

Civil Engineering Measurement Claims in Hong Kong

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SUMMARY

In building contracts where Standard Methods of Measurement with mandatory rules are normal and quantity surveyors take considerable time preparing accurate and detailed bills of quantities disputes concerning measurement matters are quite rare. In civil engineering contracts, however the approach to bills of quantities has traditionally been somewhat cavalier. Now, and maybe as a result of this traditional approach, claims based upon measurement matters have become more and more common in civil engineering works, and are, in my experience, one of the most common types of claims to be raised in Hong Kong. This paper examines the reasons for the proliferation of civil engineering measurement disputes in Hong Kong. In carrying out such examination, the paper firstly considers the purpose of Bills of Quantities and how standard method of measurements assist in the achievement of such purpose. The Hong Kong Government Standard Method of Measurement for Civil Engineering Works ("HKGSM") is then introduced and compared with the CESMM3, and the three particular type of measurement claims that arise under the HKGSM are identified to indicate its shortcomings. The conclusion reached is that many of the problems which have arisen and which give rise to so many measurement claims have arisen because of the Hong Kong Government's choice of basing its SMM on the United Kingdom Department of Transport Standard Method of Measurement for Roads and Bridges and in particular on its 'item coverage' system. Had the Hong Kong Government adopted the more radical CESMM rather than writing its own Standard Method of Measurement based upon the 'item coverage' system, then many of the measurement claims which are now so prevalent would not arise. Finally the paper looks at how civil engineering measurement claims may be avoided. Two ways can be identified. The first is simple in the extreme – ensure that the Bills of Quantities are measured in accordance with the standard method applicable, and measure the items as accurately as can be done at tender stage on the information available. The second is for employer to include provision in their contracts to prevent such claims. The first method is clearly preferable, but all too often the latter method is chosen, nearly always because of a lack of understanding of the purpose of Bills of Quantities.

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1. INTRODUCTION

1.1. In building contracts where Standard Methods of Measurement with mandatory rules are normal and quantity surveyors take considerable time preparing accurate and detailed bills of quantities disputes concerning measurement matters are quite rare.

1.2. In civil engineering contracts, however the approach to bills of quantities has traditionally been somewhat cavalier. Now, and maybe as a result of this traditional approach, claims based upon measurement matters have become more and more common in civil engineering works, and are, in my experience, one of the most common types of claims to be raised.

1.3. When I joined the Civil Engineering Department of the Hong Kong Government in 1984 the Government was still using the 1977 General Conditions of Contract, and most departments involved with civil engineering works were using the ICE Standard Method of Measurement 1954 Edition. This Standard Method of Measurement was little more than a series of recommendations as to what items may be included in bills of quantities with details of different ways in which they may be measured.

1.4. Both these documents were survivors of a different time in Hong Kong construction, and probably in construction in general. They were produced in a time when contractors were less conscious of their contractual rights, or if they were conscious of such rights, did not pursue them, and construction arbitrations were very rare.

1.5. However, since then the construction industry had significantly changed in Hong Kong. New large civil engineering projects had brought to Hong Kong a number of large international contractors who were fully aware of their contractual rights and were not afraid of pursuing them rigorously. This also led to considerably greater competition, with the industry resulting in lower margins, all of which inevitably leads to a claims conscious construction industry like we now have in Hong Kong.

1.6. Government was aware of the shortcomings of both the 1977 General Conditions of Contract and the ICE SMM, and had some years previously set up a Standing Committee to produce a new and considerably updated General Conditions of Contract. The result of this was the 1985 Edition of the General Conditions of Contract.

1.7. At the same time as the 1985 General Conditions of Contract was being drafted a separate working party was redrafting a new Method of Measurement, and publication was planned to coincide with the issue of the new General Conditions of Contract. As matters

turned out the Standard Method of Measurement was published a year later than the General Conditions of Contract.

1.8. At the time the working party commenced its work to draft a new SMM the United Kingdom civil engineering industry was just coming to terms with the new ICE Civil Engineering Method of Measurement (now in its third edition and hereinafter referred to as “CESMM3”). This document with its very brief standardised descriptions was considered somewhat radical, and the working party decided against its adoption for Government projects.

1.9. Instead the new Hong Kong Government Civil Engineering Standard Method of Measurement (now in its second edition and hereinafter referred to as “HKGSM”) was based upon the United Kingdom Department of Transport Standard Method of Measurement for Roads and Bridges. This was a very different document to the CESMM incorporating the item coverage system.

1.10. I will discuss this in more detail later in this paper, but suffice to say that the decision not to use the CESMM3 was made because at the time it was felt that this would lead to claims from contractors. With the benefit of hindsight it would now appear that the decision to go with a standard method of measurement based upon the United Kingdom Department of Transport Standard Method of Measurement for Roads and Bridges has contributed to the proliferation of claims in civil engineering measurement over the last twenty years.

1.11. Interesting comparisons can now be made between the CESMM3 and the HKGSM because whilst the latter is used comprehensively on all Government civil engineering projects, the former is now used by the Kowloon and Canton Railway Corporation (“KCRC”) and the Mass Transit Railway Corporation (“MTRC”) on their current projects.

2. BILLS OF QUANTITIES

2.1. In order to understand how civil engineering measurement claims arise it is necessary to consider the purpose and function of Bills of Quantities because it is when the purpose and function are somehow lost, that claims arise.

2.2. Bills of Quantities are a much maligned and misunderstood contractual tool and contract document. Authors such as Mr Ian Duncan Wallace traditionally argues against the use of Bills of Quantities. For example, in **Construction Contracts: Principles and Policies in Tort and Contract** at paragraph 26-16 he states:

“For the several reasons which I have endeavoured to make plain in this article, employers and their professional advisers in countries other than the U.K. would do well to ponder carefully before yielding to the blandishments of those putting forward contracts for construction projects which use Bills of Quantities, certainly if their incorporation is effected in the terms of the current standard forms in the U.K.”

2.3. I entirely disagree with this sentiment which I consider, with the greatest respect to the learned author, is based upon a fundamental misunderstanding of the construction industry. I am a firm advocate of Bills of Quantities and consider that problems and claims arising in respect of civil engineering measurement arise not because of the use of Bills of Quantities but because the Bills of Quantities have been prepared incorrectly or inaccurately, or the contract draftsman has destroyed their purpose by imposing arbitrary conditions in an attempt to avoid claims under them.

2.4. Both the CESMM3 and the HKGSMM described what they consider to be the purpose of Bills of Quantities. CESMM3 provides at Section 2 General Principles:

“The objects of the Bill of Quantities are:

- (a) to provide such information on the quantities of work as to enable the tenders to be prepared efficiently and accurately.**
- (b) when a contract has been entered into, to provide for use of the priced Bill of Quantities in the valuation of the work executed.”**

and HKGSMM at Part II General Principles paragraph 1 provides:

“The Bills of Quantities are intended in the first instance to give information upon which tenders can be obtained. When a contract has been entered into, the function of the priced Bills of Quantities is to provide for the valuation of the work executed.

2.5. Both Definitions really Cover Four Purposes

2.5.1. Tender Preparation

2.5.1.1. The Bills of Quantities facilitate the estimating of the cost of the work by a contractor when tendering. The document should therefore include the quantities of the work which is required to be carried out.

2.5.1.2. The more detailed information that the Bills of Quantities contain, not just with regard to the quantities themselves, but other matters that affect the cost of the works, such as the timing and location of particular works, the better able the contractor will be to accurately price the works. The better able the contractor to accurately price the works the less need there will be for contractors to raise claims in respect of matters that they failed to allow for.

2.5.1.3. An accurate and detailed Bill of Quantities assists the contractor not only in facilitating the economical preparation of his tender, but also by keeping his tender costs down.

2.5.1.4. However there has been a trend in Hong Kong in recent years to move away from consultant-prepared Bills of Quantities to requiring the tendering contractors to prepare their own Bills of Quantities as part of their tendering exercise. This has led to tendering contractors grouping together to employ quantity surveyors to prepare quantities for tendering purposes. This is a situation which existed hundreds of years ago before employers realised the benefit of employing their own professional quantity surveyor to prepare, at their

risk, a proper bill of quantities. Such a retrograde step imposing such a huge burden on the tendering contractors is difficult to understand.

2.5.2. Tender Assessment

2.5.2.1. An accurate and detailed Bill of Quantities also assists the employer, in two ways.

2.5.2.2. Firstly, because the tendering contractor's price is normally the basis upon which the employer decides whether to proceed with the works and if so which contractor to choose. Such a decision should be based upon an accurate and realistic assessment of the cost of carrying out the works.

2.5.2.3. Secondly, because detailed and accurate Bills of Quantities permit an employer or more usually his consultants to carry out a detailed examination of the tenders received and a meaningful comparison between them.

2.5.2.4. This is, in my opinion, an area which is traditionally poorly handled in Hong Kong. Detailed and careful analysis of tenders can bring to light many potential problems with a contractor's tender, and can if correctly handled reduce the scope for the type of disputes that have arisen under GCC Clause 59(4)(b) (or the similar provision in the KCRC Conditions).

2.5.2.5. GCC Clause 59(4)(b) type claims are outside the scope of this paper, but many of the claims arise in situations where the contractor has, maybe knowingly (maybe not), for an advantage, inserted a very high rate against an item and the quantity has then substantially increased. Careful tender analysis will alert an employer to potential problems in this respect and will give the employer the opportunity of resolving matters before they become a problem.

2.5.2.6. In passing, and with relevance to tender analysis I would draw your attention to the case of *City University (formerly Polytechnic) of Hong Kong v Blue Cross (Asia-Pacific) Insurance HCA No. A10750 of 1993*, and in particular the decisions of the court in that case with regard to a contractor withdrawing its tender within the period within which it had agreed to keep the tender open, and more importantly the employer's acceptance of the contractor's tender in the knowledge that it contained errors.

2.5.3. Interim and Final Payment

2.5.3.1. Once the contract is entered into the Bills of Quantities serve two purposes. Firstly, they facilitate the assessment of the interim and, ultimately, the final payment due to the contractor.

2.5.3.2. In contracts where there are no Bills of Quantities the assessment of interim payments due can be a very tiresome and difficult exercise. With Bills of Quantities it becomes straightforward.

2.5.3.3. There has been a trend in recent times, particularly where there are no Bills of Quantities included in contracts to make interim payments by way of a milestone payment system – often with provisions that a contractor is entitled to no payment at all if he is late in achieving a milestone until that milestone is actually achieved. I find these provisions objectionable because they are an interference by the employer in the contractor's method of working. The employer already has provisions for liquidated damages in the event that the contractor is late in completion. The effect of milestone payment provisions is to constantly threaten to penalise the contractor if he slips behind progress. There are many things that may cause a contractor to slip behind progress during the course of the works. The last thing a contractor needs in such a situation is not to be paid. This only exacerbates the problem and makes it harder for the contractor to catch up progress. The employer has the comfort of liquidated damages if completion is late. Why go further?

2.5.3.4. Accordingly there is nothing wrong in my opinion with interim payments being made on the basis of a well prepared and accurate Bill of Quantities.

2.5.4. Valuation of Variations and Deemed Variations

2.5.4.1. The fourth object of the Bills of Quantities is to provide rates that can be used for the valuation of variations.

2.5.4.2. The use of such rates is important for the employer and the contractor because the rates represent the bargain entered into between the parties. Variations are common place and it is clearly beneficial to both parties if they know that such works will be valued in accordance with the same competitive bargain that they entered into.

2.5.4.3. However, for the rates in the Bills of Quantities to be meaningful and to be valuable as a tool for valuing variations, the works for which the rates have been inserted must have been accurately measured and properly described.

2.6. **Advantages and Disadvantages of Bills of Quantities**

2.6.1. If prepared properly the Bill of Quantities is a vital tool for the administration of construction contracts. At best it helps a contractor produce an accurate tender whilst keeping tender costs to a minimum; it permits the employer to decide whether it can afford to have the works constructed and which contractor it should employ to carry out the works. When the contract is entered into it facilitates accurate and fair interim valuations of the works and the valuation of variations for the same bargain that the parties entered into by way of their competitive tendering.

2.6.2. Provided the Bills of Quantities are properly prepared they have, in my opinion no disadvantages. Experience would suggest that problems and thus claims arise where the Bills of Quantities have been incorrectly or inaccurately prepared.

2.6.3. Accordingly it is my opinion that, contrary to the opinions of people such as Mr Duncan Wallace, Bills of Quantities do not per se lead to claims. It is only incorrectly or poorly prepared ones that do that.

3. STANDARD METHODS OF MEASUREMENT

3.1. Purpose

3.1.1. It is clear that the above detailed purposes of Bills of Quantities will fail unless there is agreement as to:

3.1.1.1. The exact manner in which the items in the Bills of Quantities are to be measured. For example, if the works are to excavate for a box culvert, without any rules the measurement could be either the quantity of material removed and deposited in a truck for removal, the volume of material occupied by the box culvert or the quantity of material occupied by the box culvert plus any necessary working space.

3.1.1.2. The exact requirements as to what is to be included in the rate for each item. For example, if an item for a concrete pavement is included, does this also include for the bedding, the excavation, the formwork and the reinforcement?

3.1.2. To avoid such difficulties standard methods of measurement have evolved and are now a necessary feature of contract documents containing Bills of Quantities.

3.1.3. Standard methods of measurement set out detailed rules for the measurement of commonly occurring works, and provide guidelines as to what a tendering contractor is to allow for against each measured item.

3.1.4. Their use ensures that tendering contractors tender on the same basis, enabling the rates inserted in the tender document to be properly compared with the rates of other tendering contractors and subsequently the said rates to be used for the assessment of interim payments and the valuation of variations.

3.2. Civil Engineering Standard Methods of Measurement in Hong Kong

3.2.1. As stated previously there are two civil engineering standard methods of measurement in common use in Hong Kong. These are:

3.2.2. **CESMM3** - This document drafted by the Institute of Civil Engineers is used for KCRC and MTRC projects.

3.2.2.1. The document is incorporated into MTRC Contracts by Clause 83 that provides:
“Except where any statement or general or detailed description of work in the Bill of Quantities expressly shows to the contrary each part of the Bill of Quantities shall be

deemed to have been prepared measured in accordance with the method of measurement set out in the preambles to the Bills of Quantities”

3.2.2.2. and Preamble Clause 1.5:

**“STANDARD METHODS OF MEASUREMENT USED IN PREPARING BQ
Civil Engineering Standard Method of Measurement, Third Edition (CESMM3),
reprinted with corrections 1992.”**

3.2.2.3. The document is incorporated into KCRC Contracts by a similar clause in the Preamble to the Pricing Document, an example of which provides:

**“Cost Centres *, * and * containing remeasurement items have been prepared in accordance with the procedures contained in the following methods of measurement
(a) Civil Engineering Standard Method of Measurement, third edition reprinted with corrections in 1992, 1995 (CESMM3), which document is incorporated herein by reference.....”**

3.2.2.4. It should be noted that the KCRC Contract provides a mixture of lump sum sections of works or Cost Centres and Remeasurement Cost Centres. The implication of this is considered later.

3.2.3. **HKGSMM** – This document drafted by the Government of Hong Kong is used for all Government civil engineering projects.

3.2.3.1. The document is incorporated into the contract by GCC Clause 59(1) that provides:
“Except where any statement in the Bills of Quantities expressly shows to the contrary the works shall be deemed to have been measured in accordance with the method of measurement set out in the preambles to the Bills of Quantities”

3.2.3.2. and General Preamble Paragraph 1 provides:

“These Bills of Quantities have been prepared in accordance with the procedures set forth in the Standard Method of Measurement for Civil Engineering Works, 1992 Edition (Hong Kong Government), hereinafter referred to as the “Method of Measurement”

3.2.4. The effect of these clauses is to make it a term of the contract that the works have been measured in accordance with the methods of measurement (either CESMM3 or HKGSMM), and therefore if the works have not been so measured, i.e. because there are items omitted or errors in descriptions then this constitutes a breach of contract and, in particular, a breach of the clauses set out above.

3.2.5. As with all breaches of contract the remedy is to put the injured party in the position that it would have been in had the contract been performed. (*Robinson v Harmon*).

3.2.6. With regards to claims for items omitted this simply means that the Engineer is bound to rectify the bills by the inclusion of the item that should have been measured, had the contract been performed correctly.

3.2.7. The proviso stated in all clauses, i.e. “save where any statement in the Bills of Quantities expressly states to the contrary” will be considered later with regard to items omitted and errors in description.

3.3. CESMM3 and HKGSMM compared

3.3.1. The CESMM3 and HKGSMM share the same purpose and in many ways are very similar.

3.3.2. Both SMMs provide for the measurement of the most commonly arising types of civil engineering construction, and make provisions for unusual features to be provided for by additional measurement rules to be added in by way of Preambles to the Bills of Quantities.

3.3.3. Both SMMs divide the most commonly arising types of civil engineering construction into Work Classifications or Sections such as Earthworks, Concrete Work, Piling etc.

3.3.4. Both SMMs provide within each Work Classification or Section:

3.3.4.1. A means of formulating short standard descriptions to identify the most commonly arising types civil engineering construction within that Works Classification or Section.

3.3.4.2. Rules governing how each resulting item identified shall be measured and in what unit it shall be measured.

3.3.5. Both SMMs thus produce remarkably similar looking Bills of Quantities divided into different Work Classifications or Sections each containing a short standard description of the works required together with a quantity and the unit of measurement ready for the tendering contractor to insert his rate.

3.3.6. The main and crucial area of difference between the two SMMs relates to the works that the tendering contractor is deemed to allow for in respect of each item in the Bills of Quantities.

3.3.7. CESMM3 Section 5 paragraph 5.11 provides:

“Descriptions shall identify the work covered by the respective items, but the exact nature and extent of the works is to be ascertained from the Drawings, Specification and Conditions of Contract as the case may be, read in conjunction with the Work Classification.

3.3.8. When pricing Bills of Quantities measured in accordance with CESMM3 therefore a tendering contractor will read the item description in the Bills of Quantities and then examine the drawings and specification to ascertain the exact nature and extent of the works that he is required to allow for.

3.3.9. HKGSMM Part IV paragraph 2 however provides:

“In these Bills of Quantities, the sub-headings and item descriptions identify the work covered by the respective items but the nature and extent of the work to be performed is to be ascertained by reference to the Drawings, Specification and Conditions of Contract, as the case may be (so far all the same as the CESMM3 – but then) in conjunction with the matters listed against the relevant marginal heading ‘Item coverage’ in Part V of the Method of Measurement. The rates inserted in the Bills of Quantities shall be deemed to be the full inclusive value of the work covered by the respective items, including but not limited to the following, unless expressly stated otherwise.

and there is then a list of sixteen general items that are to be allowed for in every rate such as labour, plant and materials.

3.3.10. In line with this for each item of work requiring to be measured in the HKGSMM there is not only a standard description and measurement rule, but also an ‘Item coverage’, being a list (in addition to the general list of sixteen items in General Preamble paragraph 2) of all the works that the contractor is to allow for in the item.

3.3.11. By way of an example HKGSMM paragraph 5.15 requires that:

The items for manholes, catchpits, gullies, other chambers and drawpits shall in accordance with General Preambles paragraph 2, include for:

(a) ascertaining nature, location and size of existing utilities prior to commencement of excavation.

(b) excavation in any material except rock and artificial hard material;

(c) forming channels and benchings, and building in pipe connections, including fittings and pipe.

Etc

3.3.12. The significance of this is sometimes misunderstood, and engineers consider that the effect is the same as the CESMM3, i.e. that a tendering contractor must allow for everything shown on the Drawings and in the Specification necessary to construct the item of works described in the item description.

3.3.13. This is not the case. By inclusion of the list of items that the tendering contractor is to allow for in each rate, i.e. the Item Coverage together with the sixteen items in General Preamble paragraph 2, those are the **only** items that the tendering contractor is obliged to allow for in his rate.

3.3.14. In short, my interpretation of HKGSMM General Preamble 2 is that when pricing an item the tendering contractor should:

- Read the item description in the Bills of Quantities, the relevant item coverage for the item and the general list of items in General Preamble paragraph 2 to ascertain the nature and scope of the works that he is required to allow for in the rate for the item.
- Read the Specification to ascertain the quality of the items identified above that are to be provided for.
- Read the Drawings to ascertain the exact nature and location of the items identified that are to be provided for.

3.3.15. The significance of this is clear. If there are works required associated with an item that has been measured that are not covered in either the item description, the item coverage or the general items in General Preamble paragraph 2 then there is an omission and the contractor is entitled to have such rectified and valued as an addition.

3.3.16. A good example of this can be seen in HKGSMM:

3.3.16.1. Paragraph 5.06 which is the item coverage for Sewers, drains, piped culverts, etc. Item coverage (p) provides: **"backfilling with special fill material and compaction."** However, there is no provision in any other item coverage for backfilling with general filling material. Whilst this has now been resolved by issue of a corrigendum to the HKGSMM contracts measured in accordance with the unamended HKGSMM could have claims for items omitted in this respect.

3.3.16.2. Paragraph 17.05, which is the item coverage for Dredging, provides no item coverage for disposal of the dredged material. Whilst this has again now been resolved by issue of a corrigendum to the HKGSMM contracts measured in accordance with the unamended HKGSMM could also have claims for items omitted in this respect.

3.3.17. The scope for claiming that there are items omitted from the Bills of Quantities is therefore far more extensive than in the CESMM3, and it is this SMM that has in my opinion contributed to the number of civil engineering claims that have arisen in the last fifteen years.

3.3.18. Martin Barnes in the **CESMM3 Handbook** raises exactly this point on page 20 when he states:

"Paragraph 3.2 deals with the question of style in item descriptions. Its point is that the bill, where it is dealing with Permanent Works, should identify the physical measurable things and not attempt to list all the stages of activity which the Contractor will have to go through to produce them. There are good reasons for this apart from brevity. However careful the bill compiler might be in listing the necessary tasks there will always be at least one more he could have added."

3.3.19. This is particularly a problem where there are new items added into the HKGSMM by way of Particular Preambles or amendments made to the existing rules. The HKGSMM was the result of ten years careful work by the Government Working Party to ensure that the

item coverages for the respective items were fully inclusive of all the works that could be required. However, amendments to the HKGSMM either in the form of additional items to be measured or change in the standard provisions are often made hurriedly and sometimes by fairly junior staff in the rush to prepare the contract documents for tender.

3.3.20. It is my experience that many claims for items omitted or errors in description arise from such non standard SMM clauses.

3.3.21. Claims for omitted items and errors in description are discussed below. They can, of course, arise under both the CESMM3 and the HKGSMM, but as stated above, there is far greater scope under the HKGSMM for such claims.

4. ITEMS OMITTED / ERRORS IN DESCRIPTION

4.1. Contractual Provisions

4.1.1. The majority of civil engineering measurement claims are that there are items omitted from the Bills of Quantities.

4.1.2. These claims are respectively made under:

GCC Clause 59(3):

“Any error in description or quantity in the Bills of Quantities or item omitted therefrom shall not vitiate the Contract nor release the Contractor from the execution of the whole or any part of the Works according to the Drawings and Specification or from any of his obligations or liabilities under the Contract. The Engineer shall correct any such error or omission, shall ascertain the value of the work actually carried out in accordance with Clause 61, and shall certify in accordance with Clause 79.”

or MTRC Clause 83(2):

“Any error in description in the Bill of Quantities or omission therefrom shall not vitiate the Contract nor release the Contractor from the execution of the whole or any part or Section of the Works according to the Contract or from any of his obligations or liabilities under the Contract. Any such error or omission shall be corrected by the Engineer and the value of the work actually carried out shall be ascertained in accordance with Clause 80. Provided that there shall be no rectification of any errors omissions or wrong estimates in the descriptions quantities rates and prices inserted by the Contractor in the Bill of Quantities, which errors, omissions or wrong estimates shall be entirely the responsibility of the Contractor.”

or KCRC Preamble to the Pricing Document (standard clause):

“The Engineer shall correct any error or omission in respect of remeasurement items as a result of mis-application of the Methods of Measurement in the preparation of Cost Centres and shall determine the value of the work actually carried out in accordance with the principles set out in Clause 56.2 of the General Conditions, provided that there shall be no rectification of error, omission or wrong estimate in any description or rate inserted by the Contractor in the Pricing Schedule.”

4.2. Claims

4.2.1. The claims themselves generally fall into three types, as follows:

4.2.2. **Where there is a specific item in either the CESMM3 or HKGSMM which is required for the works but which has not been measured in the Bills of Quantities.**

4.2.2.1. Such claims occur equally under both the CESMM3 and the HKGSMM. They are generally clear cut and valid being simply an easily recognised error in measurement. The validity of such claims was confirmed in the case of *A E Farr -v- Ministry of Transport (1977) 5BLR 94*.

4.2.2.2. In Government Contracts the claims are based upon the wording of GCC Clause 59(1):

"Except where any statement in the Bills of Quantities expressly shows to the contrary the works shall be deemed to have been measured in accordance with the method of measurement set out in the preambles to the Bills of Quantities"

and HKGSMM Part II - General Principles paragraph 4:

"Unless expressly stated otherwise in the Contract the Bills of Quantities are to contain all those items compounded in accordance with the foregoing paragraph 3 required to comprise the Works."

4.2.2.3. In MTRC Contracts they are based upon the wording of MTRC Clause 83(5):

"Except where any statement or general or detailed description of work in the Bill of Quantities expressly shows to the contrary each part of the Bill of Quantities shall be deemed to have been prepared and measurements shall be made according to the method of measurement referred to in the Bill of Quantities"

and CESMM3 Section II - General Principles paragraph 2.6:

"All work which is expressly required shall be covered in the Bill of Quantities."

and further CESMM3 Section 1 paragraph 1.6:

"The expression 'expressly required' means shown on the Drawings, described in the Specification or ordered by the Engineer pursuant to the Contract."

4.2.2.4. In KCRC Contracts they are based upon the wording of KCRC Preamble to the Pricing Document :

"Cost Centres containing remeasurement items have been prepared in accordance with the procedures contained in the following methods of measurement

(a) Civil Engineering Standard Method of Measurement, third edition reprinted with corrections in 1992, 1995 (CESMM3), which document is incorporated herein by reference....."

and CESMM3 Section II - General Principles paragraph 2.6:

"All work which is expressly required shall be covered in the Bill of Quantities."

and further CESMM3 Section 1 paragraph 1.6:

"The expression 'expressly required' means shown on the Drawings, described in the Specification or ordered by the Engineer pursuant to the Contract."

4.2.2.5. A further difficulty / point of interest arises with regard to the KCRC provisions. As stated previously it is normal in civil engineering works for the Bills of Quantities to be on a remeasurement basis rather than a lump sum basis (which would be more usual on a building project). The reasons for this are obvious in that the very nature of civil engineering works is such that it is normally very difficult if not impossible to measure the works with great accuracy from the contract drawings. This is particularly the case where there are large quantities of earthworks to be measured.

4.2.2.6. Both the MTRC and the Government conditions of contract for civil engineering works follow the remeasurement approach for their Bills of Quantities.

4.2.2.7. The KCRC conditions of contract, however, provide for some sections or Cost Centres to be lump sum and some to be remeasurement. There is, of course, nothing objectionable in this in that it is clearly possible to require lump sums for clearly defined works and remeasurement items for those with less certainty.

4.2.2.8. Claims for items omitted are not possible in lump sum cost centres for two reasons. Firstly, because the clause in the Preambles to the Pricing Document only makes provisions for rectification of errors in remeasurement Cost Centres, and, secondly, because of the inclusion of an item within each Cost Centre for 'Contractors Other Charges'. Contractors Other Charges are defined in the Bills of Quantities as follows:

“Contractor’s Other Charges inserted in the Pricing Document shall cover items which are necessary for the execution of the Works, as required by the Contract, which have been omitted from or have not been separately itemised in the Cost Centres and/or Schedule of Rates nor listed against the headings ‘Coverage Rules’ in the Methods of Measurement nor included in the AAMM (additions and amendments to the Methods of Measurement) and for which a separate charge is required.”

4.2.2.9. The onus is therefore on the tendering contractor to make allowance against this item in the Cost Centre for works either omitted from or not separately itemised in the Cost Centre. The application of this provision thus negates any possible claim for items omitted in the lump sum Cost Centres.

4.2.2.10. Of more interest to this paper is the fact that notwithstanding the provisions in the Preamble to the Pricing Document requiring rectification of errors or omissions in remeasurement cost centres, these cost centres also include the item for the Contractor’s Other Charges.

4.2.2.11. It is difficult to see how these two provisions can sit together because if the Contractor’s Other Charges provisions apply there can be no items omitted, making the clause in the Preamble to the Pricing Document meaningless.

4.2.2.12. However this apparent conflict would appear to be resolved by reference to Preamble. Paragraph 3.1:

“ ... In the event that the Contractor has not inserted any Contractor’s Other Charges in respect of any Cost Centre, the Cost Centre value of such Cost Centre shall be inclusive of all the Contractor’s obligations to execute that part of the Works ... and the Contractor shall not be entitled to receive any further or additional payment in respect of such ... save as referred to in Paragraph 4.1 below.” (Underlining added.)

and Paragraph 4.1 which states:

“The total of the Cost Centre Values shown in the Pricing Schedule Summary identifies the Tender Total which shall ... be the total amount paid to the Contractor for executing the Works ... subject only to any further amounts as may be determined by the Engineer ... in accordance with the General Conditions ... or such other matters for which an entitlement to payment is the subject of the express provisions of the General Conditions, Special Conditions or this Preamble.” (Underlining added.)

4.2.2.13. In other words, the item for ‘Contractor’s Other Charges’ is subservient to, and therefore operates subject to, the express provisions of (among others) Preamble paragraph 2.5. Accordingly a genuine claim for the correction and valuation of an item omitted from a remeasurement Cost Centre in accordance with the Preamble should not be denied on the grounds that such items are deemed covered by the item for ‘Contractor’s Other Charges’.

4.2.3. Where there is a specific item in the Standard Method of Measurement which is required for the works and which has been measured in the Bills of Quantities, but is measured either with a different description or a different unit of measurement.

4.2.3.1. This is an area of more contention.

4.2.3.2. Under the MTRC Contract it appears arguable that the contractor would have no claim in this situation, although whether this is the intention or not is debatable.

4.2.3.3. This is because whilst MTRC Clause 83(2) provides:

“Any error in description in the Bill of Quantities or omission therefrom shall be corrected by the Engineer.....”.

Clause 83(5) provides:

“Except where any statement or general or detailed description of work in the Bill of Quantities expressly shows to the contrary each part of the Bill of Quantities shall be deemed to have been prepared and measurements shall be made according to the method of measurement referred to in the Bill of Quantities”

4.2.3.4. It would appear arguable that you can never have an error in description (either an incorrect description or an incorrect unit) because any such description or unit would be a **‘general or detailed description of work in the Bill of Quantities’** expressly showing that the works have not been measured in accordance with the CESMM3.

4.2.3.5. This would of course mean that there was a discrepancy between MTRC Clause 83(1) and 83(3).

4.2.3.6. Under Government contracts and the HKGSMM, if works are not described correctly or are measured using a different unit I would generally consider that the contractor has a valid claim to have the matter rectified. Of course, whether this leads to a difference in valuation depends upon the circumstances of the case.

4.2.3.7. Under the KCRC contract and the CESMM3 I consider that the position is largely the same, although the grounds for errors in description are fewer because, unlike the HKGSMM, the CESMM3 does not make it a strict requirement that the item description exactly matches the wording set out in the CESMM3 provided that the description follows the correct system and adequately describes the works concerned.

4.2.3.8. The counter argument (under both the Government and KCRC contracts) which is often argued by engineers that the wording of the item, or the measurement by a certain unit in the Bills of Quantities itself is clear and amounts to an express statement that the Bills of Quantities have not been measured in accordance with the applicable standard method of measurement.

4.2.3.9. Whilst this is seemingly a valid argument under the MTRC contracts for the reasons set out in paragraph 4.3.2.4 above, I do not consider such an argument is valid under either the Government or KCRC contracts because both the HKGSMM and the CESMM3 require that wherever methods of measurement are adopted which are not in accordance with the method of measurement such must be stated by way of a Preamble, and not simply by measuring matters in a different manner in the Bills of Quantities.

4.2.3.10. This is clear by CESMM at Section 5 paragraph 5.4:

“The Preamble shall state the methods of measurement other than the CESMM3, if any which have been adopted in the preparation of the Bills of Quantities.” And

and HKGSMM Part III paragraph 10:

“Any methods of measurement which have been adopted in the preparation of the Bills of Quantities and which are not in accordance with or included in the Method of Measurement shall be stated in a Particular Preamble to the Bills of Quantities.

4.2.4. Where works are required but there is no applicable item in the Standard Method of Measurement nor (in the case of the HKGSMM) are the works covered by an 'item coverage' of another item.

4.2.4.1. Both the CESMM3 and HKGSMM are standard methods of measurement that cover the most commonly occurring items to be constructed on a civil engineering project.

4.2.4.2. But neither document is comprehensive and both documents envisage that works will be encountered that are not covered by their rules and that in such cases provision must be made to measure the works by the inclusion of a new measurement rule in the Preambles.

4.2.4.3. CESMM Section 2 paragraph 2.2 provides **“CESMM3 does not deal with the preparation of Bills of Quantities forwork which is seldom encountered in civil**

engineering contracts. Where any such work is to be included in a Contract for civil engineering work it shall be itemized and described in the Bills of Quantities in sufficient detail to enable tenderers to price it adequately and the method of measurement.”

4.2.4.4. HKGSMM Part II paragraph 3, inter alia provides: **“Where the Method of Measurement does not identify the work required it shall be amended as appropriate.”**

4.2.4.5. These provisions are to ensure that all the works to be carried out are covered in the Bills of Quantities. This is an express requirement of both SMMs.

4.2.4.6. CESMM Section 2 paragraph 2.6 provides: **“All work which is expressly required should be covered in the Bill of Quantities.”** and further CESMM3 Section 1 paragraph 1.6 provides: **“The expression ‘expressly required’ means shown on the Drawings, described in the Specification or ordered by the Engineer pursuant to the Contract.”**

4.2.4.7. HKGSMM Part II paragraph 4 provides: **“Unless expressly stated otherwise in the Contract the Bills of Quantities are to contain all those items compounded in accordance with the foregoing paragraph required to comprise the Works..”**

4.2.4.8. Where the item omitted is a major item of works that is clearly not provided for in the respective SMMs then there will probably be no argument under either the CESMM3 or the HKGSMM.

4.2.4.9. For example, in a project that I have recently been involved with there are gabion walls. Gabion walls for those of you who are not engineers are walls constructed of stones in wire mesh baskets.

4.2.4.10. The HKGSMM does not provide for such walls, yet I am sure no-one would suggest that such walls should not be measured, and further, no one would disagree that if there were no allowance for such walls in the Bills of Quantities that there would be an item omitted.

4.2.4.11. However, the position becomes less clear where the works concerned are smaller and where such works should, in the normal course of things, be deemed to be included with an item already measured.

4.2.4.12. A good example is the one already quoted for the measurement of sewers and in particular the requirement to backfill the drainage trenches with general filling material.

4.2.4.13. In KCRC and MTRC contracts that incorporate the CESMM3 there is clearly no claim available in this situation because, having regard to the brief description in the Bills of Quantities, i.e. Pipes of ** nominal bore in trenches, the contractor is then required to examine the specification and the drawings to ascertain the nature and scope of the works to be included within his rate and such will clearly include backfilling the trench in whatever material is required.

4.2.4.14. However, as stated previously the position in the HKGSMM is somewhat different, because whilst the item coverage includes backfilling with special filling materials, it does not include backfilling with general filling materials.

4.2.4.15. There is per se an item omitted that requires rectification.

4.2.4.16. However engineers commonly argue that the contractor should have allowed for such items because the HKGSMM General Preamble paragraph 2 provides, inter alia, that the rates inserted in the Bills of Quantities shall be deemed to be the full inclusive value of the work covered by the respective items including the following:

"(x) liabilities, obligations, and risks involved in the execution of the Works set forth or reasonably implied in the Contract."

4.2.4.17. I do not believe that this is correct. The HKGSMM General Preambles, paragraph 2 items (i) to (xi) provide a list of general items, including the item above, and including such items as labour, plant and materials. It is my understanding that these are to be read as being included in the item coverage for each item in the Standard Method of Measurement, and that the General Preamble is simply a convenient way of saving the need to put items such as labour, plant and materials in each and every item coverage.

4.2.4.18. What this means is that the general preamble items do not stand alone, they can only be read in conjunction with the items in the Standard Method of Measurement. Therefore where works are required but there is no applicable item in the Standard Method of Measurement it is not possible to allow for them by way of the General Preamble Items because there is no item in the Bills of Quantities to start with, i.e. no item to read the general preambles in conjunction with - in respect of the particular works concerned.

4.3. Rectification and Valuation

4.3.1. Where it is agreed that there is an item omitted or an error in description all contracts provide that the error be rectified and valued in accordance with the valuation of variation provisions.

4.4. Conclusion

4.4.1. Many of the problems which have arisen and which give rise to so many measurement claims have arisen because of Government's choice of the 'item coverage' system of standard method of measurement. If the item in the HKGSMM simply said 'construct precast concrete manhole 1000mm in diameter x 2000mm deep as shown on drawing no.....(as would be required under a CESMM provision), then the contractor would have to allow for all matters necessary to construct the manhole. However, once the item coverage system is adopted, and a list of all the items which the contractor must allow for, e.g. concrete, formwork, reinforcement, etc, is included, if something is omitted from the list it automatically becomes an item omitted from the Bills of Quantities and a claim is formed.

4.4.2. Had Government adopted the more radical CESMM rather than writing its own Standard Method of Measurement based upon the 'item coverage' system, then many of the item omitted claims which are now so prevalent would not arise.

5. AVOIDING CIVIL ENGINEERING MEASUREMENT CLAIMS

5.1. At the conclusion of this paper it is worth spending a moment to consider how civil engineering measurement claims may be avoided.

5.2. There are two ways in which such claims may be avoided.

5.2.1. The first is simple in the extreme – ensure that the Bills of Quantities are measured in accordance with the standard method applicable, and measure the items as accurately as can be done at tender stage on the information available. Further, when tenders are received examine the rates for high rates, low rates, and inconsistencies and consider carefully the consequence of each.

5.2.2. Unfortunately this simply solution does not appear to be the solution of choice. Instead, and as a second means of avoiding civil engineering measurement disputes, employers and engineers include provisions in their contracts to prevent such claims. Such provisions come in many shapes and forms but will commonly be in the form of either an item of 'Contractor's Other Charges' whereby a contractor is to allow for anything that has been omitted from the Bills of Quantities, or a simple statement to the effect that notwithstanding the provisions of the standard method of measurement the contractor's rates are to include for everything shown on the drawings or described in the specification regardless of whether it is expressly covered or not.

5.2.3. On the face of its such provisions are attractive, i.e. the negation of claims for items omitted or the like. However, closer inspection reveals that such provisions are short-sighted in the extreme and serve only to destroy the four functions of Bills of Quantities set out at the beginning of this paper.

5.2.3.1. Tender Preparation – the contractor's tender preparation is made more complex by the knowledge that the items in the Bills of Quantities are not the comprehensive measurement of the works and that he must re-check the Bills of Quantities himself for any items that may have been omitted. Whether and where he allows for such items then creates a problem for the employer.

5.2.3.2. Tender Assessment – the employer's (or at least his consultants') tender assessment is made impossible if the items in the Bills of Quantities are not necessarily comprehensive and the contractor is deemed to have allowed in his rates for all matters whether measured or not. Tender assessment is seriously impaired because it is simply not possible to assess firstly whether the tendering contractor has allowed for something not expressly measured in the Bills of Quantities, and secondly, if he has allowed for it, where the allowance is made.

5.2.3.3. Interim Valuation – If it is not possible for the engineer to state conclusively what the contractor has allowed for in each rate then how can he properly carry out interim valuations of the works completed on the basis of such rate.

5.2.3.4. Similarly if the engineer does not know for certain what is allowed for in each rate how can he use those rates for the valuation of variations? More importantly, if one of the items which is not measured, but 'deemed to be included' is omitted how can such omission be valued? All conditions of contract require that works omitted be valued **“..at the rate stated in the contract for such works..”**. If there is no rate stated in the contract for such works (because they are deemed to be included elsewhere) I would suggest that it is not possible for any omission to be made from the contract sum.

5.2.4. Put simply it is my opinion that steps taken to avoid civil engineering measurement disputes that place the risk for items omitted etc on the contractor are short-sighted and that whilst they ostensibly place the risk on the contractor they do in reality prejudice the employer for whose benefit they are written.

5.3. In conclusion I can find no better or more apt comment than that from Mr Martin Barnes In the **CESMM3 Handbook**, when he says:

“An employer’s interest is best served by a contractor who is able to base an accurate estimate on a reliable plan for constructing a clearly defined project, and who is able to carry out the work with a continuing incentive to build efficiently and economically despite the assaults of those unforeseen circumstances which characterize civil engineering works. Confidence in being paid fully, promptly and fairly will lead to the prosperity of efficient contractors and to the demise of those whose success depends more on the vigour with which they pursue doubtful claims.”

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