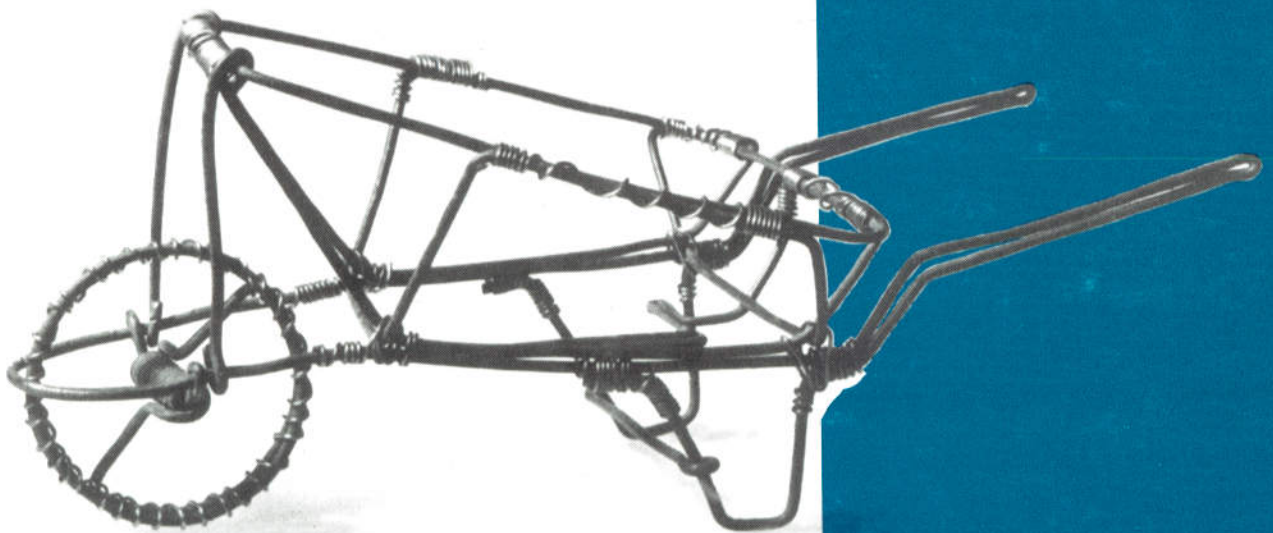




Measuring and pricing for emerging contractors

Construction and
development

André ten Krooden



Number 12

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Measuring and pricing for emerging contractors

Development Bank of Southern Africa
Centre for Policy and Information

Construction and development series

Number 12

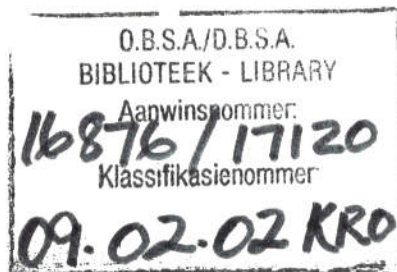
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Series preface

Policies and strategies for promoting development in South Africa are arguably as important a product of the Development Bank of Southern Africa as its loan finance and technical assistance programmes. This series of publications on 'Construction and development' illustrates this point.

Development projects in South Africa have traditionally been undertaken to meet only the physical needs of the recipient community. South Africa's changing social and economic environment demands that such projects are executed in a way that also addresses communities' other needs. To achieve this, projects should be structured so that opportunities for employment and the development of skills and entrepreneurial abilities are maximised.

Construction and maintenance of resultant facilities are an essential part of any growing economy and in South Africa historically an important employer and an industry typifying the overcapitalisation which has bedevilled the economy. These considerations, together with the fact that a large part of DBSA's lending goes to construction projects, suggest that it would be helpful to make practical proposals to assist the industry to adapt and contribute to development in the new circumstances.

The publications in this series present an approach to development that focuses on

- identification of the broad economic and social needs of communities
- optimal use of resources available to them
- ways in which communities can exploit the opportunities presented by development projects
- approaches to making best use of labour – an abundant but underutilised resource
- appropriate design and methods of building and construction
- the use of, and misconceptions about, building regulations
- entrepreneurial development.

The publications are thus designed to help alleviate the constraints which have inhibited poorer communities from developing the skills at both individual and community level that can lead to entrepreneurship and genuine empowerment. This is perhaps the most important message of the series. It is above all through active participation in the process of development that individuals and communities can improve their quality of life. And it is to this end that the series is dedicated.

The Construction and development series of publications is produced by DBSA staff and consultants contracted to the Construction and development policy programme, whose advisory panel has recommended the widespread distribution of these publications to further the human development approach pursued by DBSA.

GJ Richter
General Manager

JH de V Botha
Programme Manager

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Modification and additions

Users and readers are requested to share their comments, recommendations and own experiences. Readers who wish to contribute to further editions should contact the compiler.

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1. Introduction

1.1 Purpose of this document

This publication provides the quantity surveyor and client bodies with an alternative to the traditional bills of quantities as a basis of tender documentation for emerging contractors. It is intended to be used as a guideline and as such provides a worked example of this alternative. This document can also be used for teaching purposes, and to assist emerging contractors, as the complexities of pricing are broken down into manageable components. Traditional measuring skills used in the construction industry form the basis of these elements.

1.2 Problem statement

Emerging contractors frequently experience difficulty in accurately calculating the price to be quoted for a project or a task. This very often results in too low a tender – causing losses, or too high a tender – resulting in no work. Emerging contractors need assistance with their pricing. This publication is indicative of documentation which could be used to eliminate or reduce the guesswork.

In most cases emerging contractors price on square metre on plan basis. The detail is not calculated and is at best historical, or on what is heard in the market-place when comparing prices with other contractors.

Bills of quantities as prepared by quantity surveyors are not helpful to emerging contractors as each item involves the calculation of material, labour and profit. These are difficult to extract for the unskilled person, presenting a problem for the emerging contractor. When confronted with bills of quantities, the emerging contractor very often has to approach a quantity surveyor to do the pricing. This places the person responsible for pricing in a difficult position, as no knowledge regarding productivity and suppliers' discounts is available, thus resulting also in an educated guess as to the pricing structure. However, this method may be more of a calculated guess within the market norms, but is not specific to that particular contractor.

Building is a complex activity comprising many items and activities. This publication gives the reader an example of how documentation could be prepared for emerging contractors, particularly in the building industry. Although work to be done in the civil industry is less complex and more appropriate to task work, the same guidelines could be followed here.

1.3 Methodology

The project has been split into its various resources (Sections 1–9), and each resource is described prior to the worked example measurement. They are the following:

Section 1	Materials resources
Section 2	Labour resources
Section 3	Subcontractors
Section 4	Preliminaries
Section 5	Contingencies and allowances for sundries
Section 6	Profit
Section 7	Escalation
Section 8	Summary of bulk materials to be purchased
Section 9	Value added tax (VAT)

The resources requirements should be linked to a programme of work in order to calculate

- the material delivery dates
- the labour resources required, and
- when subcontractors are required on site.

This enables the emerging contractor to plan material requirements as well as labour resources and not to over or undersupply any of these on site.

1.4 Workshopping

Once a schedule of resources has been prepared by the quantity surveyor, it is advisable that this schedule, together with the drawings, be workshopped with all the emerging contractors prior to them preparing their tenders. This could take place as a compulsory seminar or workshop. An example is then to be calculated with the emerging contractors prior to the pricing of the actual document. It is advisable to conduct another workshop, say two days prior to tender closure in order to assist with any problems. It is important that the emerging contractors understand the document and have the opportunity to raise questions in order to obtain clarity on all issues.

1.5 Annexures

Annexures of the various sections are as set out below:

Section 1	Materials resources
Section 2	Labour resources
Section 3	Subcontractors
Section 4	Preliminaries
Section 5	Contingencies and allowances for sundries
Section 6	Profit
Section 7	Escalation
Section 8	Summary of bulk materials to be purchased
Section 9	Value added tax (VAT)
Section 10	Labour requirements
Section 11	Elemental costs
Section 12	Bar chart
Section 13	Cash flow and graphs

2. Resources

2.1 Section 1: Materials resources

The purpose is to provide the emerging contractor with a “shopping list” of materials required for the project. This section forms part of the whole tender and should be seen as such. The whole tender involves materials, labour, subcontracts, preliminaries, contingencies and allowances, profit, escalation and VAT.

In the main the materials resources have been divided up into trades as they would appear in a traditional bill of quantities. This resource, together with the programme, will also assist the emerging contractor in determining aspects such as delivery dates. Having a list of all material requirements enables him to negotiate prices and delivery dates with the suppliers.

This example has deliberately been shortened by not including detailed specifications in the effort to simplify the documentation. A column has been added to indicate the wastage by ordering in the quantities available, for example drums or tins of paint. This informs the emerging contractor of the wastage which should be managed, and which could then be used on another project.

Separating materials from labour enables the emerging contractor to have a “materials shopping list” for comparative pricing by suppliers.

When pricing for concrete work the emerging contractor also has the opportunity of either pricing for mixing on site or for purchasing ready-mixed concrete.

Notes:

- (1) If the ready-mixed concrete option is chosen (which comes in 5,5 to 6 cubic metre loads), care should be taken of the wastage factor, as this could be significant.
- (2) Any contractor has to manage the materials to avoid breakages and losses due to theft and bad building practices. In addition, the waste per item should be managed, hence waste amounts are shown separately in order to bring waste to the contractor's attention. When pricing, it is important to realise that calculation of the building materials required does not take into account any of the above losses. Some allowances in the profit or contingency could possibly be made to cover these eventualities.
- (3) The rates used in the example are only indicative and are not to be used when calculating a tender price.
- (4) The emerging contractor is advised to use the list as a comparative shopping list in order to get the best price. This list can also be used by a quantity surveyor or the building owner to obtain prices for the builders. On projects where there is more than one builder, bulk buying could play a role.

Table 1: Example of a tender document, Section 1 (Materials resources)

	<i>a</i> Units of measure- ment	<i>b</i> Bill of quantities	<i>c</i> Units of purchase	<i>d</i> Ordering amount	<i>e</i> Rate	<i>f</i> Amount R	<i>g</i> Waste	<i>h</i> Units of waste
TENDER INFORMATION								
CONCRETE FORMWORK AND REINFORCE- MENT								
Mass concrete in foundations	m ³	33	Stone m ³ Sand m ³ Cement pockets	25 25 180				
Alternative – ready-mixed concrete			Loads	6			0,3	m ³

Explanation of table

- First column: Descriptions of items as they would appear in a quantity surveyor's bill of quantities.
- Column a (Units of measurement): This column indicates the unit of measurement either as cubic metre (m³), square metre (m²), metre (m), number (No.) or item.
- Column b (Bill of quantities): This column gives the quantities as they would appear in a normal bill of quantities prepared by a quantity surveyor.
- Column c (Units of purchase): This column indicates the unit of purchase of items, for example, cubic metre (m³), square metre (m²), metre (m), number (No.) or item, or as in the example above, stone m³, sand m³, cement in pockets, with an alternative of ready-mixed concrete in loads.
- Column d (Ordering amount): This column shows the required volume or amount to be purchased. In the example above it is the cubic metres of stone, sand and the number of pockets of cement required for 33 m³ of concrete. Alternately, to cast 33 m³ of concrete using ready-mixed concrete will require 6 loads of 6 m³ each, giving a wastage volume, or excess to requirement for this task of 0,3 m³. This wastage will have to be paid for and cannot be claimed from the client. Prior to using the ready-mixed option, careful planning should be done to minimise wastage.
- Column e (Rate): This column is for the emerging contractor to calculate the net rate per item. Cost per unit will be provided by the contractor's supplier.
- Column f (Amount): This column is used for calculating the end costs by multiplying Column *d* with Column *e*.
- Column g (Waste): This column indicates to the emerging contractor what the waste could be.
- Column h (Units of purchase): Like Column *c*, Column *h* indicates the unit of purchase of items, for example cubic metre (m³), square metre (m²), metre (m), Number (No.) or item.

Table 2 is an example of what the above would look like in a completed tender.

Table 2: Example of a completed tender, Section 1

	<i>a</i> Units of measure- ment	<i>b</i> Bill of quantities	<i>c</i> Units of purchase	<i>d</i> Ordering amount	<i>e</i> Rate	<i>f</i> Amount R	<i>g</i> Waste	<i>h</i> Units of waste
TENDER INFORMATION								
CONCRETE FORMWORK AND REINFORCE- MENT								
Mass concrete in foundations	m ³	33	Stone m ³ Sand m ³ Cement pockets	25 25 180	R52-00 R40-00 R14-95	R1248-00 R 960-00 R2526-55	57,00 45,00 18,15	1425,00 1125,00 3267,00
Alternative – ready- mixed concrete			Loads	6			0,3	m ³

The ready-mixed option was not priced in this instance.

2.2 Section 2: Labour resources

The purpose is to provide the emerging contractor with a “shopping list” of labour required for the project.

When faced with a traditional bill of quantities as prepared by a quantity surveyor, or worse still, a specification and a drawing, the emerging contractor faces enormous difficulty in assessing how much labour is required for the project. Due to the time pressure of a project he often miscalculates the amount of labour required and normally oversupplies this costly resource, resulting in cost overruns and inefficient utilisation. This methodology extracts the labour and shows it separately, enabling the emerging contractor to focus on productivity and labour in particular.

In calculating the labour resource the emerging contractor is faced with the problem of determining productivity for each item of work. Once productivity has been established, he is able to calculate the number of man-days required to complete each task. This, in turn, will help him to calculate the number of labourers and artisans required to meet the programme. The higher the productivity, the keener the

price could be. Assisting the emerging contractor to determine the productivity of the labour force also assists in cost control per task during the contract period.

Table 3: Example of a tender document, Section 2 (Labour resources)

		<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	<i>e</i>	<i>f</i>	<i>g</i>
						Quantity	Rate	Amount
Concrete in foundations	m ³	32,71	Rate/m ³					
		Production/day m³	Rate/day	Cost/m³	Man-days required			
Labourer								
Semi-skilled								
Plant								
		Total/m ³			m ³	33		

Explanation of table

- First column; first line: Description of items as they would appear in a quantity surveyor's bill of quantities. Below are the categories of artisans/labourers who may be involved in the task or item.
- Column *a* (Exact measurement): This gives the emerging contractor the exact measurement without any rounding off so that he can calculate the labour more accurately. Under the box "Production/day m³" the emerging contractor fills in the cubic metres which the labourers could handle per day.
- Column *b* (Rate/day): In these boxes the daily wage per day per category is filled in.
- Column *c* (Cost/m³): In these boxes the cost per unit per day is calculated by dividing the rate per day by production per day. Lower down the table the rates are added to give a total cost per unit of measurement.
- Column *d* (Man-days required): It is important to know how many man-days will be required to complete the task so that once the programme has been drawn up, the number of days available for this task is used to calculate the amount of labour required for each task – 32,71 or 33 Column *a* = Column *e*.
- Column *e* (Quantity): This is the quantity of work that needs to be done – in this

case 33 m³ of concrete.

- **Column *f* (Rate):** The rate as calculated at the bottom of Column *c* and transferred to Column *f*.

Table 4 is an example of what the above would look like in a completed tender.

Table 4: Example of a completed tender, Section 2

		<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	<i>e</i> Quantity	<i>f</i> Rate	<i>g</i> Amount
Concrete in foundations	m ³	32,71						
		Production/day m³	Rate/day	Cost/m³	Man-days required			
Labourer		2	44	22,00	17			
Semi-skilled		15	50	3,33	2			
Plant		20	172	8,60	3			
			Total/m ³	33,93				
					m ³	33	33,93	1119,67

2.3 Section 3: Subcontractors

The purpose is to provide the emerging contractor with a “shopping list” of subcontractors that may be required for the project. Subcontractors play a major role in a contractor’s programme and tend to be more specialist in nature. Since the subcontractor is a specialist in this field – usually having a higher level of competence – a lump sum tender could be calculated from drawings.

It is recognised that each contractor will make use of subcontractors. Such subcontractors could be for plumbing, electrical installation, roofing, joinery, glazing, specialist foundations such as rafts, concrete structures, flooring, etcetera. This section could include both nominated and domestic subcontractors. In some instances the emerging contractor may decide to build the structure only and to manage the other trades such as plastering and painting.

Where one has emerging subcontractors, a higher level of detail will need to be given and a subcontract document will need to be drafted using the same principles as the main contract. In the example specialist subcontractors’ quantities have not been fully

measured but rather are indicative only, for example the number of wash basins including taps and piping. A plumber, for example, would need to price the drawing and specifications, extracting the specific quantities himself. However, should the specialist subcontractor require more detailed measurements, this could be provided by the quantity surveyor.

The use of subcontractors should be discussed with the emerging contractors prior to the preparation of the documentation in order to accommodate the specific subcontractors.

2.4 Section 4: Preliminaries

Preliminaries cover items such as the setting out of the works, insurances, foremen and security. The items set out in this section are the items usually priced by contractors. Normally the preliminaries section of a bill of quantities enables the contractor to price each clause of the contract. A summary of the most often priced items for this example has been extracted.

It is advisable for an emerging contractor to price the preliminaries and not to make a percentage allowance on contract value. This ensures that the conditions of contract are applied and that the emerging contractor has thought through each item. Incorrect pricing of the preliminaries can result in either the contract being priced too low – resulting in the emerging contractor forfeiting profit, making a loss – or the same being priced too high and the emerging contractor losing the contract.

2.5 Section 5: Contractors' contingencies

The way the above sections have been compiled and the acknowledgement that the "shopping list" does not cover each and every eventuality, creates a need for the document to have a section where eventualities and small items such as nails, screws and sundry bolts can be priced as a lump sum amount.

To cover all eventualities and items of minor material could place a huge and onerous task on the person preparing the documents. In normal circumstances a 1,5 to 2 per cent allowance should be made.

2.6 Section 6: Profit

Profit should always be the driving force of a company and the business of an emerging contractor is no exception. Profits are normally priced as a percentage added to all costs. It is important to show emerging contractors what their potential profit is likely to be and not hide this in the rates, as is normally the case. Profitability should be monitored regularly throughout the contract in order to keep the emerging contractor focussed. Profits for emerging contractors should vary between 7,5 and 15 per cent, as most of their jobs are small.

An emerging contractor's competitiveness is measured by the amount of profit required. Profit is also linked to productivity. The faster the team can produce, the more profit is likely to be made. While setting out to make a profit there are eventualities that can quickly reduce this profit, and even cause losses. These are

- lack of productivity
- theft
- wastage
- materials handling errors
- lack of timeous deliveries
- bad supervision and management of workers, causing tasks to be broken down and rebuilt.

2.7 Section 7: Escalation

Escalation is the amount by which a tender price is likely to increase during the building period. Contracts can be put out as one of the following:

- Fixed price or lump sum type contracts where the risk of escalation lies with the contractor
- Fluctuating contracts where the risk of escalation lies with the client or building owner.

Where an emerging contractor is required to submit a fixed price for a contract, he should be encouraged to at least think about escalation. A fixed price contract forces the contractor to risk escalation. As soon as a contractor has built a portion of the project, escalation will cease to affect that portion.

Escalation will not be a fixed amount per period but rather smaller amounts per month/fortnight/week for the first period, increasing during the middle of the contract and decreasing towards the end. This is often referred to as the S-curve. The method

most often used to calculate escalation is firstly to guess the average monthly increase in costs. Guesswork can be done more accurately by subscribing to publications which forecast increases on an index basis. The formula for calculating escalation is as follows:

Present building cost (PBC) × monthly escalation percentage (Esc %) × number of months (Months) × 85% (which is the normal standard used in the building industry for non-escalating amounts of the tender price) × factor (which will be to compensate for the S-curve on a factor basis).

PBC × Esc % × Months × 85% × Factor, where

PBC	=	Present building cost
Esc %	=	Percentage escalation per month
Months	=	Contract period
85%	=	Factor omitting the contractor's so-called profit and non-escalating amounts of the tender price from the tender amount. This factor is the standard within the building industry.
Factor	=	Factor which attempts to calculate escalation on an S-curve basis, that is 0,5 would be a straight line while 0,65 would give an S-curve factor.

Worked example

Building value	R500 000,00
Estimated monthly escalation	1% per month
contract period	11 months
S-curve factor	0,65

Calculation of escalation

$$R500\,000,00 \times 1,0\% \times 11 \times 85\% \times 0,65 = R30\,387,50$$

2.8 Section 8: Value-added tax (VAT)

VAT is added to all materials purchased by the emerging contractor. If he is not registered as a VAT vendor, then it would not be possible to claim these costs against the income received from the employer. Most emerging contractors are not registered VAT vendors and therefore have to include the VAT in their materials in the form of an increased price. The advantage to the client who uses the building for his own purposes is that theoretically, he should be getting a cheaper price, as VAT is only included in the materials element and not the labour element. If an emerging contractor is not VAT

registered then the materials should be VAT inclusive and he will not calculate this section at all.

2.9 Section 9: Summary of bulk materials to be purchased

An emerging contractor will need to plan each microlevel of the construction process. Knowledge of the total bulk purchasing volume will assist him in negotiating the best possible discounts, as discounts are calculated on volume. Furthermore, knowledge of the bulk supplies required could give the supplier an indication of the total amount required.

Table 5: Example of a summary of bulk materials, Section 9

			Actual required	Purchase amount	Type	Waste	Units
RIVER SAND			69	13	5,5 m ³ loads	3	m ³
BUILDING SAND			42	8	5,5 m ³ loads	2	m ³
PLASTER SAND			20	4	5,5 m ³ loads	2	m ³
CEMENT			624	624	pockets	0	pockets
COMMON BRICKS			41 256	42	thousands	744	bricks
3 000 brick deliveries				14	3 000 bricks	744	bricks
In foundations	Type	Light	1 564	2	thousands	436	bricks
In superstructure: external	Type	Light	8 881	9	thousands	119	bricks
In superstructure: external	Type	Dark	1 595	2	thousands	405	bricks
3 000 brick deliveries				1	3 000 bricks	1 405	bricks
In external gables	Type	Light	1 312	2	thousands	688	bricks
3 000 brick deliveries				1	3 000 bricks	1 688	bricks
In external site walling	Type	0	4 546	5	thousands	454	bricks
3 000 brick deliveries				2	3 000 bricks	1 454	bricks
Concrete stone 20 mm			46	9	5,5 m ³ loads	4	m ³

2.10 Section 10: Labour requirements

It is important for all contractors to plan their labour requirements on site for each item of work. The number of labour days (man-days) required is obtained from Section 2 (Labour resources), which is based on productivity. The contractor needs to then plan the project in terms of time taken to build. (See Section 12 – Bar chart.) Having programmed the project on a bar graph basis, the emerging contractor can now determine how much labour is required to complete each element of construction. Say, for example, the programmed time required for brickwork is 7 days, and 165 man-days are required for labour and 83 man-days for the bricklayer in order to undertake the task. The contractor will need $165 \div 7 = 24$ labourers and $83 \div 7 = 12$ bricklayers. By applying these principles a complete labour requirement can be calculated, thus preventing an over or undersupply of labour.

Table 6: Example of labour requirements, Section 10

Programme	Man-days required			Number of employees required			
	Time – days	Labourer	Semi-skilled	Artisan	Labourer	Semi-skilled	Artisan
FOUNDATIONS							
Clear site	3	17	3		6	1	
Excavations etc.	3	56	10		19	3	
Concrete & formwork	3	17	2	0	6	1	
Brickwork & finishes	4	144		71	36		18
Floor structure							
Filling	2	10	2		5	1	
Concrete	2	9	1		5	1	
SUPERSTRUCTURE							
CONCRETE WORK							
Slabs	1	5	1	1	5	1	1
Walls & retaining walls	2	28	11	11	14	6	6
Reinforcing	1	1	1	1	1	1	1
BRICKWORK							
Brickwork	7	165		83	24		12
External facings	7	26		13	4		2
ROOFS							
Structure and coverings	5	21	10	21	4	2	4
Coverings	3	6	3	6	2	1	2

2.11 Section 11: Elemental costs

This is an abstract of all costs scheduled as materials, labour and subcontractors, which is then totalled. This helps the emerging contractor to know how much money is available per task and also helps to keep track of costing, should all costs be allocated to these cost centres. This will give the emerging contractor an early warning system should costs be running away. It is therefore important for emerging contractors to keep an analysis cash book of all costs analysed against each of the headings.

Table 7: Example of elemental costs, Section 11

	Materials	Labour	Subcontractors	TOTAL
FOUNDATIONS				
Clear site		R644,10		R644,10
Excavations, etc.	R750,00	R1 922,17		R2 672,17
Concrete & formwork	R5 216,00	R891,00		R6 107,00
Brickwork & finishes	R4 620,24	R2 336,25		R6 956,49
Floor structure				
Filling	R4 202,54	R387,00		R4 589,54
Concrete	R3 484,00	R486,00		R3 970,00
SUPERSTRUCTURE				
CONCRETE WORK				
Slabs and beams	R317,60	R167,00		R484,60
Walls & retaining walls	R1 563,40	R1 062,50		R2 625,90
Test cubes	R65,00			R65,00
Reinforcing	R289,80	R138,00		R427,80
BRICKWORK				
Brickwork	R11 977,94	R7 888,95		R19 866,89
Windows	R5 076,17	R607,50		R5 683,67
Door frames	R2 436,00	R495,00		R2 931,00
External facings	R5 679,29	R1 725,00		R7 404,29
ROOFS				
Structure	R5 008,74	R2 813,17	R11 605,80	R19 427,71
Coverings	R10 266,16	R1 333,33	R0,00	R11 599,49
INTERNAL FINISHES				
Walls				
Plaster	R1 880,60	R4 196,11	R0,00	R6 076,71
Facings	R936,32			R936,32
Wall tiling	R703,90	R120,00		R823,90

Floors				
Screed & power float	R1 110,40	R1 587,37		R2 697,77
Finishes	R13 087,00	R430,86	R0,00	R13 517,86
Ceilings				
Ceilings	R7 754,75	R1 052,31		R8 807,06
Painting	R5 575,00	R2 183,05	R0,00	R7 758,05
WINDOWS AND DOORS				
Glazing	R575,00	R0,00	R2 730,00	R3 305,00
Hanging doors and locks	R9 114,44	R770,00		R9 884,44
PLUMBING				
Gutters, down pipes & flashings	R1 512,00	R430,50		R1 942,50
First fix			R8 750,00	R8 750,00
Second fix			R9 257,50	R9 257,50
Builders' work	R1 800,75	R540,23		R2 340,98
ELECTRICAL				
First fix			R8 631,00	R8 631,00
Second fix			R24 989,00	R24 989,00
Cabling			R9 300,00	R9 300,00
Builders' work	R129,00	R2 146,00		R2 275,00
FITTINGS				
Cupboards, etc.	R1 073,00	R0,00	R19 057,50	R20 130,50
EXTERNAL PLUMBING				
Water	R0,00		R6 300,00	R6 300,00
Drainage	R0,00		R14 815,00	R14 815,00
EXTERNAL WORKS				
Fencing and gates	R0,00		R57 555,00	R57 555,00
Paving, etc.	R18 640,00	R5 815,00		R24 455,00
Roads	R5 150,00	R1 221,90		R6 371,90
Site walling	R3 503,13	R2 161,91		R5 665,04
Sundries	R0,00			R0,00
SUBTOTAL	R133 498,17	R45 552,20	R172 990,80	R352 041,17
PRELIMINARIES		R21 122,47		R21 122,47
SUNDRIES		R7 463,27		R7 463,27
PROFIT	R13 349,82	R7 413,79	R17 299,08	R38 062,69
ESCALATION	R6 608,16	R3 669,83	R8 563,04	R18 841,03
TOTAL	R153 456,15	R85 221,56	R198 852,92	R437 530,63
VAT	R21 483,86	R11 931,02	R27 839,41	R61 254,29
GRAND TOTAL	R174 940,01	R97 152,58	R226 692,33	R498 784,92

2.12 Section 12: Bar graph for contract purposes

The bar graph is a very important planning tool for the contractor. (Section 12, page 30 gives a worked example of a bar graph.) Emerging contractors should be encouraged to draw up a graph prior to commencing a project, as this – apart from assisting with the programming and monitoring of the project – enables the calculation of the number of artisans and labourers required for the project. (See Section 10.)

It is always important for a contractor to programme his work. The emerging contractor, in particular, needs to be assisted practically with his planning. Programming of the labour requirements, the materials supply and the subcontractors is important for the smooth running of the contract. This will ensure that the project is completed on time and, more importantly for the emerging contractor, within the tender amount.

It is the programme that determines the amount of labour required for a specific task. For example, if only four days are programmed for the brickwork and the emerging contractor is required to complete 120 square metres of brickwork in that period, he will firstly need to calculate his productivity. If the productivity of his bricklayers is, say, 500 bricks a day, then each team completes 4,55 m² in a day and the task will require 26 man-days. Having only four days to complete all the brickwork will require 26 man-days divided by 4 days = 6½, or 7, teams. If the task can be completed in time by using only six bricklaying teams, thus increasing productivity slightly, the contractor can expect slightly more profit on that task.

The programme also indicates to the contractor when materials should arrive, as too early exposes the contractor to theft risks and too late will cost him in “down time” for his labour.

Many emerging contractors are unable to get credit from suppliers and therefore have a more severe cash flow problem than established contractors. Suppliers more often than not demand payment prior to delivery. Clients, project managers and supervising persons could make this much easier for the emerging contractor by facilitating the credit supply from suppliers. This could take the form of, say, a guaranteed payment to suppliers under certain conditions.

2.12.1 Cost control and management of the project

Cost control of a project is vital and the emerging contractor should be encouraged to keep at least an analysis cash book per project wherein each purchase and amount paid on the entire project is recorded. A materials log book wherein he records the order

placed, the amount and the cost, the delivery and also the payment made, gives the emerging contractor a control on his materials. He will be able to see the position of his cash flow and stock at any time. This will enable him to keep accurate records and also to compare the costs to the tender amounts per resource.

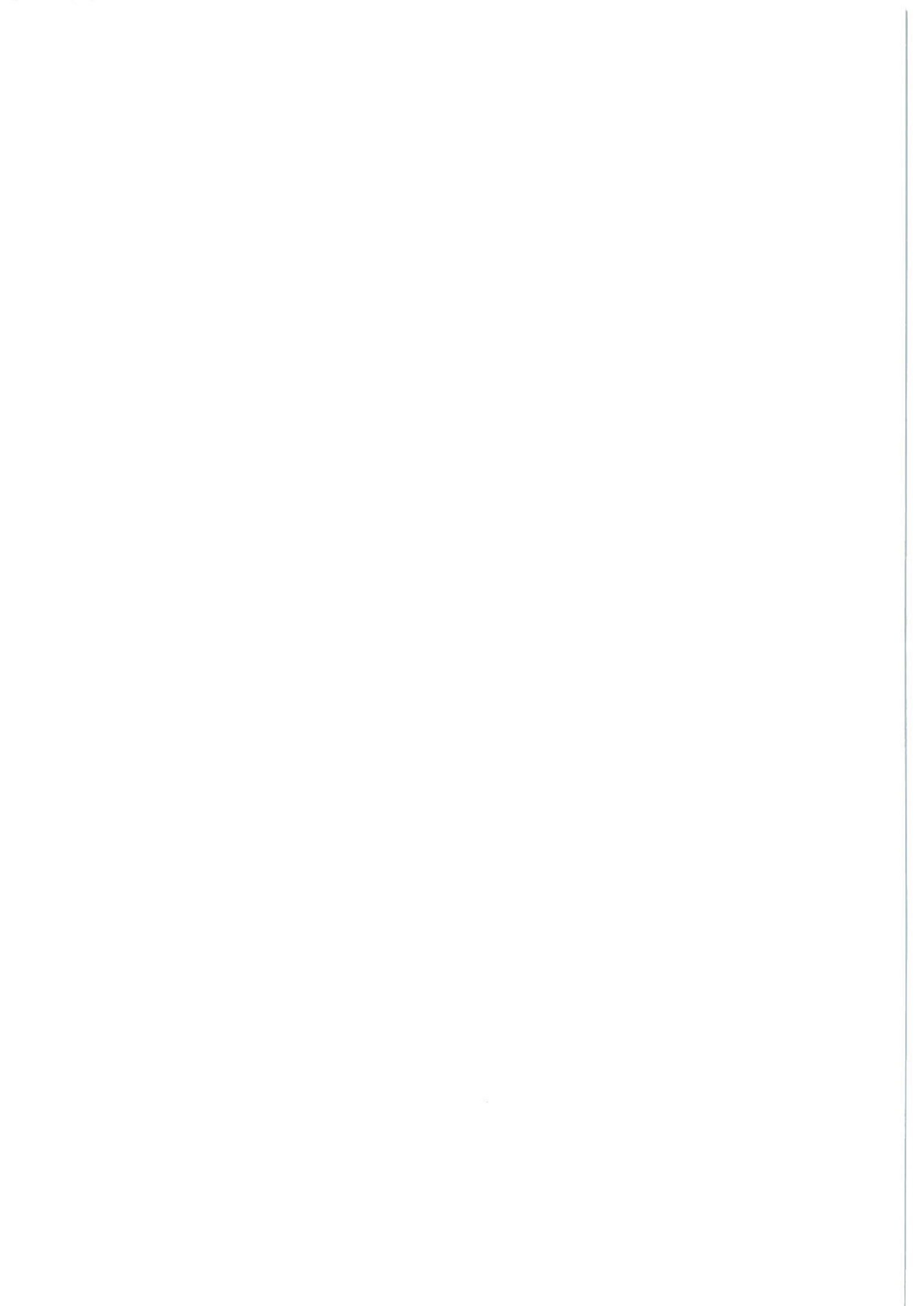
Having access to such records can be invaluable to the contractor when the quantity surveyor prepares the valuation of work done as a checking mechanism. Being able to disclose the quantities and costs to the quantity surveyor ensures that the contractor receives a fair valuation and he is able to argue more convincingly should he be underpaid. It is always recommended that a contractor does the valuation together with the quantity surveyor and that an open and instructive approach is used by the professionals. This ensures that the contractor will eventually be able to prepare his own valuation for the quantity surveyor as a check.

2.13 Section 13: Estimated cash flows and graphs

By knowing what the contract amount is per element, the contractor can, from his bar chart, now calculate what his cash flow is likely to be. This gives the contractor yet another tool with which to monitor the project properly, namely the cash flow chart. By plotting the expected expenditure per week, this information can then be graphed. This also provides the contractor with a check mechanism to evaluate whether the payments made by the client are reasonable.

3. Conclusion

In order to manage a successful construction company there are many tasks that have to be seen to. Construction is not simply laying one brick upon the other. Management of one's resources – that is materials, labour, subcontractors, finances, and so on – is very important. Emerging contractors should be encouraged to apply the systems as indicated in this document as a relatively simple method of controlling their business. Quantity surveyors should be encouraged to produce documentation that would assist emerging contractors with their development. This publication is but an example that could be used to this end.



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