Measurement and valuation of railway construction works

Introduction of the RMM suite of documents

A commentary described the progress of the introduction of the RMM suite from July 2014 until the present time; successes, failures, obstructions and further work required

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Origins and use of the Rail Measurement of Measurement (RMM Suite)

The RMM was written in three volumes between 1999 and 2012, the three volumes are:-

- Volume 1 - Cost Planning - begun 2007/8 in Australia
- Volume 2 - Detailed Measurement - written between 07/2011 and 10/2012 in NR
- Volume 3 - Operational Maintenance and Interventions - written and developed 1998 -2004, completed 10/2012

The suite is designed and has been written to provide a common, industry-standard, internationally accepted, method of measurement and valuation for all works of railway engineering construction and maintenance from inception of any project through to the final disposal of the asset; it provides, ultimately a basis for the calculation of LCC (Life-Cycle Cost) and WLC (Whole Life-Cycle) costs.

The suite was adopted and developed by Network Rail from July 2011 onwards. The three volumes were completed in October 2012; Volumes 1 and 2 were published by NR in July 2014, Volume 3, although complete, remains to be published although managers within NR are asking from suppliers to provide LCC and WLC advice with bids for works although the latter have not been issued with copies of Volume 3 nor have they been party to any training or induction in its use.

Volumes 1 and 2 are in a form of restricted circulation and have been used on a number of projects including the East West Railway Phase 1, Kent Multi-Functional Framework and other works in the Central and North West Areas of NR; they have also been used overseas in the Middle East, Africa (Mozambique and Angola), North America (USA and Canada), China and Australia.

Application date

In Great Britain RMM Volume 1 is in limited regular use within Network Rail and is being used by departments within HS2 Limited. Its use is severely restricted by the fundamental lack of measurement and valuation competencies of commercial staff at all levels employed by NR and HS2 Limited.

The Office of Rail Regulation (ORR) has mandated its use for all future financial submissions from works with Control periods 5 and 6.

Experiences from practical application

To date my experience has been disappointing both from my experiences as a trainer and mentor and also from my operational experience on live projects.

I have since July 2014, delivered over 40 training sessions and have worked on in excess of 100 live projects.

I summarize my experiences as follows:-

- General apathy amongst NR staff and its consultants although staff from the contracting (supplier) side have welcomed it and have asked me to deliver further basic competence improvement courses.
- Obstructions to the introduction of the suite by NR and other staff, "*why do we need measurement and valuation - we rely on market forces*" - to "*oh, it's just another idea that will pass over, why should I take notice of it?*" - more worryingly "*it's not my job to measure and price, the contractors do all of that side!*"
- Difficulty in arranging the training sessions involving NR staff although I have been asked to provide them by operational directors of NR.
- During presentations on the concept and intentions of the RMM suite, I have come across an alarming absence of measurement and valuation competencies amongst measurement engineers and quantity surveyors, often combined with a lack of understanding of railway construction technology.
- Limited understanding by NR staff and its consultants of the requirements of the ORR and the procedure to be followed to obtain sanction for scheme approvals.

Level of competencies

I return to this point in light of my experiences and discussions with my sponsors within NR. At a recent meeting with my sponsors[1]

- Detailed measurement and valuation does not form any part of the day jobs of NR staff and their appointment consultants
- Of approximately 650 directly employed and consultancy staff engaged by NR, NR believes that "*only 15% or probably 10% have the necessary measurement and valuation competencies to do the job*"

I have therefore developed training programmes for occupational application and two university based courses to address these deficiencies.[2]

The course makes use of the RMM suite but considers other competencies required by the industry, including:-

- The non-constructions costs associated with projects - RMM Volume 1 - Elements 3.01 to 6.01
- The optimum use of access arrangements - there is currently a blind faith that all works can be executed within "Rules of the Route" possessions without the need to consider 27, 48 or 72 hour disruptive possessions.[3]
- The costs of liaising with Train Operating Companies (TOCs) and Freight Operating Companies (FOCs) to minimise the disruption to rail users and to focus the works carried out to ensure that maximum benefit accrues to rail users and operators.

[1] Neil Thompson and Stephen Blakey, meeting 1st July 2015 at 4 Eversholt Street, London NW1 2EE
[2] See Appendix A for details of the course "*Construction Economic s of Railway Infrastructure*"
[3] Refer to Appendix B - Labour cost comparison - South East England for an illustration of the effects of reduced or limited access for works

- The operational requirements of running a railway rather than confining discussions and decisions to the immediate regulated aims of the network operator (NR).

Since the first edition of this paper, I have been made aware of the need for *vocational courses* to cover the use of the RMM suite and to provide a foundation/refresher course in measurement and valuation techniques in railway engineering construction works, these competencies once mastered are application measurement and valuation of all building and civil engineering works.

Training and further education required

Without doubt the training and induction courses offered by me and by others will be insufficient to address the dearth of competencies and absence of more formal structured training programmes. The need to put these in place is urgent as the lack of experience and competence at all levels is driving costs of work up thus delaying delivery programmes with Control Periods 4, 5 and 6.

The tools used to conceal these deficiencies are:-

- Abuse of risk management processes - misuse of contingency allowances to conceal lack of knowledge, forethought of planning.
- Transferring all of the financial responsibility for preparing feasibility study estimates and the costs of delivery to the supply side. *With all due respect to the contracting side who are anxious to deliver as much work in the industry as the Government plans, being asked to hold the purse string and to deliver, without monitoring and constraint, is akin to asking "King Herod to babysit!"*.
- Understating prices in the hope of obtaining approval for project commencement then dealing with the inevitable variation (increased scope) problems at a later date.
- Omitting from the project scope the non-construction costs within projects, either by design or more often through ignorance; these omissions cause either delays to projects that cannot be delivered with the budgets monitored by ORR or cancellation of later projects where "*Peter is robbed to pay Paul*" to ensure the earlier commenced schemes can be completed.

The paper makes reference to the scope, or more accurately the inconsistencies in scope writing by NR; I have yet to see in the one hundred-plus live projects to which I have applied the RMM suite of documents, a written scope that aligns with and can be reconciled with the estimates present to the ORR to create the budgets for Control Period 5 works.

Many of the Project Manager's Remits (PRS) omit the access arrangements available to do the works envisaged, none of the PRS documents I have seen to date define the purpose of the proposed works in any commercial sense. When I have asked NR employees and suppliers' employees for which of the following reasons, is the work being carried out:-

New Build	New installation on Greenfield/Brownfield site works where no similar type of asset exists
Replace - Full	Replacement / reconstruction of all life-expired structural

	components with equivalent or lesser specification components.
Replace - Partial	Replacement / reconstruction of targeted life-expired structural components with equivalent or lesser specification components.
Refurbish	Renovation or overhaul of existing asset or components/elements, including e.g. redecoration, cleaning, remove graffiti/ vegetation, etc. Also includes minor remodelling & upgrades
Upgrade (Enhancement)	Improvement of existing asset to provide additional benefit or functionality over that it currently exhibits.
Remodel / Alter	Modifications in layout or location but with functionality of elements unchanged
Extend	Increasing the functionality of existing elements through extension of length, area, volume, or coverage
Repair	Restoration to good condition of defective elements or components, including inspection, spot/patch repairs, etc.
Strengthen	Addition to existing or replacement with higher specification components to increase strength of asset or components, make safe or prolong life prior to repair.
Preventative Maintenance	Treatments or maintenance to prevent or slow the rate of deterioration of assets or components
Hazard Management	Planned programme of work to reduce risk; works or treatments to remove or make safe existing hazards within assets or components, other than strengthening
Abandon / Demolish / Remove	Removal of an asset, the functionality or liability of an asset without replacement. Where this entails works other than demolition (e.g. Infilling) to remove functionality, this shall be classed as replacement. (2A)
Asset Protection	Infrastructure owner supervision only of works to assets which impinge on railway land but are owned and constructed by outside parties.

The answer has invariably been negative and occasionally dismissive, the response being "*I have been told to do it, so I just get on with it*".

These answers have convinced me that in addition to the measurement and valuation competencies referred to in my training proposals, there should be added, a course covering the introduction to ,

awareness of and competent application of approximate estimating and cost planning of railway engineering works to make best use of the foundations created by the RMM suite.

These techniques have existing for very many years in the building industry, originally developed by eminent quantity surveyors[4] working in the public sector, post war, in health, education and public works, leading to the creation of the *Standard Form of Cost Analysis (SFCA)*[5] used nationally and internationally for building works, the supporting the works of the *Building Cost Information Service (BCIS).*[6]

Conclusion

Although this paper may appear wholly negative, it should not be read as such.

There are a good number of younger employees of both NR and its supply chain who are aware of the work done, primarily via BCIS, in the building sector to promote and develop better informed understanding and decision making in the building industry that can and should be applied to the rail sector.

Many have asked me about the availability of courses to develop their knowledge, which in turn has given me confidence that the courses I have proposed (and included at Appendix A) should be promoted via a specialist university or bespoke industry training school such as those developed by the former LMS Railway in its School of Transport at Derby and by the former LNER at York.

The onus to create these courses does lie with the Department for Transport, ORR, NR and the supply chain as the professional institutions such as RICS and ICE[7] have let the study of these missing competencies fall away over the past 25 years.[8]

To conclude I have included in Appendix B, a comparison of the labour costs incurred by the railway industry in the UK through various possession regimes in the south east corner of the country with the equivalent normal daytime working costs of artisan staff in the building industry. This table is included to illustrate the consequences on the totals of cost estimates, if those preparing them fail to take account of or do not understand, the consequences of limited access to do work.

This table has been created from estimates for live projects prepared using the RMM suite of documents, based on the principles contained in the "*Code of Estimating Practice*" published by the

[4] James Nisbet (Education), Nigel Rose (Education and Health) and Idwal Eric Symonds (Public Works and Defence)

[5] SFCA - "The Standard Form of Cost Analysis" (for building works) published and managed by RICS, 12 Great George Street, Parliament Square, Westminster, SW1P 3AA

[6] *Building Cost Information Service (BCIS),* a company and cost consultancy wholly-owned by RICS, providing analytical cost advice nationally and internationally to government departments, financial institutions and insurance intermediaries

[7] RICS - Royal Institution of Chartered Surveyors; ICE - the Institution of Civil Engineers

[8] At the time of publication of this report, there are outstanding complaints with the Privy Council, alleging that ICE - the Institution of Civil Engineers and RICS are breaching their respective Royal Charters by ignoring or failing to the develop their respective intellectual property, as required by their charters.

Chartered Institute of Building in 2009[9]; much of the work of analysis appears to have been unknown to staff I have met during my training and work sessions since July 2014.

However it does go a long way to wards explaining the large disparities of costs between estimates lodged with ORR for works within the CP5 and the costs of tenders received for the actual projects.

Conclusion - added January 2016

The need for adequate readily available vocational education in the rail industry is becoming critical as costs of major projects appear to be spiralling out-of-control for no good reason; in the absence of credible programmes from ICE and RICS, the onus falls of

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[9] "*Code of Estimating Practice*" - *7th Edition - 2009;* ISBN 978-1-4051-2971-8; published by Blackwell Publishing on behalf of the Chartered Institute of Building

APPENDIX A - Training Proposals

- **Vocational Courses** currently on offer to HS2 Limited and Network Rail CLG and their supply chains
- **First and Masters Degree Courses**

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