality register (optional) are:

Cost of rectification: an estimate of the cost of rectifying the quality issue. This excludes the implications of consequential costs.

Time: an estimate of the time to rectify the quality issue and the impact of the quality issue on the overall programme.

Source/Effectiveness: by identifying the source of the quality issue, who identified it and when it was rectified, the quality register will be a valuable source of data to begin to understand the causes of quality issues and start to improve quality of construction projects.

Quality Register

Project

Name:

Value:
Sector (eg. Civil Engineering, Commercial):
Class (eg. Road, Office):
Type (eg. New Build, Refurbishment):

Date:
Location (Region):
Project's Stage:
Ref. No.:
Funding (eg. PFI):
Contract (eg. Consortium):

Client

Name:
Type (eg. Developer, Local Government):

Reported Quality Issues	*Summary Details*			*Time/Cost Details*			*Source of Quality Issue*					*Effectiveness*		
	Rejected	Reworked	Compromised	Cost: Rectification	Time: Rectification	Time: Impact	Workmanship	Design & Specification	Defective Material	Damage On Site	Other	Quality Issue Identified by	Date Issue was Cleared	Total Quality Issues
1														
2														
3														
4														
5														
6														
7														
8														
9														
10														
Total														

APPENDIX 3

Customer Satisfaction Survey

PROFORMA I

Customer:	Type of customer:	
Project name and address:		
Type of project:	Value of project:	
Supplier to whom this pro-forma refers:		
Individuals to be responsible for these reviews: From client From supplier		
Frequency of reviews		
IT IS STRONGLY RECOMMENDED THAT THE GUIDANCE NOTES FOR THE RELEVANT PHASE OF THE PROJECT BE READ BEFORE COMPLETION OF THE NEXT SECTION.		

	Key aspects which customers view as critical measures of his/her satisfaction (to be filled in by customer following a dialogue with supplier)	Customer-specified weighting (1-10)
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

PROFORMA 2

Part I – Project Specific Measures

How satisfied are you with the following customer selected key aspects?		Totally Dissatisfied				Neither satisfied nor dissatisfied					Totally satisfied
		1	2	3	4	5	6	7	8	9	10
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											

Part IIa – Product

How satisfied are you with the finished product?		Totally Dissatisfied				Neither satisfied nor dissatisfied					Totally satisfied
		1	2	3	4	5	6	7	8	9	10
1	*Overall performance*										

Part IIb – Advisers

How satisfied are you with the services of the adviser?		Totally Dissatisfied				Neither satisfied nor dissatisfied					Totally satisfied
		1	2	3	4	5	6	7	8	9	10
1	*Overall performance*										
2	*Design creativity*										
3	*Ability to innovate*										
4	*Speed and reliability of services*										
5	*Co-ordination between team members*										
6	*Overall value for money*										

Part IIc – Suppliers and Contractors

How satisfied are you with the services of the suppliers and contractors?		Totally Dissatisfied						Neither satisfied nor dissatisfied			Totally satisfied
		1	2	3	4	5	6	7	8	9	10
1	*Overall performance*										
2	*Ability to keep to price quoted*										
3	*Ability to keep to time*										
4	*Build/quality of completed items*										
5	*Resolution of any defects*										
6	*Trust/overall confidence in their ability*										

Part IId – Defects

What was the impact, at the time of handover, caused by the condition of the facility with respect to defects?									
Totally defective		Major defects major impact on client		Some defects some impact on client		Few defects no significant impact on client		Apparently defect free	
1	2	3	4	5	6	7	8	9	10