Construction Journal

The RICS New Rules of Measurement: a toolkit for cost management

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• Standard Form of Cost Analysis update • history of measurement •
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From the Chairman

Seize the NRM opportunity

At some point, clients are probably going to ask you about the RICS New Rules of Measurement and BIM, says David Bucknall. Are you up to speed?

The quantity surveying profession has a great opportunity to punch above its weight in the challenges that confront the construction sector during the dog days of recession over the next 2-5 years – providing we have the collective guts to do it.

In my experience, previous downturns have always reshaped both our profession and the industry. In three of the four recessions I have been through, we emerged having developed cost planning, project management and facilities management – all of which became core services of our company.

So what are we quantity surveyors going to develop now to enhance the profession’s standing and increase our future business potential? How do we ensure that clients and industry colleagues give us the ‘first phone call’ and also recognise quantity surveyors as their prime advisors in delivering improved whole-life value for money? A significant step in the right direction is discussed in this edition.

The QS and Construction Professional Group Board has a wide remit: to be relevant across the spectrum of quantity surveying membership. Its two primary focuses are:

- maintaining and improving technical and ethical standards to ensure a consistent quality of core services; and
- ensuring that quantity surveyors are equipped to ‘sit at the right tables’ and be a positive influence in improving industry performance.

With the above in mind, I am delighted that this edition of Construction Journal is dedicated to the RICS New Rules of Measurement (NRM). This comprises three volumes, the first two of which are due to be launched on 24 April.

The details of the philosophy and strategy of the NRM, together with its practical application, are dealt with in the body of the journal. There are also articles on the updated BCIS Standard Form of Cost Analysis and a brief history of measurement.

We welcome the introduction of the NRM as, for the first time, there will be a direct link throughout the life cycle of a project. With the NRM, Stuart Earl and his working group colleagues have created a strong, seamless, linked cost-control pathway (see page 6) through all stages of the project from inception, viability and feasibility to detailed design, construction documentation and construction, and finally through handover to operations.

This seamless controlled path, when linked to Building Information Modelling (BIM), will enable the quantity surveyor to play an increasingly strong role in the delivery of government and market requirements with a ‘more for less’ approach.

This will put an increasing focus on consistency and the standardisation of components, which is key to reducing waste and rework, to deliver essential value for money – and it should enhance rather than reduce the variety of architectural designs.

The timing of RICS’ launch in April of NRM1 and NRM2, followed later by NRM3, together with government mandating the use of BIM, represents a great opportunity for us all. And as RICS President See Lian Ong discusses on page 5, the NRM also creates an opportunity for these measurement rules to be adopted and adapted in international markets.

Incidentally, the properly informed quantity surveyor has a great opportunity to take up the role of ‘BIM Co-ordinator/Leader’ and this is one of the ways the profession can create and increase the vital link between the NRM, BIM and its own cost databases.

To maximise this opportunity, quantity surveyors must improve their ‘soft’ skills. Clear communication, persuasion and leadership will be essential to help us deliver the full benefits.

Understandably, there has been cautious take up of the NRM by the profession but an increasing number of clients are recognising the benefits to them, and we hope momentum will quickly increase.

Remember that the QS and Construction Professional Group Board aims to give quantity surveyors the tools with which to enhance their roles going forward – but only you and your companies (large and small) can deliver. Adoption of these initiatives may seem like bold steps that will take investment of time and money – but surely it is better to be proactive and engage rather than find yourself on the back foot when a client asks why you’re not up to speed with them.

We believe it is in your best interests to embrace NRM1, 2 and 3 and BIM to create both the perception and the reality that quantity surveyors provide clients and industry colleagues with reliable cost data that gives them a competitive advantage.

David Bucknall is Chairman of the QS and Construction Professional Group Board

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Competing in a global industry

RICS President See Lian Ong discusses the international potential of the RICS New Rules of Measurement

Data is recognised as the fourth factor of production. Land, labour and capital are still fundamental, but information may be the key to faster development in an international context. A recent study highlighted that the amount of digital information created annually will grow by a factor of 44 from 2009 to 2020.

All other things being equal, the country with better data and information – and the ability to use it effectively – will achieve faster growth. Causality between data-driven decision-making in government and organisations and their success has been proven by a study published by the Massachusetts Institute of Technology in 2011. It found that firms adopting a data-driven approach can increase their output and productivity by about 6%.

So what does all this mean for construction? Building Information Modelling (BIM) is set to capture data in construction settings, especially internationally. However, for BIM to fully take effect, standard data-sets are required for cost, time and design. In terms of cost, this is where the RICS New Rules of Measurement (NRM) have a leading role to play as they will provide a consistent cost management framework for the whole life cycle of construction. This structured set of rules for measurement and data collection is, initially, intended for the UK market but has the potential to be applied globally.

What data exists to support this proposition? RICS recently carried out a survey of its international members to establish the use and benefits of the Principles of Measurement (International) for Works of Construction (POMI) which were first published in 1979. POMI constitutes a simplified NRM approach, but uses the same principles. Responses to the survey were received from 444 members in 62 countries. Highlights included:

- 45% of respondents had used POMI;
- 74% believed that POMI was fit for purpose; and
- 79% felt that further guidance would be useful.

Key improvements requested were to make it more detailed and that an update of POMI was long overdue.

Therefore, the potential to adapt and adopt the NRM for the international construction market appears real. Since POMI is particularly aligned with the FIDIC international form of contract (as per 79% of respondents in the survey) it may be preferable to consider international measurement rules in conjunction with an international contract. Although local jurisdictions have developed their own rules to some degree, the globalisation of the construction market, and the seamless data transfers that accompany it, are a clarion call for global standards.

What benefits may accrue from an international method of measurement? Firstly, it would provide a benchmark for best practice in international construction cost management and an essential training and education aid.

Secondly, it would allow a comprehensive and structured approach to be taken to cost management from inception through to post-occupation. It would also provide a uniform and consistent basis for measurement and risk management and define the data required for decision-making at each stage of a project.

This structured data collection and analysis translates easily into BIM. In turn, BIM will allow faster and more accurate iteration of design solutions to achieve the optimum cost: value solution and the subsequent capture of this data for the management of the asset.

Underestimating costs

Cost over-runs are common in international infrastructure and building projects. A comprehensive study of cost over-runs published in the Journal of the American Planning Association in 2002 found that 90% of construction projects had under-estimated costs, and that over-runs of 50-100% were common. Cost under-estimation was found in each of the 20 nations and five continents covered by the study, and the under-estimating of costs had not decreased during the 70 years for which data was available.

Hence, international financial institutions should recognise that international measurement rules would allow better prediction of costs and a defined approach to risk. The rules would also promote establishing a ‘cost limit’ or benchmark by allowing the setting of a ‘risk-free’ base estimate and a ‘risk allowance’ estimate. Combined, the estimates provide the cost limit, which should not be exceeded unless the employer changes the scope of work.

The message is clear. Competitiveness and progress in international construction is inextricably linked to data analysis and collection, and RICS is uniquely positioned to set global standards for measurement using the NRM as a framework. After all, you need to measure it to manage it.

Further information


See Lian Ong is a quantity surveyor and President of the RICS

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All other things being equal, the country with better data and information – and the ability to use it effectively – will achieve faster growth.
Managing costs consistently

The RICS New Rules of Measurement will bring consistency to cost management of construction and maintenance work, says Stuart Earl, and to the services provided to clients.

As we progress through 2012, with all its economic uncertainties, the imminent publication of the RICS New Rules of Measurement (NRM) should present all those involved in delivering and managing buildings with an opportunity: to bring consistency to the cost management of construction and maintenance work.

The NRM suite covers the life cycle of cost management and means that, at any point in a building’s life, quantity surveyors will have a set of rules for measuring and capturing cost data. In addition, the BCIS Standard Form of Cost Analysis (SFCA) 4th edition has been updated so that it is fully aligned with the NRM suite.

The three volumes of the NRM are as follows.

- **NRM1** – Order of cost estimating and cost planning for capital building works.
- **NRM2** – Detailed measurement for building works.
- **NRM3** – Order of cost estimating and cost planning for building maintenance works.

NRM1, first published in March 2009, has also been updated in line with comments from practitioners. The relationship between the SFCA and the NRM volumes is set out in Figure 1.

In these difficult economic times, where clients are working to ever-tightening budgets, it is important that those involved with construction and maintenance projects look to improve the consistency of the service they provide. Clients should also be able to feel confident in the cost advice they are being given.

At the same time, our industry could make far greater strides towards understanding the cost data that it has and how comparable it is. The NRM suite is not just a set of rules for the measurement of construction and maintenance work to enable budget setting; it is also a set of rules for cost analysis. Until cost data is compared on a like-for-like basis, we cannot begin to compare and investigate project-specific costs accurately.

This is, perhaps, the missed opportunity to date with NRM1. While there are those practitioners and clients who have fully embraced the opportunity that NRM1 provides, there is still much resistance to its use.

**Capturing common practice**

Those RICS members who have attended one of the NRM roadshows will have gained a full appreciation of how it can be used as a toolkit for cost management, and the concept of trying to work with the design team and clients to deal with total project costs is now fully understood. Similarly, those tasked with trying to forecast outturn costs understand they cannot do this accurately at the early design stages until all surveys have been carried out, the design has been co-ordinated and updated, and key client decisions have been confirmed. Again, the NRM suite gives guidance to the client and the project team as to what should ideally be in place at each design stage.

It has also not been lost on a number of practitioners that NRM1 sets out what they have been doing already. NRM1 did not intend to re-define estimating and cost planning – it captures best/common practice and documents it as a single reference resource for everyone.

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**Figure 1 – Interaction between the three volumes of the RICS New Rules of Measurement and the BCIS Standard Form of Cost Analysis**

- **NRM1**
  - Construction Cost Estimating
    - Capital costs
    - Capital works
    - Refurbishment works

- **NRM2 & 2A**
  - Detailed Measurement
    - Construction costs
    - Capital replacement costs
  - Maintenance Cost Estimating
    - Maintenance works
    - Measured term contracting

- **BCIS Standard Form of Cost Analysis, 4th edition**
  - Through-life costs
    - Maintenance
    - Renewals
    - Inspection

- **NRM3**
  - Maintenance Cost Estimating
  - Exclusions
    - Operation costs
    - Occupancy costs
    - Disposal costs
    - Income
    - Externalities
    - Non-construction costs
NRM2 provides a detailed set of measurement rules to support the procurement of construction works. These rules will ultimately be a direct replacement for the Standard Method of Measurement for Building Works (SMM7), which will be discontinued in 2013.

Likewise, NRM3 should be able to support a consistent approach to the estimating and cost planning of maintenance work that has, perhaps, been missing for some time.

Misconceptions

However, there remains a disappointing number of practitioners who have failed to properly understand what the NRM suite is trying to achieve and there is an ongoing misconception that the NRM is only applicable to quantity surveyors. This is simply not the case and it is equally of relevance to development surveyors, project managers and building surveyors. In fact, it is applicable to anyone involved in setting and managing construction and/or maintenance budgets. Until there is a much broader understanding among practitioners of the benefits of the NRM suite, there is very little chance of helping our clients to understand why they should be adopting the rules.

On a positive note, we have seen more and more clients referring to the NRM in their tender documents and wanting to see evidence that practitioners are using it. In addition, one of the clear messages from the NRM – about the proper quantification and management of risk – is clearly evident in the tenders that we all now have to respond to.

Moving forward, the launch of NRM1 and NRM2 on 24 April (NRM3 is expected in the autumn) will be the start of a planned education programme to help all practitioners get up to speed. This will initially include a series of ‘orientation’ talks to help clients and members understand the NRM suite, and a series of more detailed training courses will then be developed around the three NRM volumes. In addition, RICS and the NRM Steering Group will help universities to develop and update their courses to ensure they are covering the NRM suite in their syllabuses.

The NRM suite is all about trying to ensure a budget is correct at the outset and those involved in constructing and maintaining buildings should not lose sight of the importance of measurement. As the UK economy tries to find ways of avoiding a second economic dip and identify how to deliver more sustainable economic growth, the NRM suite should form part of the solution.
Dispute Board Register

RICS has announced its inaugural Dispute Board Register aimed internationally at pre-empting and resolving contractual disputes on major construction projects. Individuals across the professions are now invited to train as accredited Dispute Board members.

The RICS Dispute Board Training, Assessment and Accreditation Programme is designed to meet the well-established need in the international, and increasingly UK, construction sectors for a comprehensive dispute avoidance and resolution mechanism. This three-day programme provides comprehensive training in the background law and practice of dispute boards. Candidates are assessed by written dissertation and a panel interview. Once accredited, RICS dispute board members will be eligible to be deployed on major construction projects internationally.

For further information, email drs@rics.org

CJ readership survey

The readership survey received a fantastic response from members – thanks to all that took the time to share their views. The Construction Journal received the highest response rate (30%, 1,538 members) from a total of 5,123 and 72% of readers were either satisfied or very satisfied with the journal. However, members identified some areas in which they would like to see more coverage. From a technical viewpoint, that ranged from content on contracting views and infrastructure to project management and cost planning. Members also wanted to see more coverage of public sector, offices and schools. We will be further analysing the results and feeding the comments back into the editorial planning so that content continues to meet members’ needs.

For more information, email Joshuamiller@rics.org

QS and construction conference

22 May 2012, No 2, Royal Mint Court, Tower Hill, London, EC3N 4QN
In response to the government’s vision for building more effectively and reducing costs by 20%, the RICS inaugural conference for quantity surveyors will showcase RICS’ solutions to how quantity surveyors can play a leadership role in achieving the Government’s cost reduction target. The main programme includes the ever-popular technical “break-out” sessions and is packed full of inspiring sessions, including:

- Keynote address – Global challenges in the world of quantity surveying
  See Lian Ong, RICS President
- BIM – How the role of quantity surveyors is going to change
  Simon Rawlinson, Head of Strategic Research and Insights, EC Harris
- The government’s construction strategy
  Joe Martin, Executive Director, BCIS

RICS Construction survey

The RICS UK Construction Market Survey is a quarterly sentiment survey of firms working in the construction sector. It provides timely market intelligence on national, regional and sector trends. There is a backward-looking aspect of the survey, measuring the changes over the past quarter, and a forward-looking feature, measuring respondents’ expectations over the next year.

To contribute to the survey, or receive the latest quarterly updates, email Joshua Miller, Senior Economist, via joshuamiller@rics.org

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In brief…

DCLG has published an ‘easier to read’ summary on the 2012 consultation on changes to the Building Regulations in England ow.ly/8TvFe

UKTI has published its Smart cities of the future in Asia – the opportunities for UK business report. It covers the main developments, opportunities and principal business challenges in four cities in Indonesia, Malaysia, Singapore and South Korea. ow.ly/8QUHo

NEC has published a guide to help users to produce Works Information for the NEC3. The Engineering and Construction Contract Works Information Guidance is free to download. ow.ly/8PJD7

The addendum can be downloaded from www.rics.org/guidance

The CPI Committee has published proposals for the Uniclass system, which include plans for a new Uniclass work section classification. RICS is a member of the CPI Committee. bit.ly/26WtTV

Keeping it out of court

Martin Burns looks at the development and use of adjudication in the construction industry and how it can play a role in other types of property dispute

In 1994, Sir Michael Latham described the UK construction industry as being so rife with disputes that any (new) method for resolving them would be welcomed. Around this time, I was regularly talking to people in the industry who were unable to resolve their disputes because the sums involved were relatively small and the only methods available to them were litigation and arbitration. Using either would often cost more than the amounts in dispute.

Then along came adjudication and things improved. Lots of people who were previously disenfranchised from dispute resolution now had access to a process that was quick, effective and not too costly.

Since 1998, when the Construction Act came into force, RICS has appointed around 11,500 adjudicators. In 1998, it appointed 23 adjudicators. In 1999, after the decision in Macob v Morrison, RICS appointed 577 and then averaged around 900-1000 per year until 2011, when numbers were hit by the recession (fewer construction projects means fewer disputes). In 2011, the number dropped to around 650.

The burgeoning popularity of adjudication through the late 1990s and into the 21st century has, at least in the UK, coincided with a big drop in the numbers of arbitrations. In 1991, RICS appointed around 400 construction arbitrators. In 2011, the number was 25.

One surveyor and arbitrator I know still describes adjudication as the “new kid on the block”. He told me last November that he doesn’t think it will last. When I mentioned that adjudication was older than the son from his first marriage he seemed to change his mind. UK adjudication is 14 years old this spring.

Evidence of what was agreed between parties will probably be documented on paper in most cases. What one party has actually done, e.g. build something, will often evidence the intentions of both parties to enter into a legal relationship. But I cannot help feeling that where the contract is oral, more often than not, reluctant parties will run with jurisdictional challenges and make life harder for adjudicators and referring parties.

Simple and effective

Whether the adjudication landscape changes dramatically as a result of recent changes to UK law remains to be seen. I believe it will still be used widely in the UK construction sector for years to come.

My rationale is that the attractions of adjudication are straightforward. It is simple, quick and parties can use it at any time. An adjudicator’s decision is binding and easily enforceable, and they are generally experts in the subject matter in dispute and they give reasons for their decisions. This means decisions are made by people who understand the sometimes highly technical issues involved. Reasoned decisions provide a good indication of what the outcome would be if either party was inclined to continue with a dispute and take it through the courts or to arbitration. Most disputes end with the adjudication decision.

So what about the longer-term future for adjudication? It seems to me that a process which is simple to understand, and is so very effective at resolving disputes quickly and cheaply, should not be restricted to the construction sector.

Last year, the Ministry of Justice published a consultation paper on proposed reforms to the County Courts. The paper included all kinds of statistics which highlighted the monumental costs to the nation of limitless types of civil disputes: IT, planning, boundary issues, party walls, dilapidations, service charges, the list goes on and on.

The proposed reforms focus on using mediation to resolve disputes before they get to court. I am a fan of mediation. I also believe that, if the government wants people to resolve their disputes without bothering the courts, they should give them easy access to a range of options. One of these should be adjudication.

One can only speculate as to how adjudicators will deal with arguments from the ‘wrigglers’ around what was or was not said in the past by parties.

Parties to oral contracts

The reason we were chatting about adjudication was because Parliament had, just a few weeks before, made a number of changes to the law on adjudication by enacting the Local Democracy, Economic Development and Construction Act 2009.

In my view, the changes have been relatively minor. None will have a significant impact on the future of adjudication, except perhaps that parties to oral contracts can now refer disputes to adjudication.

It is a little early to gauge the impact of this, but it seems to me that a logical outcome (once the recession in the construction industry has abated) will be more adjudications and more jurisdictional challenges for adjudicators to deal with.

In my experience, a lot of adjudications involve one party who starts the process, and another who does everything possible to wriggle out of it. One can only speculate as to how adjudicators will deal with arguments from the ‘wrigglers’ around what was or was not said in the past by parties.

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Related competencies include: M006, T017, T064

April-May 2012    Construction Journal
Clear and simple

David Benge highlights the key changes in the second edition of NRM1: Order of cost estimating and cost planning for capital building works

NRM1 provides guidance on the quantification of building works when preparing cost estimates and cost plans. It also gives direction on how to quantify other items forming part of the cost of a construction project that are not reflected in the measurable building work items, i.e. preliminaries, overheads and profit, project team and design team fees, risk allowances, inflation, and other development and project costs. It is the ‘cornerstone’ of good cost management of construction projects – enabling more effective and accurate cost advice to be given to clients and other project team members, as well as facilitating better cost control.

Although written primarily for the preparation of cost estimates and cost plans, the rules will also be invaluable when preparing approximate estimates. In addition, the rules can be used as a basis for capturing historical cost data in the form required for cost estimates and elemental cost plans, thereby completing the ‘cost management cycle’.

Title change
The title of NRM1 has been changed to give clarity of purpose and to reflect the development of each document within the NRM suite. The volumes are called:

- NRM1 – Order of cost estimating and cost planning for capital building works.
- NRM2 – Detailed measurement for building works.
- NRM3 – Order of cost estimating and cost planning for building maintenance works.

Since the publication of the first edition of NRM1 in February 2009, a number of factors have combined to cause the need for an update of its content.

- The need to align the building elements within the BCIS Standard Form of Cost Analysis (SFCA) with those in NRM1 to provide a consistent elemental breakdown structure (see Figure 1).
- To enhance the measurement rules to strengthen the link with the nature of contractor organisational structures and construction procurement methods.
- To ensure a correlation between NRM1 and NRM3.
- To make sure that the cost structure in NRM1 is ready for Building Information Modelling (BIM).

Main changes
In reviewing and revising the first edition, the opportunity was also taken to simplify and augment certain aspects of the rules. The main changes incorporated into the second edition are as follows.

1. Renumbering Group element 9: Facilitating works to Group element 0 (i.e. making this the first Group element); with the Group elements now being 0 to 8 (replacing Group elements 1 to 9 in the first edition).
2. Renumbering Group elements 10 to 15 as 9 to 14, with these being Main contractor’s preliminaries, Main contractor’s overheads and profit, Project/design team fees, Other development/project costs, Risks and Inflation respectively.
3. Restructuring Group element 1: Substructure. This now comprises a single Element (1.1: Substructure), which is divided into five Sub-elements, namely: 1.1.1: Standard foundations, 1.1.2: Specialist foundation systems, 1.1.3: Lowest floor construction, 1.1.4: Basement excavation, and 1.1.5: Basement retaining walls.
4. Renaming and restructuring the Sub-elements within Element 2.2: Upper floors. This Element is now divided into three Sub-elements, namely 2.2.1: Floors, 2.2.2: Balconies, and 2.2.3: Drainage to balconies.
6. Changing the headings of some other Elements and Sub-elements; again so that both the NRM and BCIS SFCA elemental breakdown structures are fully aligned (e.g. Element 5.1 has been changed from ‘Sanitary appliances’ to ‘Sanitary installations’, Element 5.9 from ‘Gas and other fuel installations’ to ‘Fuel installations/systems’ and Sub-element 5.8.5 has been changed from ‘Transference devices’ to ‘Local electricity generation systems’).
7. Omitting the Sub-elements relating to testing and commissioning of services and incorporating these works within each Sub-element to which such work applies.
8. Placing the rules of measurement for compiling an elemental cost model within Part 2: Measurement rules for order of cost estimating Paragraph 2.8: Measurement rules for elemental method of estimating, thereby making clearer the purpose and use of this cost management tool, i.e. for pre-cost planning cost modelling and cost analyses. These measurement rules were previously hidden away in an appendix in the first edition of NRM1.

The revised logic and arrangement of the NRM Group elements, Elements and Sub-elements (i.e. levels 1 to 3) for elemental cost planning can be found at Appendix E to the rules. The opportunity has also been taken to make minor amendments and corrections to the text of the second edition, as well as to simplify and enhance certain aspects of the rules. Other than the main updates referred to above, there are no changes in principle or in the general arrangement of NRM1.

First and foremost, changes 1 to 7 referred to above have been made so that the NRM1, NRM3 and the BCIS SFCA elemental breakdown structures and coding structure are identical. Furthermore, following comprehensive debates with BCIS, a new fourth edition of its SFCA is to be published at the same time as the updated NRM1 (see page 12).

Change 8 above has been made simply to make clear that the purpose and use of the elemental method of estimating is to establish an initial cost model before embarking on the preparation of formal cost plan 1, and how these rules can be used as a basis for preparing cost analyses and benchmark data.

Strengthening links
The opportunity has also been taken to further strengthen the link between the method of measurement and how contractors actually procure works today – most main contracting organisations today are basically management organisations that employ specialist work-
related competencies include: T010, T022

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<td>2.8 Internal doors</td>
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<td>3 Internal finishes</td>
<td>3.1 Wall finishes</td>
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<td></td>
<td>3.2 Floor finishes</td>
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<td></td>
<td>3.3 Ceiling finishes</td>
</tr>
<tr>
<td>4 Fittings, furnishings and equipment</td>
<td>4.1 Fittings, furnishings and equipment</td>
</tr>
<tr>
<td>5 Services</td>
<td>5.1 Sanitary installations</td>
</tr>
<tr>
<td></td>
<td>5.2 Services equipment</td>
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<td></td>
<td>5.3 Disposal installations</td>
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<td>5.4 Water installations</td>
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<td></td>
<td>5.5 Heat source</td>
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<td></td>
<td>5.6 Space heating and air conditioning</td>
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<td></td>
<td>5.7 Ventilation systems</td>
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<td></td>
<td>5.8 Electrical installations</td>
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<td></td>
<td>5.9 Fuel installations/systems</td>
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<tr>
<td></td>
<td>5.10 Lift and conveyor installations</td>
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<td></td>
<td>5.11 Fire and lightning protection</td>
</tr>
<tr>
<td></td>
<td>5.12 Communication, security and control systems</td>
</tr>
<tr>
<td></td>
<td>5.13 Specialist installations/systems</td>
</tr>
<tr>
<td></td>
<td>5.14 Builder's work in connection with services</td>
</tr>
</tbody>
</table>

[The changes] have been made so that the NRM1, NRM3 and the BCIS SFCA elemental breakdown structures and coding structure are identical.
Changing requirements

Joe Martin describes the fourth edition of the BCIS Standard Form of Cost Analysis and discusses its importance in the light of the UK government’s Construction Strategy

The growth of the BCIS and its development into a thriving online service shows the continued relevance of the elemental cost data.

The government’s construction strategy calls for the implementation of cost-led procurement, benchmarking, life cycle costing and Building Information Modelling (BIM), all of which require cost information to be presented consistently in a standard format. At the early stage of a project, clearly defined elements provide the basis for early cost advice, benchmarking, performance specification and value engineering.

Therefore, publication of the new edition of the BCIS Standard Form of Cost Analysis (SFCA) based on common elemental definitions with NRM1 and NRM3 could not be more timely.

The presentation of costs in elements for benchmarking is, of course, not a new idea. It was introduced over 50 years ago, by the Ministry of Education. An element is defined as “a major physical part of a building that fulfils a specific function, or functions, irrespective of its design, specification or construction”. Elements classify parts of a building by what they do rather than how they are built, this allows the budget to be established before the design is developed – designing to a cost rather than costing a design.

For procurement of building work, we still need detailed rules for trade (work section) measurement but the analysis of costs into elements provides the data required for early cost advice and cost planning. Today, many of the bills of quantities we see are presented in elements even though the measurement is in work sections.

Thus, we have a flow of measurement through the NRM documents (see Figure 1).

Value-added services

The technique of elemental cost planning has served the profession and the industry well in offering value-added services to clients, and the concept of elements has been incorporated into the development of life cycle costing, performance specification and value management. Furthermore, current changes to procurement practice are making the cost plan central to the entire process by providing a common means of structuring contract sum analyses on design and build contracts, and target costs on partnered and framework contracts.

The first SFCA was published in 1961 by the RICS Cost Research Panel and in the same year RICS launched the BCIS to exchange data in elemental form for the benefit of the profession. The growth of the BCIS and its development into a thriving online service shows the continued relevance of the elemental cost data.

The second edition of the SFCA was published in December 1969 by BCIS and the third edition in 2008. It was produced as part of the initial NRM consultation on elements. The elements were used as the basis for the new tables of rules for measuring designed elements, sub-elements and components in NRM1, which was first published in 2009. The development of those rules and subsequent feedback has given rise to the need for a new edition of both documents to ensure they work on a common basis.

New edition

The key changes in the updated SFCA are as follows.

1. Editorial changes to improve the definitions and descriptions.
2. Expansion of the sub-elements.
3. To reflect practice, we have included Lintels and forming openings in Walls rather than Windows, and Drainage under the building is included in Substructure rather than External works.
4. Building management systems have been moved from Special installations to Communication, security and control systems.
5. Introduction of a new cost category for Prefabricated building and building units. While this is not a functional element it does allow the analysis of prefabricated buildings and buildings containing prefabricated pods or room units to be presented more clearly.
6. Introduction of a new cost category for Work to existing buildings. Again, not an element but will clarify the analysis of refurbishment and conversion schemes where the allocation of costs for general stripping out had been problematic in the past.
7. External works have been significantly revised and reflect the groupings of entities in the standard form of civil engineering cost analysis documents, i.e. pavements, landscaping, divisions, fixtures and services.
8. Splitting out of Facilitating works. In most cases, cost analyses are based on building works contracts where the facilitating works having been carried out in a previous contract. Including this in the SFCA will allow costs to be analysed where they are included in the building contract, but it will also allow facilitating works contracts to be analysed in a consistent manner.
9. Cost analyses are normally prepared from contract documents at ‘tender’ stage (commit to construct) and therefore only reflect the cost of the construction work. NRM1 covers all the client’s project costs and the SFCA has been expanded to facilitate the collection of this wider information where available.

For most buildings, at the building element level, the definitions are the same as in the previous edition so
that historic cost information can be used with a few major exceptions.

- Where there is a lot of prefabrication, the pods would have been included in Sanitary Installation and other prefabricated units in Frame.
- On refurbishment and conversion schemes, the stripping out costs would have been spread among the elements on an ad hoc basis.
- For external works, the new structure is significantly different so that comparisons can only be made at the group element level.

**SFCA and NRM1**
The SFCA shares elemental definitions and a data structure with the second edition of NRM1 (see page 10) but they have different objectives.

- The SFCA provides rules for allocating cost to their functional elements.
- The detailed tabulated rules of measurement for costs planning in NRM1 provides rules for measuring designed elements.

The NRM1 tables are therefore expanded to cover various design solutions to the same functional element; this does not affect the definition of the elements and sub-elements, which are common to both documents.

There is one instance, Work to existing buildings, where the measurement rules in NRM1, for ease of pricing, have been grouped to reflect their specification and procurement rather than their function. For cost analysis purposes, these cost should be allocated to the appropriate elements. When analysing refurbishment or conversion work, the cost of work to existing structure, fittings, finishes and services should be allocated to the appropriate functional element. General stripping out costs that cannot be allocated should be shown in Work to existing buildings – minor demolition and alteration works.

**SFCA and NRM3**
NRM3 uses the common elemental data structure expanded to identify the maintainable assets that are included in each element. CIBSE, HVCA and BCIS have agreed to adopt the NRM3 expanded elemental data structure for their task schedules and through-life data. This allows the cost plan reporting and benchmarking of the maintenance life cycle costs to use a common format with the capital costs.

The government’s Construction Strategy focuses on delivering buildings to a known cost and on being able to track the reduction in costs that result from the improvements in procurement. To do this requires the type of information BCIS provides at cost per m² of gross internal floor area for buildings and elements and cost per element unit quantity.

The Cabinet Office’s Efficiency and Reform Group have published cost benchmarks for various departments and it has been important to define exactly what is included in the benchmark. This has been done by reference to the NRM1 elements so that the benchmarks could themselves be validated against BCIS information.

**Elements and Building Information Modelling**
The government’s BIM strategy calls for information to be supplied from the BIM model at various stages along the project timeline so that the costs can be checked. At the earliest stage of a project, this information will be derived from a block model that will provide basic quantities from which element unit quantities can be derived. Clear rules for measuring the building and its elements need to be included in the employer’s BIM requirements and/or in the Project BIM Execution Plan to ensure that appropriate cost information is used.

Changing procurement methods, the changing means of information management, the growing need for through-life data all reinforce the continued usefulness of elements and of the BCIS elemental cost data. The use of the common elemental definitions and cost breakdown structure with the New Rules of Measurement for capital and maintenance cost increase their usefulness to the profession and its clients.

I would like to thank my colleagues on the NRM Steering Group, particularly the Lead Authors David Benge, John Davidson and Andy Green, and the Chairman Stuart Earl.
A core skill

John Davidson gives an overview of NRM2: Detailed measurement for building works and discusses how it will satisfy the needs of different parties in the construction industry.

Measurement of construction and the need to understand construction technology are two core skills that quantity surveyors need if they are to properly provide construction cost advice to clients.

Consequently, in 2006, the QS and Construction Professional Group Board decided that construction measurement must be improved as too many quantity surveying firms seemed to be leaving measurement to the contractor. The Board was concerned that this lack of measurement skills was putting other parts of firms’ professional advice at risk.

Without data from a wide range of sources, e.g. priced bills of quantities (BoQs), where would BCIS get sufficient up-to-date cost information to publish pricing books? And without up-to-date construction costs, how would the quantity surveyor know that a cost plan submitted by a contractor represented value for money?

These questions drove the development of the New Rules of Measurement (NRM). Because the Standard Method of Measurement for Building Works (SMM7) was seen as coming to the end of its natural life (it was nearly 20 years old, measured a lot of low-value labours, didn’t cover risk, total project fees, etc), the Board decided to develop a replacement set of measurement rules for the UK construction industry. This has now become NRM2: Detailed measurement for building works, which is part of an integrated set of rules that covers the measurement of the whole life cycle of cost management. It sits between the rules for NRM1: Order of cost estimating and cost planning for capital building works and the rules for NRM3: Order of cost estimating and cost planning for building maintenance works.

The Board aimed to satisfy the differing needs of the client, the quantity surveyor, the contractor and the specialist sub-contractor who, without a common set of measurement rules, would have difficulty in agreeing the cost of construction work. These rules will ensure they can all understand what is or isn’t included in a measured item of work no matter where this has been measured, priced or executed.

The main criteria for NRM2 were to simplify and modernise the rules, and to write rules that allowed the quantity surveyor to measure the areas where most cost lay. The SMM7 rules had developed from the previous versions of SMM but had retained many of the width, depth and height bands that were originally based on manual construction methods. These bands clearly could be modernised to reflect today’s highly mechanised construction processes.

Even with computer-aided measurement processes, such as digitiser boards and BoQ packages, it was becoming uneconomic for a surveyor to spend hours measuring many of the labours and minor extra over items. These have now been relegated to be “deemed included” in NRM2.

It was also decided early in the NRM2 drafting not to provide coding to standard specifications such as the National Building Specification. Because SMM7 contained Common Arrangement of Work Sections (CAWS) referencing in its Work Section titles, it always became necessary to issue amended versions every time the CAWS were updated. This makes the NRM2 document neutral and it can be used in any construction market. However, we have not forgotten CAWS – a full cross-referenced index is provided as an appendix for those wishing to set their BoQs out in Common Arrangement order, and the Work Sections of NRM2 do follow the CAWS order and imitate the Work Section titles.

The main benefit of NRM2 is that it uses a general protocol that should allow any surveyor to measure any type of construction from any era. The rules are set out in five columns and should be followed when composing a BoQ description unless otherwise stated or shown (see Figure 1).

1. **Column one** describes the item or work to be measured.
2. **Column two** gives the unit in which the item or work is to be measured.

**Figure 1 – Extract of the measurement protocol for Proprietary linings & partitions**

<table>
<thead>
<tr>
<th>Item or work to be measured</th>
<th>Unit</th>
<th>Level one</th>
<th>Level two</th>
<th>Level three</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Proprietary metal-framed system to form walls</td>
<td>m²</td>
<td>1 Finished thickness stated</td>
<td>1 Insulation</td>
<td>1 Fixed direct to structural soffit</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 Height or average height stated in 1.00m increments</td>
<td>2 Vapour barriers</td>
<td>2 Supported on adjacent structure, span stated in 1.00m increments</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 Total length stated measured along centre line</td>
<td>3 Sub linings</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4 Finish</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>5 Glazing</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>6 Curved: radius stated</td>
<td></td>
</tr>
<tr>
<td>2 Proprietary metal-framed system to form ceilings</td>
<td>m²</td>
<td>1 Over 300mm wide on face</td>
<td>1 Insulation</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2 Vapour barriers</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3 Sub linings</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4 Finish</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>5 Curved: radius stated</td>
<td></td>
</tr>
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<td></td>
<td></td>
<td></td>
<td>6 Sloping</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>7 Convex or concave: radius stated</td>
<td></td>
</tr>
<tr>
<td></td>
<td>m</td>
<td>2 Not exceeding 300mm wide on face</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Extra over for different</td>
<td>m²</td>
<td>1 Lining, details stated</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 Finish, details stated</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Extra over for forming openings</td>
<td>nr</td>
<td>1 Not exceeding 2.50m²</td>
<td>1 Lined: details stated</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 2.50–5.00m²</td>
<td>2 Unlined</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 Exceeding 5.00m² in further increments of 2.50m²</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3. **Column three** lists the critical sizes or dimensions that must be given in the BoQ description.

4. **Column four** lists the descriptive features that must be given in the BoQ descriptions.

5. **Column five** is for the method of fixing the work (if not left to the discretion of the contractor) together with the nature of the background to which the work is to be fixed.

The lists contained in these rules are not exhaustive – just because something obscure is not listed is not a reason to omit the information from the description if it is of significant cost importance.

This protocol order applies to most Work Sections but sometimes it is more logical to change the order of the information. This should not pose a problem as the surveyor should be able to logically set out the critical information needed to complete a BoQ description.

As with SMM7, the rules must be enhanced where the cost of a material or labour places an exceptional cost on the work being measured, e.g., the rules state that all cutting is deemed included. However, it is always left to the discretion of the quantity surveyor to decide how much additional information needs to be given.

**Comparisons with SMM7**

Part 3 of NRM2 sets out all the principal items that govern the measurement rules, including defining what is and isn’t included in the measured work. These do not differ significantly from SMM7 with the main exception that the quantity surveyor can now include composite descriptions for work that comprises differing types of material. The quantity surveyor is encouraged to provide additional information in a description to remove any ambiguities – the general approach should be “If in doubt, include it in the description”.

Other differences from SMM7 are as follows.

1. The rules now use the word ‘Mandatory’ when describing the information that must be put into a BoQ description. If this mandatory information is not available to the quantity surveyor when preparing the BoQ, they cannot properly describe the work and the tenderer cannot accurately price the work.

2. Unlike SMM7, the rules allow the measurer to create composite descriptions provided the description makes clear what is or isn’t to be included in the rate.

3. Prime cost work and provisional work is more clearly defined.

4. There is a Work Section for off-site manufactured materials, components or buildings.

5. Working space is now deemed included when measuring excavations.

6. Earthwork support is no longer measurable unless its use is not left to the discretion of the contractor.

7. **In-situ** concrete is now categorised into horizontal, vertical and sloping. This is to reflect the different costs associated with pouring concrete into these differing locations and realising that the main cost items here are the formwork.

8. Common rules now apply to types of masonry walling, cladding and screening.

New categories have also been added to the lengths and weights of steel sections to reflect the cost differences arising from the effect that increasing lengths and weights have on fabricating and erecting.

Labours in sheet metal roofing are now measured in linear metres as an extra over for the general area of roof covering. This is to ensure that these labours are fully measured, allowing specialist sub-contractors to make their own allowances for additional sheet metal when pricing. This change will require all of the labours to be shown on the tender drawings.

The rules for finishes now concentrate on the final location of the finish, i.e., the floor, wall or ceiling. The suspended ceiling rules now allow the measurer to differentiate between solid and demountable ceilings. Below-ground drains are measured in linear metres with the excavation, pipe, backfill and/or surround now measured as one composite linear item.

Manholes, pits, etc. are now enumerated with the excavation, bases, walls, slabs, benching, channels and branches, and are all included in one composite item. We have left items such as step irons and covers to be enumerated separately but, if needed, it would be appropriate for the quantity surveyor to include these items in the BoQ description.

M&E services are still described by their differing systems but the measurement is simplified, concentrating on their principal elements which comprise, for example, primary equipment, terminal equipment and fittings, distribution pipework, etc. This reflects more closely how the industry measures and prices its work.

NRM2 was drafted by a team of quantity surveyors with input from various trade bodies and main contractors. The team tried to ensure the rules reflect the varying needs of the construction industry from the quantity surveyor preparing a BoQ, to the contractors’ surveyor preparing work packages for sub-contractors, to contractors preparing claims for changes to their work and clients abstracting out the cost of work that attracts capital allowances and VAT.

I believe these new rules provide today’s quantity surveyor with the necessary tools to provide the core quantity surveying skill of measuring and costing construction work.

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**Notes, comments and glossary**

1. **No deductions for voids ≤ 1.00m²**

2. **The average height will be calculated for each length of partition with a sloping head measured between junctions**

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**NRM – Volume 2**

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Related competencies include: T010, T074
Moving forward from SMM7

David Benge explains a number of the additional features included in *NRM2: Detailed measurement for building works* and how it will help with the development of schedules of rates.

What's the difference between NRM2: *Detailed measurement for building works and SMM7*? At its simplest level, the NRM2 rules for quantifying building works items now reflect current construction practices (see page 14). However, NRM2 also addresses all aspects of bill of quantities (BoQ) production, including defining the information requirements and dealing with the quantification of non-measurable work items, contractor-designed works and risks.

Guidance is also provided on the content, format and benefits of BoQs and will facilitate their design for both main building contracts and work package contracts. The additional features in NRM2 are discussed below.

**Preliminaries**

These are divided into two categories.

1. Main contractor's preliminaries.
2. Work package contractor's preliminaries.

Each category is divided into two sections.

1. Information and requirements (the descriptive part of the contractor's preliminaries).
2. Pricing schedule.

The quantity surveyor can’t quantity the main/work package contractor's preliminaries as it is for them to interpret the details within the tender documentation. From this, the contractor will ascertain his method of working, the resources required and identify any other costs to be recovered. The preliminaries bill includes a pricing schedule listing the headings under which the contractor is to price his preliminaries items.

**Dealing with non-measurable works**

Provisional sums

Where building components/items cannot be measured and described as per the rules, they shall be given as a ‘provisional sum’ and identified as either ‘defined work’ or ‘undefined work’ (no real change from SMM7).

Contractor-designed works

NRM2 recognises ‘contractor-designed works’ (often called ‘contractor designed portion’) and where the contractor needs to take responsibility for the design of discrete parts of the building, such as pre-cast concrete components or windows, the work items shall be identified as such.

**Risks**

The rules recognise that when preparing a BoQ, a quantified schedule of works or other quantity-based documents, some risks will be managed by the employer. Consequently, NRM2 caters for the different risk mitigation strategies, e.g. it requires that contractor's risks are fully described so the extent of services and/or works the employer is paying for is transparent. Such risks are to be listed under the heading ‘Schedule of construction risks’. Alternatively, the employer may wish to share the risk. Under NRM2, shared risks are dealt with using ‘approximate’ or ‘provisional quantities’ with the pricing risk being taken by the contractor and the quantification risk by the employer.

Works to be carried out by statutory undertakers

These are to be given as a ‘provisional sum’, with the scope of works to be executed by the statutory undertaker described.

**Overheads and profit**

Separate provision is to be made in the BoQ for the contractor to apply his required percentage addition for overheads and profit.

**Credits**

In dealing with refurbishment and demolition works, NRM2 recognises that the employer may wish to seek credits (e.g. for old building materials) arising from stripping out or demolition works, and for which they are content to pass ownership to the contractor for reuse or recycle. Credits are based on a pre-prepared list of items within the BoQ, against which the contractor should insert the amount of credit he will give for each item. Alternatively, they can be invited to list items for which he is willing to offer a credit and the amount for each.

**Other pricing considerations**

Price fluctuations

NRM2 advises on dealing with price fluctuations in BoQ preparation.

Director's adjustment

Separate provision is to be incorporated in the BoQ for the contractor to insert a discretionary ‘director's adjustment’.

Dayworks

These are no longer hidden away in the preliminaries, but are a discrete bill. A schedule of dayworks will comprise a list of the various classifications of labour (and estimated hours for each) and estimated lump sums for materials and plant, for which daywork rates (and percentage additions for overheads and profit) are to be inserted by the contractor. The sum included by the contractor for daywork is a provisional sum for unforeseen works and is to be excluded from the contract sum.

VAT

This is to be excluded from BoQs. However, if required by the employer, NRM2 recommends that provision for the contractor to provide a VAT assessment as part of his tender return can be incorporated in this.

BIM

The work section breakdown structure designed for NRM2 anticipates the widespread adoption of BIM and recognises the rapid emergence of this new way of working. NRM2 is central to the detailed measurement and description of building components under BIM.

While written mainly for the preparation of BoQs, quantified schedules of works and quantified work schedules, NRM2 will be invaluable when designing and developing standard or bespoke schedules of rates.

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Related competencies include: T010, T074
Deal-maker or deal-breaker?

David Jay examines the psychology of negotiation and how it can be used to supplement technical knowledge – and the five cardinal sins you must avoid.

In surveying, as in many other businesses, strong negotiation skills are vital. Financial and contractual discussions, as well as project management, require effective negotiation skills in varying degrees, so it is important to understand the psychology behind the art of deal-making and ensure negotiations achieve the right outcome for you and your clients.

In its simplest terms, negotiation is a discussion between two or more parties who are working towards a solution to a problem. Negotiations typically take place either because the parties wish to create something new that cannot be achieved by one of them alone or in order to resolve a problem or dispute. The parties acknowledge that there is some conflict of interest between them and believe they can influence the outcome to get a better deal, rather than taking what the other side will voluntarily give them. They prefer to search for agreement rather than fight openly, just give in or break a contact.

Everyone’s a winner

Often the outcome of a negotiation is determined by the fundamental philosophy of the parties involved. Negotiation is not a contest that must be won; instead, it is an opportunity to seek synergy and allow both parties maximum gain. Each party has a philosophy they bring to the table, and it is fatal to assume that the other party shares your philosophy. The only sensible approach is an objective measure based on independent principles, which allows you to negotiate on the merits of the agreement without the influence of emotions.

The common element to all negotiations is that, to a certain degree, conflict is always present. Some people’s personality will cause them to become aggressive and overpowering, while others are more level-headed and seek a peaceful and co-operative solution, often placing greater value on the relationship than the outcome of the negotiation.

The most successful negotiators are able to rise above the emotional aspects of a situation and separate the people from the negotiations. They seek out a mutually beneficial agreement and are able to assess and make decisions on the merits of the issues at hand. These people are adept at prioritising the issues and leaving aside their own emotions.

Perhaps the single most important objective of an honestly negotiated agreement is to ensure that each party leaves with the impression they have won.

Perhaps the single most important objective of an honestly negotiated agreement is to ensure that each party leaves with the impression they have won; meeting the objectives they had before negotiations started.

For this to be achieved, basic psychological constraints and guidelines must be followed during the negotiation process. These fundamentals include:

- honesty;
- willingness;
- having shared and conflicting interests; and
- having authority to manoeuvre.

The attitude of the negotiators is key to the process. When negotiations fail there are usually several reasons. The most common is that each side becomes emotionally involved, takes an entrenched view and treats the opposition as if it were the enemy.

In my experience, the best negotiators seek a mutually beneficial outcome and in doing so avoid taking an unyielding position. They have an ability to divorce themselves emotionally from the process and focus on what can be achieved together. The best settlements come from negotiators who understand a win-win outcome and approach the negotiations from a ‘glass-half-full’ rather than a ‘glass-half-empty’ point of view. Bearing this in mind, both sides should hold realistic expectations at the outset.

Know your currency

In any negotiation process one of the most critical tools is knowledge. The more you know compared with your opposite number, the better the outcome you will achieve. Knowledge will not automatically ensure success but lack of it will place you at a significant disadvantage. In any negotiation process it is important to understand the ‘currency’ of each party. Negotiation currency is comprised of the concessions that each party has at its disposal and the relative perceived value of each of those concessions. It is the interplay of this currency and its perceived value that will shape negotiations.

When to walk

It is vital to predetermine the point at which you elect to reject the deal and walk away. This is your ‘bottom line’. It may consist of a complex mixture of concessions that have been given and received but the net effect is that if negotiations cross this threshold, the deal becomes unacceptable. Anything above the line is acceptable to a greater or lesser degree.

Some of the strong interests (things you want to win) you have in the negotiating process are likely to be less valuable to the other party. These are known as ‘compatible interests’ because negotiating these points does not present a great deal of conflict. In other words, you want to win these points and your opponent is less concerned about losing them. The more valuable you can make these compatible interests to your opponent, the more leverage you will gain as possible concessions to counter your opponent’s strong interests. Compatible interests rarely cause negotiations to fail. The greatest conflict
Negotiation skills

Negotiation results from ‘competing interests’: those that cause an impasse because each side places a high value on them. Therefore successful negotiation is based on an ability to successfully predetermine the value of concessions and to manage them.

Avoiding pitfalls

In my work as a surveyor over the last two decades, I have witnessed many errors in the negotiation process. The five cardinal sins of negotiation are listed below.

1. Ineffective preparation will put you at a disadvantage. Before negotiations start you must have set clear objectives and anticipated the tactics of your opposition. You must also be well equipped with counter tactics of your own. Many deals are struck at the eleventh hour. Do you know the other party’s options and timeframe, and how badly they want to conclude a deal? Time is often the biggest leverage point in any negotiation.

2. Inability to leave your emotions behind. Experienced negotiators understand the need to separate the people from the problem. They are sure to be soft on people, but rigorous regarding the problem. They focus on interests, not positions, and are always exploring mutual interests.

3. Giving without getting. Never give concessions too readily. To give something without getting is a fatal error. This sets a precedent for future competing interests and is difficult to reverse. Any concession must be hard fought – it may be very valuable to your opponent. Throughout the negotiation process maintain a mental ledger of concessions, ensuring there is a sense of fairness on both sides.

4. Lacking trust. In any negotiation process one needs to build rapport and establish a trusting relationship. If this is lacking the negotiations are likely to fail because trust is the cornerstone of all business relationships.

5. Focusing on positions not outcomes. Good negotiators focus on outcomes not positions. A poor negotiator will approach the table with a fixed position and will be less flexible, often becoming focused on maintaining a position rather than seeking a creative solution. This causes the parties to choose sides and withdraw to intransigent positions.

Many negotiations fail not because of misunderstanding the issues at hand but because of an inability to deal with the tactics and emotions of the participants. At all times, an objective and principle-centred approach must be maintained instead of letting emotions dictate decisions.

This article was first published in the Commercial Property Journal, Jan/Feb 2012.

Further information

The Art and Science of Negotiation (1985) Howard Raiffa
Getting to Yes: negotiating agreement without giving in (2011) Roger Fisher, William Ury & Bruce Patton

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Never give concessions too readily. To give something without getting is a fatal error. This sets a precedent for future competing interests and is difficult to reverse.
A centuries-old practice
Doug Chalmers looks at the history of the rules of measurement and how these have changed in line with construction industry developments stretching back to the Great Fire of London

The measurement of quantities can arguably be traced back to ancient Egyptian times as part of the construction process for their major building structures and was subsequently used by artisans as an aid to establishing the amount of reimbursement for their work.

The extensive building work required after the Great Fire of London in 1666 promoted the publication of several books containing guidance on the measurement of building work, in particular William Leybourn's *Mate for Measurers* in 1667 and Mandey's *Marrow of Measuring* in 1682, which ran to four editions by 1727. William Hawney published *The Compleat Measurer* in 1717 and this remained in use until 1850. There is evidence that disputes were arising as a result of different modes of measurement being used and that these publications were an attempt to provide some sort of common basis on which to measure the work of various trades.

In Scotland, the importance of measuring building work was recognised at a similar time as England, but it was given more status as measurers were required to be a member of a guild and were known as ‘sworn measurers’. Scotland also led the way in recognising the need for a common mode of measurement, as in 1773 Edinburgh Town Council set up a committee comprising artisans and sworn measurers to prepare a *Mode of Measurement* for masons, wrights, slaters and painters. Later versions were issued in 1803 and 1804, and other areas of Scotland introduced standard rules, with the Forfar Rules published in 1809 and rules for Glasgow in 1815.

**Contractor responsibilities**
The early part of the 19th century saw changes in the way in which building contracts were carried out, with the emergence of the building contractor taking responsibility for individual trades, rather than the trades being appointed separately. The cost management of building projects had also come under scrutiny following the escalation of costs on some high profile public projects, such as Buckingham Palace and Windsor Castle. These events enhanced the status of the bill of quantities as a tool for good cost management and the emphasis on measurement began to move away from ‘after measurement’ to pre-contract measurement, both for initial estimates and tendering purposes. Following the Scottish example, ‘local’ modes of measurement were being adopted in various parts of England, but estimators preparing tenders complained that the lack of uniformity “left doubt as to the true meaning of items in the bills of quantities and militated against scientific and accurate tendering” (source: 1922, *Standard Method of Measurement*). In 1895, the Institute of Builders suggested that consideration be given to preparing agreed principles for the measurement of slating and slaters’ work for use, nationally. This was not taken up and it was not until 1911 that the first steps were taken to standardising modes of measurement.

**RICS involvement**
Although work started in earnest in 1913 with the establishment of a joint committee of members from the Surveyors Institution (known as the RICS since 1946) and the Quantity Surveyors Association, the intervention of the First World War delayed the completion of the method of measurement until 1922. By this time, the committee had been expanded to include members from the Institute of Builders and the National Federation of Building Trades Employers, and the resulting document covered most trades then in use on building works. The principles were mainly based on the practice used by the leading London quantity surveyors, but provision was allowed for adaptation to suit local practices.

It was recognised that this Standard Method of Measurement (SMM) would need to be kept under review and amended from experience gained or as a result of new construction techniques. As a result, the second edition was published in 1927 with a further revision in 1935. This also marked another milestone in the recognition of the SMM’s status as the RIBA Form of Building Contract now included a clause stating the bills of quantities would be prepared in accordance with the requirements of the SMM.

The Second World War delayed the publication of the next edition which did not appear until 1948, and this saw changes to the Preliminaries section together with the introduction of sections covering heating, ventilating and electrical work. In 1952, suggestions for amendments or clarifications were invited and during the course of that decade various amendments were issued, but a completely new 5th edition was published in 1963. This had the distinction of appearing in two versions due to the advent of metrication in 1971. While quantities were expressed in metric, imperial measurements could still be used in the item descriptions where appropriate.

**Post-metrication**
It was recognised that rapid developments were taking place at this time in both building techniques and the use of IT, and a development unit was set up in 1972 to create a method of measurement which would be relevant for the remainder of the century, and in to the 21st century. This would result in a completely revamped SMM and it was understood that this would take time to produce. As a result,
Measurement history

the 6th edition was issued in 1979 as an interim measure to deal with any immediate amendments or clarifications and with this came a Practice Manual to assist interpretation of the rules.

The 7th edition was initially published in 1988 and a major change was immediately noticeable in the use of classification tables rather than prose. This SMM had been designed for use as part of the Co-ordinated Project Information system using a common arrangement for work sections and also for ease of computer use. Minor amendments were issued during the next decade, and a revised 7th edition was published in 1998 with minor changes to the rules, but significant changes were made to titles, phraseology and the replacement of the Common Arrangement of Work Sections with UNICLASS.

The SMM has been adapted for use in other countries (some even had their own SMM before the publication of the 1st edition) and the peculiarities of specific situations have also been recognised by the issue of publications such as the Principles of Measurement (International) For Works of Construction in 1979 and the Code for the Measurement of Building Work in Small Dwelling Houses in 1945. Other sectors of the construction industry have their own methods of measurement such as the Civil Engineering Standard Method of Measurement (CESMM) and the Method of Measurement for Highways Works.

The method of measurement has always been viewed as a “living” document, in need of review and updating to keep it relevant to current and future developments in the building industry, and the introduction of the RICS New Rules of Measurement is part of that continuing process. Measurement will be part of the construction process in the future in some form or other, even as part of BIM, and the use of a standard set of rules will be as important as ever.

Further information
Chartered Surveyors – the growth of a profession by F M L Thompson, Routledge & Kegan Paul, 1968
Standard Method of Measurement of Building Works, editions 1-7, RICS

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Related competencies include: T010, T074
Avoiding negligence claims

Gary Peters looks at consultants’ liability to contractors for negligent misstatements and under-pricing of tenders

During the tender process, it is common for consultants engaged by an employer (such as project managers, architects, engineers or quantity surveyors) to provide information to tendering contractors when they are pricing work. Contractors may find that they have under-priced the work resulting in a loss-making project. To recover such losses, they may attempt to pursue the consultant(s) who provided the advice or information which the contractor considers to have caused it to suffer loss.

This type of claim against consultants is for what is known as economic loss. This is a purely financial loss and claims in respect of it usually arise where the contractor has under-priced the works in reliance upon a representation or statement from a consultant. To be successful in making such a claim, a duty of care not to cause economic loss needs to be established and it must be shown that the contractor relied on consultants’ representations or statements which are said to have caused that loss.

Owing to the recent economic climate and potentially impecunious employers, this type of claim has increased

Owing to the recent economic climate and potentially impecunious employers, this type of claim has increased as the pursuit of consultants is seen as a safe option because any ultimate financial liability will be underwritten by insurers.

It was generally thought that a consultant engaged by an employer would not owe a duty of care to contractors in relation to economic loss (Pacific Associates v Baxter (1990) 1 QB 993 (CA) Civ Div was thought to be the authority for this proposition). The issue as to whether consultants owed such a duty was later considered in J Jarvis & Sons Ltd v Castle Wharf Developments (2) Gleeds Management Services (3) Franklin Ellis Architects [2001] EWCA Civ 19 and also in Galliford Try Infrastructure Ltd v Mott MacDonald and Rowen Structures Ltd [2008] EWHC 1570 (TCC).

In the Jarvis case, Jarvis claimed for losses allegedly caused by negligent misstatements made by Gleeds during the tender process upon which Jarvis relied when completing its tender. Jarvis claimed it had been induced to tender for, and enter into a design and build contract based on, Gleeds’ representations that the development had full planning permission. It did not have full planning permission, resulting in Jarvis suffering loss owing to additional planning requirements. Jarvis’ case failed as the court decided there was no reliance by Jarvis on Gleeds’ alleged misstatements.

Also in the Jarvis case, the Court of Appeal stated there was no reason in principle why a consultant of the employer could not owe a duty of care to a contractor for negligent misstatements resulting in economic loss. This decision represented a change in previous position that no such duty existed (Pacific Associates v Baxter), increasing the extent of consultants’ liabilities to contractors.

In the Galliford case, Galliford said that when tendering it had relied on the Mott MacDonald’s design and other services it provided for the employer but that the design was subsequently found to be flawed, resulting in Galliford incurring considerable extra cost for additional structural steel and other work and delays during the project. As there was no contract between Galliford and Mott MacDonald (as no novation had occurred), Galliford brought a claim in the tort of negligence for damages for economic loss against Mott MacDonald owing to an alleged breach of the duty of care.

Among other reasons, Galliford’s claim failed as Mott MacDonald’s documents (drawings and specifications) contained disclaimers saying that it accepted no liability other than to its employer. The judge said that the disclaimer clearly suggested that no duty of care existed. The judge said that, save in the most exceptional circumstances, consultants providing information as part of the tender process have no duty of care in tort to tendering contractors to prevent them from under-pricing.

Accordingly, there is no reason in principle why consultants engaged by the employer can be liable to contractors for negligent misstatements during the tender process, but it would only be in the most exceptional circumstances where such liability would arise and contractors would have to prove that they relied on the consultants’ statements or representations which are said to have caused a loss.

In summary, the principal way for consultants to avoid liability in tort for negligence for economic loss to tendering contractors is to clearly disclaim such liability, as this provided a successful defence in the Galliford case.

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Related competencies include: M006, T017, T062
Historic capacity for national investment is now being challenged as both government tax revenue and private finance is scarce. Our infrastructure continues to age and is in need of renewal or enhancement, and it is no longer seen as an unbound answer to social needs – we must manage our demand and dependence upon infrastructure, and only build and operate what we can afford. To this end, there has been a shift in emphasis of investment away from private residential/retail/office development construction towards infrastructure projects.

KPMG’s recent 2012 Global Construction Survey identified that the:
- energy/power sector will offer the most attractive investment opportunities in 2012.
- industry expects growth in 2012, yet economic uncertainty and government deficit/debt in some regions are still major concerns.

Public-funded investments such as transportation, utility projects and even the science of waste recycling and the roll-out of national broadband communication networks are increasingly being seen as key to our economic revival. The changing economic circumstances are also increasingly influencing the way that clients operate and behave. Affordability constraints mean that clients are less able to commit to ambitious projects and investments in the way they have previously.

Avoiding risk

Furthermore, clients are unable to tolerate substantial cost escalation and programme delays – funds are just not there; and without available contingency, clients are less likely to embark on an investment where there is a risk (even a small risk) that they could ‘take a bath’. It is in this ‘R-word’ that we may find our salvation – who is going to take these risks in the future, and who is really best qualified to take them.

An underlying truth in the world of contracting is that all too often the client is ultimately taking substantial risk in the enterprise. Modern projects and particularly those in the infrastructure space have a degree of complexity which makes outcomes somewhat unpredictable. And therefore even when the client goes to great lengths to structure a contractual framework to mitigate and pass on those risks, unexpected changes in scope or programme, which happen to be outside the immediate remit of the engaged contractors, result in the client having to absorb the impact and foot the bill of putting it right. There are many examples of this across infrastructure – particularly in sectors such as transport where projects cut through the community and business landscape and any interruption or delay directly impacts residents and day-to-day users.

So, we see a construction contracting world emerging where, for now at least, the dominant market will be in infrastructure, where clients have serious affordability constraints, there is limited access to long-term private finance, and the risks and uncertainty in developing and delivering major investment are becoming only more complex.

So what now?

Well, we are already seeing the emergence of possible solutions to the current circumstances and, like much about the world of belt-tightening austerity, it may ultimately lead to a fitter and healthier situation with opportunities for quantity surveyors and project managers operating in the construction arena.

Firstly, the construction industry is already responding to this change. KPMG is seeing evidence of major construction companies recruiting and re-skilling to exploit the potential in the infrastructure market. Secondly, many new players entering the sector bring much needed capacity and muscle but often lack key skills and experience or certain specialisations. To address this we are seeing collaboration and partnering of small- to mid-sized organisations to create a winning combination of capabilities.
Creative ideas
Clients are increasingly receptive to approaches and unsolicited propositions putting forward novel and creative ideas to problems; in recent years we have had London Underground’s competition for tube tunnel cooling ideas, and the Department for Transport is currently inviting solutions to the A14 route capacity. In the public sector, innovation is partly constrained by the heavily involved procurement processes which seek to ensure fairness – but is it time to reconsider? If part of the value of a renewal project is the creativity of finding a best-fit solution, why not create a market where innovation and proactivity is rewarded, not where good ideas are snapped up and then shared with all the bidders to ensure fairness of pricing, etc?

And yet in infrastructure, with collaboration and innovation, there are potential risks; there have been many instances where, due to difficulties in the approach to one or more of these key areas, contracting companies have struggled to deliver or at least achieve success.

Client standards and specifications
Infrastructure disciplines are often subject to industry-specific or authority-specific standards and processes. This means the trades, professions and expert resources involved are typically unable to apply their skills purely on their professional knowledge but must comply, and be seen to comply, with pertinent applicable regimes.

This can often mean that clarity of applicable standards and processes should be achieved prior to commencing work and ideally prior to even planning and pricing the contract. Some infrastructure clients will even demand comprehensive assurance plans demonstrating how the quality of work will be guaranteed to comply with appropriate standards and that work is undertaken in a safe and controlled way.

Some are forecasting a trend away from lowest-cost compliant tenders as the means for selecting contractors

Client approvals and acceptance
Another key feature of infrastructure clients is their acceptance and approval role – often demanding evidence of formal functional testing and compliance. This is another source of potential risk to completion and cost certainty, and is best mitigated by agreement of applicable standards and the handover criteria prior to commencement.

Collaboration and partnering risk
JVs and consortia
There has been an increase in collaboration and partnering between entities seeking to enter the infrastructure sector. A key issue in identifying prospective partners is what will each bring, how they will work together and who is responsible for what key roles.

The most successful of such partnerships are those that leave individual company loyalties and allegiances at the door and that form genuine joint teams with a common goal and clearly established organisation structures where individuals from all organisations involved populate key roles on a best-person-for-the-job basis.

Relationship breakdown
The other key factor in successful partnerships is where the parties have a process for handling disputes and disagreements. This is because a remarkably high proportion of JVs and partnerships experience some level of disagreement or relationship breakdown which can very quickly impact the quality of work being undertaken and often becomes obvious to the client.

Mitigation through dispute avoidance techniques
Giving proper attention to how the relationships will be managed before the start of the joint undertaking is a key differentiator in successful consortia. Establishing a decision-making process and a regular forum where concerns can be raised and discussed can often diffuse issues before they get out of control.

Innovation ‘opportunity’
Investing in the development of solutions
Some are forecasting a trend away from lowest-cost compliant tenders as the means for selecting contractors; a shift is being detected towards innovation as the main differentiator in this sector. Where clients are cash-strapped, they are turning to the supply chain to come up with novel approaches to deliver more for less, or the same without the need for expensive processes and oversight.

Possibly the most successful contractors in the coming years will be those who can bring greatest innovation – those who can identify the client need early on and put forward clever, cost-effective solutions.

Client appetite
The client appetite for such innovation is growing. We see a trend towards the ‘open invitation for ideas’, unsolicited proposals and a readiness to ‘pilot’ alternative approaches.

And therefore it is in this space that we see the most promise. Can we imagine a supply chain that takes the lead on behalf of its clients? Or one that offers solutions where it takes the risks for outcomes but also the responsibility for whole-life performance?

Industry challenge
This all begs a question – is the expense and formality of procurement processes, compliance and competing on cost really the most appropriate regime for contracting in the current climate? Would a new approach which creates space for competition in innovation and creativity deliver better value for all? True or not, what is apparent from recent and current major projects is that the rise in infrastructure work, and the increase in competition and economic conditions, are giving rise to a trend of improving cost efficiency and more competitive pricing – could this be leading to a more cost-efficient and competitive UK infrastructure construction industry that is better able to compete and export on a global stage?

Further information
The great global infrastructure opportunity: Global Construction Survey 2012 is available from KPMG at bit.ly/KPMG2012GlobConSurvey

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RICS Infrastructure Forum
Infrastructure is clearly an important sector for chartered surveyors and one in which the skills of project and cost management are highly valued. RICS has established an Infrastructure Forum to develop standards, policy and communication in this area.

For more information, or to contribute on the online forum, email Sophie Mason via sophiemason@rics.org

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Out with the old…

The refined FIDIC Subcontract published as the First Edition contains some noteworthy changes, says Khalid Ramzan, such as risk pass-down and compliance with programme

In October 2011 the International Federation of Consulting Engineers (FIDIC) published the “Conditions of Subcontract for Construction, Building and Engineering Works designed by the Employer” (the Subcontract). This was the First Edition of this form and the official form for contract use that superseded the Test Edition which was published in 2009*. The First Edition is the culmination of a two-year period of feedback and discussion on the terms of the Test Edition leading up to its publication. The result has been an exercise in refinement and fine-tuning with changes to 17 clauses.

Perhaps the most significant commercial changes relate to the measurement of Subcontract Works (the Subcontract being a re-measurement form)

While many changes may not seem significant, the First Edition contains a number of drafting changes over the Test Edition that affect risk allocation. Users who had familiarised themselves with the Test Edition are now advised to ignore it (as it was never intended for contractual use) and instead rely on the First Edition as the basis of any commercial transaction. This article does not review the key features of the Subcontract, but rather analyses some key changes between the editions to measure the impact they have on the intended risk allocation in the standard form.

Changes to basic philosophy
The risk pass-down principle that is the hallmark of the Test Edition subsists. The sub-contractor is deemed to have full knowledge of the relevant provisions of the Main Contract (which could be either the Red Book or the Pink Book) and the overall obligation to complete the Subcontract Works in accordance with the Main Contract.

The quid pro quo of this obligation is for the contractor to secure for the sub-contractor the like rights, entitlements and remedies from the employer under the Main Contract (clause 2.4).

This latter obligation has been re-formulated in the First Edition as a positive acknowledgement that the sub-contractor “shall have like rights, entitlements and remedies that the Contractor has under the Main Contract” (clause 2.4). In the Test Edition, the sub-contractor relied on an obligation of the contractor merely to “take reasonable steps to secure from the Employer like rights entitlements and remedies that the Contractor has under the Main Contract”.

The overall obligation to complete the Subcontract Works in accordance with the Main Contract has developed. The First Edition contains a specific qualification to comply with the contractor’s obligation under the Main Contract “other than where the provisions of the Subcontract otherwise require” (clause 2.2). This is an important amendment because it clarifies that the Subcontract provisions take precedence but it does mean that any departures from the overall obligation must be explicitly provided in Subcontract documents.

Specific obligations of the main contractor, which the sub-contractor will not be responsible for performing, are defined at clause 2.2 by reference to duties under the Main Contract (e.g. setting out, provision of water, electricity and gas, payment of royalties, etc.). The list in the First Edition has been extended to include the main contractor’s obligations relating to obtaining permits, licences and approvals. The effect of this change is debatable, since even under the Red Book-based Main Contract, the contractor’s obligation only extends to providing reasonable assistance to the employer in obtaining permits, licences and approvals.

Compliance with programme
In the Test Edition, the sub-contractor is under an obligation to complete the Subcontract Works “without delay in accordance with the current Subcontract Programme” (clause 8.1). The obligation to complete in accordance with the Subcontract Programme has been removed in the First Edition. This is not surprising as sub-contractors commonly object to the need to comply with a programme contending that a strict obligation to achieve a particular end date is sufficient and desirable.

In relation to extensions of time (clause 8.3), the catch-all entitlement under paragraph (d) to an extension of the Subcontract Time for Completion due to “a cause of delay which would give the Contractor an entitlement to extension of time under the Main Contract” has been re-formulated so that entitlement arises where “any one of the causes set out in the Main Contract Clause 8.4” has occurred.

This has narrowed the scope of the grounds for an extension of time since they are now limited to grounds explicitly set out in sub-clause 8.4 of the Main Contract rather than any right that may arise under any clause of the Main Contract. However, when viewed in the context of the sub-contractor’s
entitlement at sub-clause 2.4 to the “like entitlements and remedies that the Contractor has under the Main Contract”, it is not entirely clear what this amendment intends to achieve.

Pricing of Subcontract items
Perhaps the most significant commercial changes relate to the measurement of Subcontract Works (the Subcontract being a re-measurement form).

Clause 12 contains a detailed procedure for measurement. Where the contractor and sub-contractor fail to reach a decision on the measurement of the Subcontract Works, the First Edition requires the contractor to make a “fair decision” as to the appropriate measurement to apply having due regard to the sub-contractor’s views and “all relevant circumstances” (clause 12.1).

This is in contrast to the Test Edition which simply permits the contractor to decide the “appropriate and applicable measurement, having due regard to the Subcontractor’s views and all relevant circumstances”. The addition of a fairness obligation provides the sub-contractor with a further level of comfort in this all-important process.

The second significant change is the procedure for agreeing the Subcontract Price. The Test Edition provided that the parties are to reach agreement on the Subcontract Price by evaluating the items of the Subcontract Works applying the measurements arrived at under 12.1 and “the provisions of the… Main Contract” relating to evaluation – provided that the relevant Main Contract provisions will not apply to the evaluation “unless a new rate or price for the item is determined by the Engineer under the Main Contract”. A key sub-contractor criticism of the Test Edition was that it limited independent commercial agreement on pricing items between the sub-contractor and contractor.

FIDIC has relaxed this approach and the First Edition (clause 12.3) has omitted the proviso that 12.1 of the Main Contract will not apply unless a new rate or price is determined by the engineer under the Main Contract. This development will be welcomed by sub-contractors, as the application of new rates is no longer tied on a back-to-back basis to their application under the Main Contract. The sub-contractor no longer has to be so obviously at the mercy of the rates struck in the deal between the employer and the contractor.

Contractor to state what it is not paying for
The key change in the payment machinery is that the contractor’s notice to the sub-contractor of payment due, must be accompanied by full particulars and provide substantiating documentation of amounts that have not been certified by the engineer or for which the employer has failed to make payment. This is an interesting development particularly as it coincides with the restatement of the importance of paying party notices and the crystallisation of the sums due (as a notified sum) under the amended UK Construction Act.

The Final Subcontract Payment period has been considerably shortened in the First Edition from 84 days after the expiry of the Subcontract Defects Notification Period to 56 days. The provision has been simplified to remove the interim ‘draft’ stages and the provision of information between the parties before the final statement is issued.

‘A cause for which Subcontractor is responsible’
Finally, in relation to the sub-contractor’s liability for loss or damage that occurs to the Subcontract Works while they are in the sub-contractor’s care, the drafting has been clarified to ensure that it is easier for the contractor to establish a claim. In the Test Edition, the sub-contractor’s obligation to rectify work arises where damage is caused by “any cause which is the responsibility of the Subcontractor” (clause 17.1). This qualification has been deleted recognising the difficulty the contractor has in proving that damage has been caused by something “for which the Subcontractor is responsible”. In the First Edition, the sub-contractor is deemed to be responsible given it has care of the Subcontract Works.

While the amendments in the First Edition may not seem significant, they affect the balance of risk in key commercial areas such as risk pass-down, compliance with the programme and pricing – however, the amendments are not necessarily all for the benefit of contractor or sub-contractor. The Test Edition should now be gracefully retired.

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Related competencies include: T017, T077
Towards a standard assessment

Martin Russell-Croucher summarises progress with the development of a standard for measuring embodied carbon

As buildings contribute 47% of the UK’s operational carbon emissions (see Figure 1), RICS recognises that achieving the mandatory Climate Change Act targets for 2020 and the 80% reduction in CO₂ by 2050 will be challenging. This will require considerable improvements to be made to the energy efficiency of today’s existing buildings, which will account for up to 70% of the building stock in 2050.

As energy efficiency improvements and building regulations improve over time, the operational carbon generated during the lifetime of a building will reduce. However, the carbon embodied in a building during construction or refurbishment is often not calculated and, as this has an immediate effect on the environment, it should form part of the decision-making process when deciding to demolish, refurbish or build anew.

The importance of embodied carbon was recognised in the 2010 Low Carbon Construction Innovation and Growth Team Final Report. This included the recommendation “That as soon as a sufficiently rigorous assessment system is in place, the Treasury should introduce into the Green Book [the framework for the appraisal and evaluation of all policies, programmes and projects] a requirement to conduct a whole-life (embodied + operational) carbon appraisal and that this is factored into feasibility studies on the basis of a realistic price for carbon.”

This recommendation was influenced by Redefining Zero, an RICS Research report, which showed that a realistic assessment of the proportion of whole life carbon that is embodied could be as high as 60%. This proportion will increase as operational energy consumption is reduced and, therefore, needs to be brought into design decisions. This should ensure that operational efficiency is not prioritised over operational life, which could lead to a reduced design life and increased embodied carbon as the product is replaced more frequently.

Measuring carbon data
You might assume that embodied carbon measurement is still in its infancy; however, many construction-related practices have been developing their own methodologies and the European standards-setting body CEN (through its CEN/TC 350 technical committee) has been working on a proposed standardisation through the Construction Products Directive and the related Environmental Product Declaration. This would mandate the inclusion of carbon data at the factory gate as part of the declaration process and hopefully improve the underlying data over time. The government was sufficiently encouraged by the development of metrics for the measurement of embodied carbon so far that in its response to the Innovation and Growth Team’s report, the Low Carbon Construction Action Plan, the measurement of embodied and whole life carbon formed part of two recommendations.

1. The IGT recommendation on whole-life carbon appraisals (see above).
2. That industry and government should agree a standard method of measuring embodied carbon for use as a design tool.

RICS is leading the development of the standard and its related documentation setting out an approach to carbon accounting (due, at the time of writing, to be published as an exposure draft in spring 2012).

This documentation will look at the following points:

- Assessment boundaries and introducing the concept of the ‘embodied carbon assessment’ which should include the following phases of the project: design, materials and product manufacture, distribution, assembly on site (with the emphasis on the carbon impacts of materials and product manufacture, with distribution and assembly on site also described).
- The carbon assessment data structure following a standard data structure (e.g. the New Rules of Measurement). This will facilitate standardisation and benchmarking with the main emphasis on the high-volume/weight building elements, e.g. foundations, ground floor construction, frame, upper floors, roof and external walls.
- The calculation methodologies, tools and data sources for measuring carbon during a project.
- How to conduct an assessment.
- Case studies demonstrating the calculation of embodied carbon.

This is the start of what will probably be a long journey to the ‘standard method’ as the data underpinning the calculations is largely based on the work by Bath University and published by BSRIA (a research and consultancy organisation providing specialist services in construction, building services and facilities management) and, as yet, lacks the rigour that the product declarations will bring over time.

So while progress is being made, there are still a number of imponderable issues to be resolved, e.g. how to deal with the carbon at the end of a building’s life, where there is the potential for recovering and recycling products such as the steel frame.

Further information


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* Redefining Zero is available to download from bit.ly/RICSRedefiningzero

Related competencies include: M009, T013
Top 5 reasons to attend:

1. Understand the business benefits of the new RICS Standards: the Black Book and New Rules of Measurement
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