



International Materials Handling Conference

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Under the office of:
The SA Institute of Materials Handling
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Conveyor Manufacturers Association of SA Limited



The Needs of the Contractor

Mr. Brian Rogers
Cost Time Resource cc, RSA



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By Order

THE NEEDS OF THE CONTRACTOR

B G Rogers, Cost Time Resource cc

Introduction

The main purpose of this paper is to provide enough food for thought so that at the end of the day, hopefully, we can have some lively discussion during the debate "Practical implementation of clients evaluation process on contractors bidding proposal". I am not too sure of the split between client and contractor representation to-day but I feel sure that any contributions made later this afternoon can only improve the "Us" and "Them" atmosphere which can tend to detract from happy and successful projects.

A) THE NEEDS OF THE CONTRACTOR - PRIOR TO CONTRACT AWARD -TENDER PHASE

Client's selection of tenderers

As we are all aware good resources are scarce in the republic and reputable contractor's do not enjoy "MASS" tendering. Clients, who mostly have been in the business for many years, should have enough information to limit their list of tenderers for a specific project/item of equipment to a maximum of five and preferably three.

The Client should ensure his procurement department have vetted and approved in accordance with ISO 9001 their list of preferred vendors after each project and out of courtesy if a vendor has not performed to the satisfaction of the client they should be informed and given a chance to put their house in order.

Clients should not "USE" suppliers to obtain check prices. Any contractor needs to feel costs, time and resources are not being wasted in submitting a check price. The client resorting to this practice will inevitably not achieve his objective because he will not be getting a truly competitive bid. If it is solely to satisfy the in-house tendering procedure i.e. 3 bids then at times this falls short as vendors decline to bid because they feel it is for a check price only.

Client's Tender Documentation

First priority is to ensure that the Client's tender documentation will provide easily comparative bids to the level of accuracy anticipated from the documentation provided with the tender document. More on this in the next section when I deal with Classes of Estimate and Accuracy.

Define the scope well. This will save much heartache in the contract phase on both sides. Clients do not enjoy being hit with Cost Variation orders and most contractors/vendors would rather not have the hassles of generating them and fighting their case for additional monies.

Decide on the Work Breakdown Structure at the tendering phase and present the tender to suit this breakdown.

Decide on the level of detail wanted in the tender and make sure the documentation can support this level of detail.

Client should make sure that the level of detail is in line with the way the Client wants to control the project. Do NOT call for a basic breakdown of costs and request a level four programme to control the project. If your ultimate aim is to control the project with a level 4 programme (more on this later) then ensure the tender is broken down to the same level. Many attempts to integrate costs and time have failed because of this fundamental variance.

THE NEEDS OF THE CONTRACTOR

Synopsis of a paper to be presented at BELTCON 10 Tuesday 19th October 1999

PRIOR TO CONTRACT AWARD - TENDER PHASE

- Client's selection of tenderers.
- Client's tender documentation.
- Class of estimate and accuracy.
- Format of tender pricing - Type of contract
- Contractor's submission documentation
- Reasonable time allowance to suit class of estimate and information available/required.
- Tender clarification meeting.
- Ethics
- Letters of regret

CONTRACT PHASE

- Handover and kick-off meeting.
 - a) Client and Contractor's teams and interfacing
 - b) Scope definition and freeze
 - c) Agreed as sold price
- Project Controls
 - Programme - parameters, details (Level), submission
 - Commissioning Phasing
 - Work Breakdown Structure.
 - Dependent on type of contract - Code of Accounts.
 - Reporting requirements
 - Invoicing / Progress Payments / Cash Flow
- Scope change procedure
- Quality Assurance / Control :- Procedure/Requirements
- Preferred Vendor list
- Construction philosophy

CONCLUSIONS and RECOMMENDATIONS

CURRICULUM VITAE of AUTHOR

VIEWS and OPINIONS

THANKS

If a Client wishes to go out to tender before engineering / documentation will support a definitive estimate make sure allowance is made for a definitive estimate within the contract phase of the project but DO NOT then expect a fast track project. If the Client elects to go this route the project control procedure can be adjusted at this phase of the project.

Client should include details of insurance cover carried by them so that the contractor can provide for any additional cover he deems necessary, or client can detail the extent of insurance cover to be taken out by the contractor.

On major projects the Client may elect to call for an project organogram from the Contractor and CV's for key personnel. If, as often happens the adjudication and award period becomes protracted the Contractor may have allocated his resources to the intake of other work. Client should accept this favourably but endeavour to ensure he does not finish up with the Contractor's "B" or "C" team on his project.

Class of Estimate and Accuracy

Refer to diagrams appendices 1.1,1.2,and figs 2, 3, 4 and 5 following;

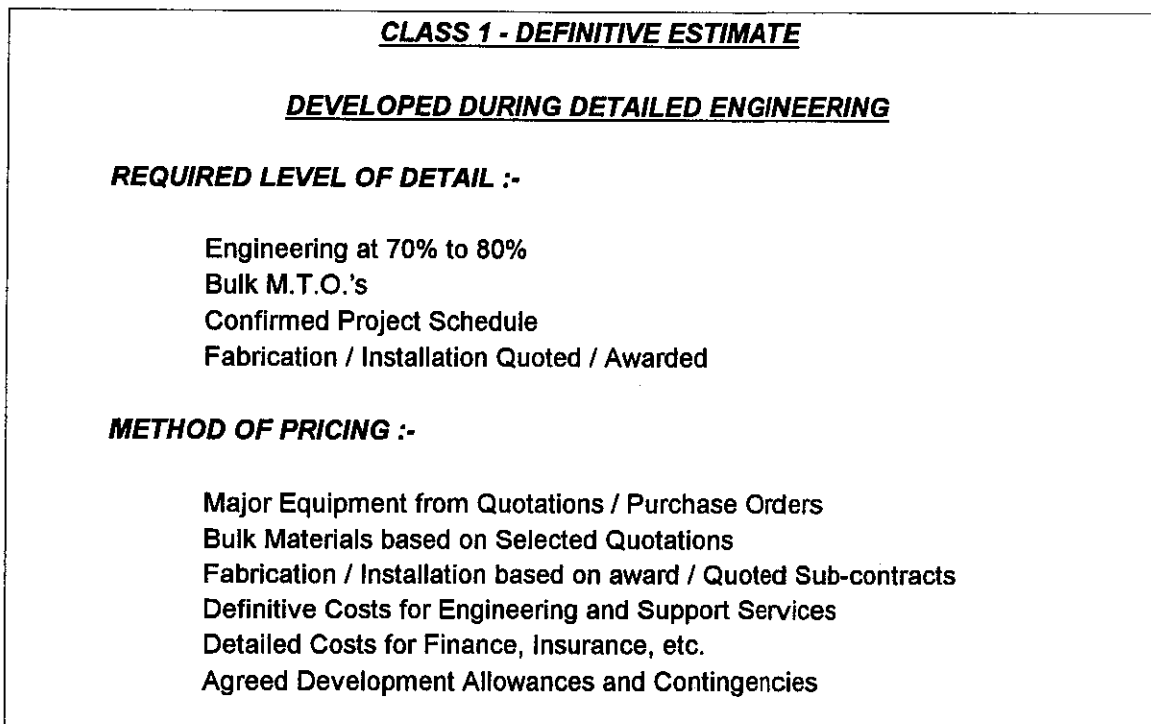


fig 2 Class 1 - Definitive Estimate

CLASS 2 - CONTROL ESTIMATE

USED FOR PROJECT CONTROL

REQUIRED LEVEL OF DATA :-

Engineering at 30% - 40%
Equipment sized and specified, intermediate bulk M.T.O.'s established
Approved Project Schedule
Established Construction Philosophy

METHOD OF PRICING :-

Maximise Supplier Quotations for Major Equipment
Obtain costs for Key Bulk Materials
Quotes for Major Sub-contracts
Preliminary rates for Fabrication / Construction
Established costs for Engineering and Support Services
Indicate costs for Finance, Insurances etc.

Fig. 3 Class 2 - Control Estimate

CLASS 3 BUDGET ESTIMATE

USED FOR ECONOMIC EVALUATION AND PRELIMINARY BUDGETS

REQUIRED LEVEL OF DATA :-

Process Engineering substantially complete
Preliminary P & ID's
Preliminary Plans & Layouts
Major Equipment, Instruments, Electrical etc., identified
Preliminary Programme approved

METHOD OF PRICING :-

Major Equipment costed from "in-house" data.
Bulk Material quantities from "in-house" data.
Engineering, Computing, Finance, Insurance from "in-house" data.
Fabrication / Installation relating to location and development
Assessment of development allowances and contingencies

fig. 4 Class 3 - Budget Estimate

CLASS 4 - CONCEPTUAL (ORDER OF MAGNITUDE) ESTIMATE

USED FOR DEVELOPMENT OPTIONS AND ECONOMIC FEASIBILITY

REQUIRED LEVEL OF DATA :-

Basic Engineering Design data
Preliminary Sizing of Major Equipment
Basic Layouts
Preliminary PFD's
Proposed Programme

METHOD OF PRICING :-

Equipment costed from "in-house" data
Bulk Materials costed by factors
Engineering, Computing, Finance, Insurance
and other costs from "in-house" data
Fabrication / Installation relating to location and development
Assessment of Contingencies

fig. 5 Class 4 - Conceptual (Order Of Magnitude) Estimate

Format of Tender pricing and Type of Contract

Format of pricing

Client MUST decide on the format of pricing which can be supported with documentation available. The Class of Estimate/Accuracy will dictate the pricing format.

Type of Contract

Again the Class of Estimate/Accuracy will dictate the type of contract.

Do NOT attempt to go fixed price on a vague scope or loosely engineered package. This will produce large inbuilt contingencies and numerous variation orders during the contract phase and can often result in an "unhappy" project.

There are several types of Contract and the Client should weigh up and evaluate the type of contract for his particular situation.

Cost Plus Fee (can be adjusted if scope varies)

This form of contract works well provided the Client limits his in-house key personnel on the project. If the Client is using a contractor to undertake specific functions within disciplines then he should have sufficient faith in his choice of contractor to undertake the functions of engineering, procurement, construction and project management assisted by key personnel from the Client's own organisation. Typically this should comprise a Project Director/Sponsor, Project Manager, Project

Engineer, Specialist Engineers, Commissioning Specialists. It is a total waste of resources for the Client to have a project team almost the same size as the contractor's resulting in extended approval times, interface clashes and overruns of estimates.

Cost to Definitive Estimate then Fixed Price to Completion

This works well provided there is a "Team" desire to achieve "Frozen P & ID's"/ "Technical Freeze" as quickly as possible and the Client limits his involvement during the fixed price phase.

Fixed Price (normally with escalation)

Can only work well if engineering has been completed through to Final P & ID's and scope fully defined.

Escalation is included and calculated from a declared base date, usually date of tender submission.

Fixed and Firm

Engineering well defined and the Contractor builds in to the price his allowances for contingencies and escalation.

Contractor's Submission Documentation

Limit the required documentation to be submitted by contractors to allow a fair bid comparison. Do not go overboard with your requirements if it is either not necessary or it is an onerous task to complete properly with the information provided.

Reasonable Time Allowance to suit class of estimate and information available/required

PLEASE ensure that sufficient time has been allowed for the submission of tender relative to the size/complexity/level of breakdown.

Avoid adding late arrivals to the bidders list.

If for any reason the Client grants an extension to the submission date ensure the other tenderers are also informed and given the benefit of the additional time.

Tender Clarification Meeting

The Client should convene tender clarification meetings as part of his adjudication process with those tenderers who are in the running to be awarded the contract.

Ethics

A controversial topic which has been addressed by both client and contractors, under the auspices of The Conveyor Manufacturers Association who recently "rubber stamped" their revised version of their "Code of Ethics" at their Annual General Meeting. Suffice to say that it takes two to tango and policing on both sides is not easy.

Letters of Regret

After final adjudication and award ALWAYS send a nicely worded "Letter of Regret" to the Contractors who have not been lucky enough to be awarded the contract. It takes very little effort and is greatly appreciated for time and money expended by the contractor on tendering.

B) CONTRACT PHASE

Handover and kick-off meeting

Client and Contractor's teams and interfacing.

In addition to an internal contractor's kick-off meeting when the Sales and Marketing Dept hand over to the Operations Dept it is fundamental for the Client and Contractor to jointly convene a kick-off meeting to introduce key personnel, formulate/approve the project co-ordination procedure and agree on functional philosophies. On major projects this can be broken down into several meetings.

Scope definition and freeze

Ideally at the "kick-off" meeting the scope of the contract should be fully defined and frozen. This does not mean a "Technical Freeze" or "Frozen P&ID's" but must reflect an agreed scope for the "As Sold" price.

Agreed "As Sold" price

Ideally at this meeting the "As Sold" price should be agreed.

Any carry over of points of dissension in the contract document should be resolved. This most times requires an additional meeting and on major projects can become protracted when as often happens the legal fraternity get involved.

Project Controls

Client MUST provide the overall programme parameters and any specific phasing required. As most Clients will get involved in the commissioning phase a set of parameters to suit their commissioning requirements should be provided right up front and the detailed Design, Procurement and Erection phases can be programmed to suit the commissioning requirements. This is fundamental to the sequencing of design production through into procurement.

The level of detail for the contractor's programme should have been indicated in the tender documents.(refer appendix 7.1 thro 7.4) for definition of planning levels 1 - 4. Client should indicate the level of detail required to suit incorporation into the Client's overall plan.

If at the combined "kick-off" meeting the Work Breakdown Structure has not been formally agreed between Client and Contractor a Project Controls meeting should be convened to agree the following;

- a) "As sold" price and breakdown.
- b) Work Breakdown Structure (refer appendix 6)
- c) Code of Accounts (Client to ensure that there are no specific requirements in their assets register which could latterly in the project cause coding problems)
(Appendices 8A, 8B, 8.1, 8.2 & 8.3)
If the project is a fixed price contract the Client should indicate the format and detail, including Cost Coding, of the required progress payment certificate to accompany the monthly invoice. If possible, avoid trying to merge both Client and Contractor's Cost Code of Accounts or operating two sets of coding.
- d) Agree Invoicing schedule/payment certificate/Cash Flow requirements
- e) Level of detail for contractor's planning. Ensure that Contractor's Planning software is compatible/acceptable to integrate with the Client's Overall Planning system
- f) Agree on reporting requirements/formats/frequency.
- g) Agree on frequency of progress meetings / venue / agenda and attendees.

Scope Change Procedure

Although invariably not a popular topic with Clients it is in their own best interests for controlling the project and for future tenders / projects that a comprehensive Scope Change Procedure be agreed. The type of contract should NOT make any difference to having a Scope Change Procedure.

Clients should ensure that the selected contractor is producing scope changes for approval timeously and endeavour to approve them as quickly as possible. This will ensure that the cost reporting and forecast cost projections are up to date.

Contractors should ensure that their project team are well versed in the Scope Change Procedure and make sure that "internal" changes are monitored as well as Clients changes. The Project Cost Engineer must retain a Status Register indicating ALL changes, type(internal / external), date raised, initiator, value and breakdown including coding, pending or approved.

Quality Assurance / Control : Procedure Requirements

Most competent contractors have or are striving to achieve Quality Assurance to ISO 9001 standards/approval. However this need not necessarily be the case with all the contractor's suppliers though again most contractors are endeavouring to get all suppliers to conform. It is my considered opinion that there has been a tendency for some Client's to go overboard in some instances and to go beyond the requirements of "fitness for purpose". The documentation requirements to be initiated and monitored can in many instances for smaller vendors become extremely onerous and I submit that in a lot of instances paperwork will be completed and submitted in volume without the due diligence that should be incorporated.

Having said that, I firmly believe that quality does have to be assured and controlled and I acknowledge that most leading contractor's have installed systems and procedures to monitor these activities.

Preferred Vendor List

Most Clients have a preferred vendor's list which ideally should be included with their tender documentation and thus enable the contractor to obtain preferred prices for inclusion in the tender submitted. In the event that this is not the case then a list of preferred vendors must be included with the contract documents for obvious reasons.

Construction Philosophy

A joint Client / Contractor meeting should be convened to formulate and agree sequencing of construction to achieve Client's programme parameters and commissioning requirements as indicated in the project objectives programme; major lifts / rigging studies and crane requirements; site establishment and manning, construction power and utility requirements, working hours including overtime limitations.

Conclusions and Recommendations.

Tender Phase.

- At the tender phase try and limit the number of tenderers; select well tried and proven contractors; do not use contractors for a "check" price.
- Client's tender documentation should enable the client to undertake an adjudication procedure which is fair and equitable in all respects, both technically and commercially.
- Make sure the tender documentation includes sufficient information for the contractor to undertake his bid to the level of accuracy expected.
- Allow sufficient time for the bidders to bid against clients requirements.

Contract Phase.

- Right from the outset get a project team spirit going. The senior project representatives from the client and contractor should instill this at the kick-off meeting.
- Reach commonality and agreement on project control procedures including scope changes.
- Agree on preferred suppliers and Quality Assurance and Control
- Finalise the construction philosophy including an agreed commissioning sequence.

Curriculum Vitae.

Brian Rogers was educated in the UK, winning a scholarship to a well known South London Public School before obtaining a Higher National Certificate in Mechanical Engineering during his tertiary education period. He spent 7 years gaining fabrication experience, both hands-on and managerial, with a major manufacturer renowned for fabricating pressure vessels and tanks. He joined a major UK based contractor in 1965 as a planning engineer and gained considerable experience in Critical Path Planning techniques prior to emigrating to RSA in January 1972. He spent the first 13 years in RSA with a major South African contractor controlled from London. During this period he acquired extensive experience in all aspects of project controls. With the demise of the organisation in 1985 he joined a subsidiary company of Murray and Roberts specialising in acid protection, rubber lining and waterproofing and gained experience of running many minor projects simultaneously. Late in 1988 he returned to major projects and was involved in the planning of the Sua Pan Soda Ash Project. Since then he has operated as Project Controls manager with 2 of SA's leading contractors before deciding at the age of 55 to break away from the corporate environment and operate on a consultancy basis. This has continued since 1993 providing services to 7 local contractors and very recently, for the first time in 35 years, to a major client. He was recently elected to the board of directors of the Cost Engineering Association of South Africa (CEASA) with specific responsibilities to undertake a survey of current membership .

Views and Opinions.

The author of this paper would like to state that the views and opinions expressed, both in the paper and during the presentation are entirely his, derived from 35 years in the industry and do not represent those of any organisation that the author has been employed with.

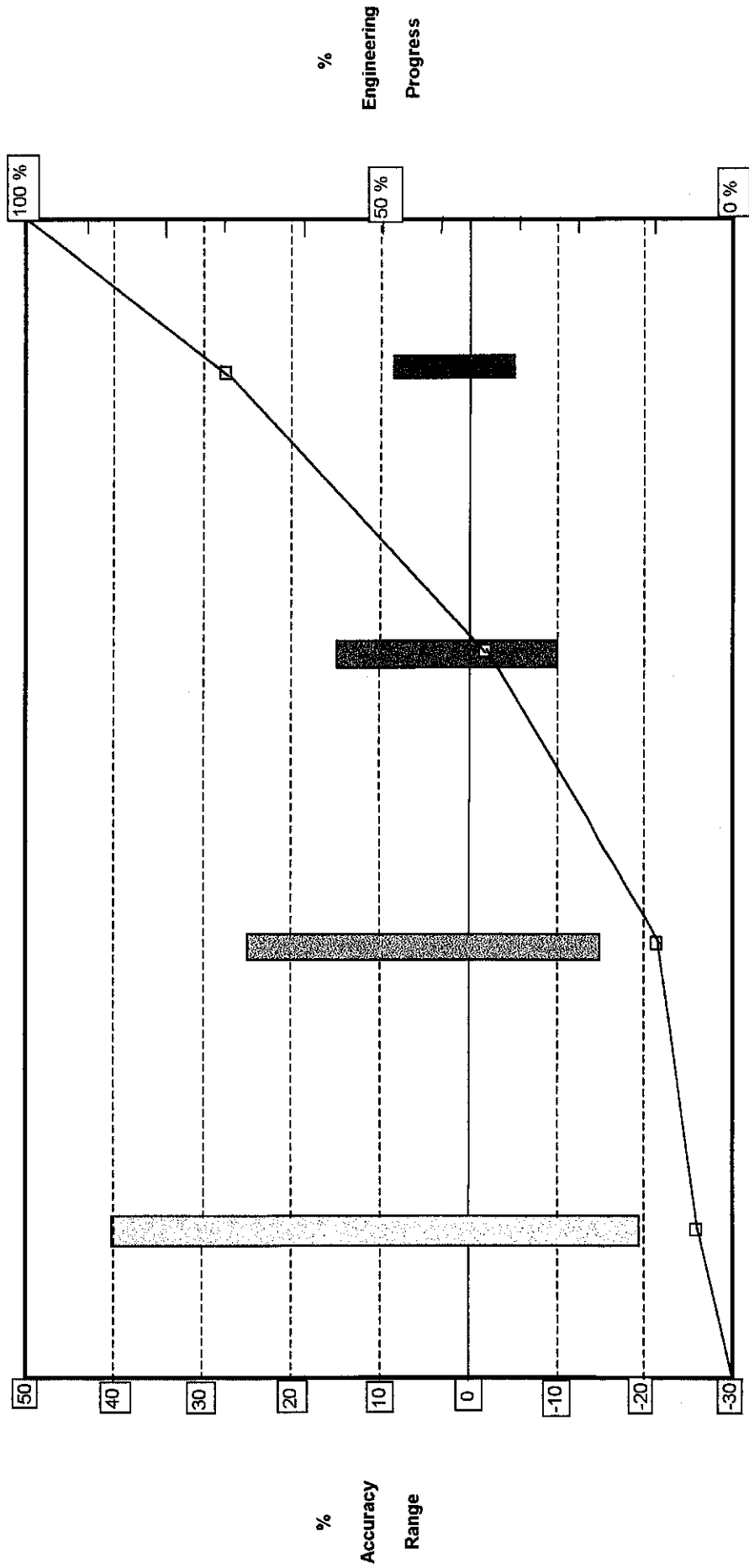
Thanks.

I would like to take this opportunity of thanking the committee of IMHC for affording me the opportunity of presenting the paper and to those members of the committee who have offered their valuable time in reading and vetting the content. I sincerely hope that the presentation will contribute towards achieving the purpose as declared in my introduction. To my business partner, Chris, thanks for assisting and unravelling the mysteries of Mr. Gate's MS Word software and tidying up the paper so that it meets the specification requirements of the IMHC. To Steve Wilson (SENET) thanks for the jaundiced eye and comments and also for the use of your laptop for the presentation.

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Classes of Estimates - Typical Accuracy



Class 4	Class 3	Class 2	Class 1
OOM	Budget	Control	Definitive
Design Data Prel PFD's Factor Costing Contingencies	Process Complete Prel P&ID's Prel Layouts Equip List	Equip Specified Intermediate MTO Appvd Programme Constrn Philosophy	Final MTO Vendor Drwgs Installation Quotes Constrn Programme

SCHEDULE OF ESTIMATE DELIVERABLES

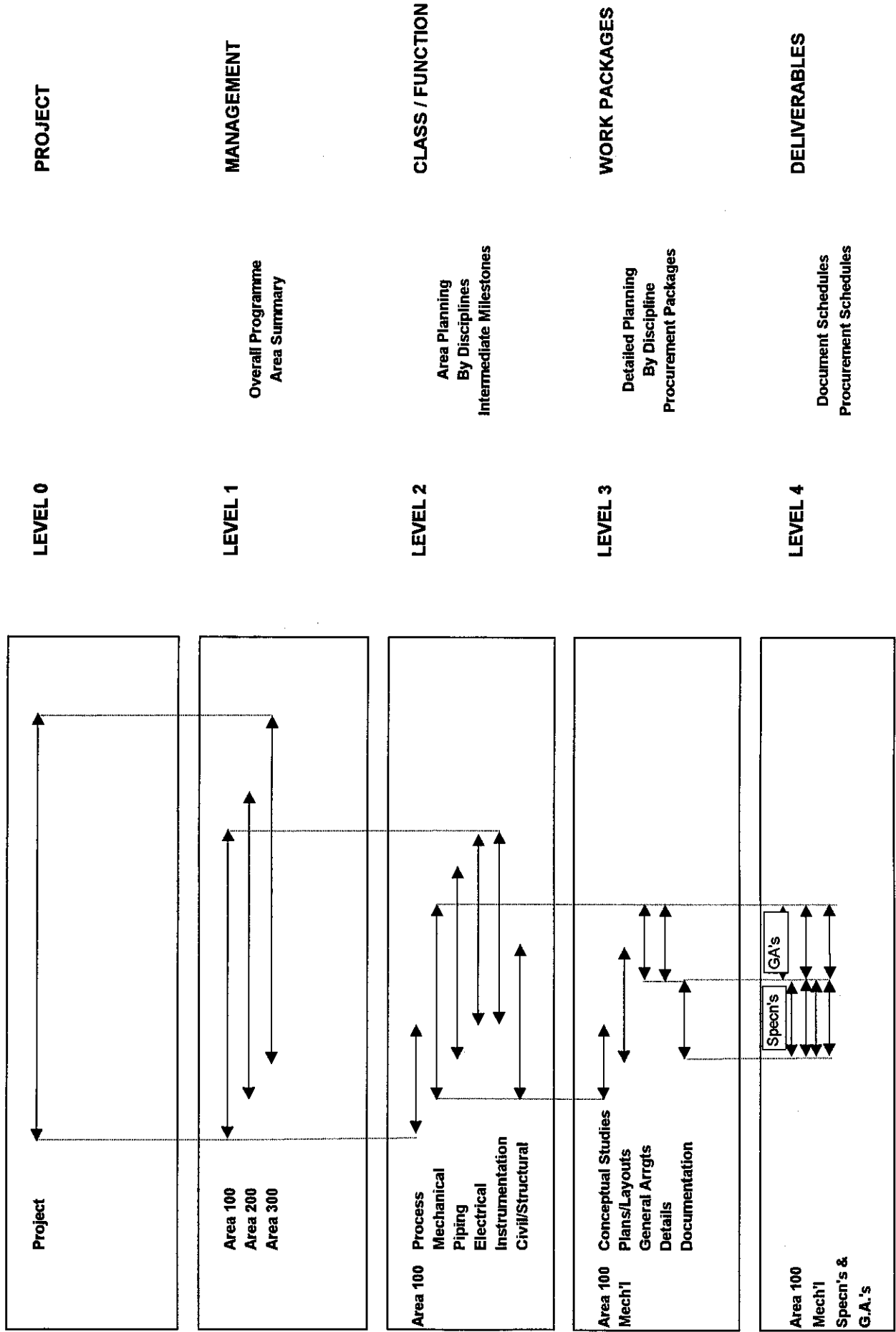
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EXPECTED ACCURACY OF ESTIMATE

- Conceptual :- -20% +40%
- Budget :- -15% +25%
- Control :- -10% +15%
- Definitive :- -5% +7.5%

	DELIVERABLES / INFORMATION REQUIRED	TYPE OF ESTIMATE		
		CONCEPTUAL	BUDGET	CONTROL / DEFINITIVE
PROJECT SCOPE AND PROCESSES	PRODUCT & CAPACITY	X		
	UTILITIES AND SERVICE REQUIREMENTS, BUILDINGS	X		
	AUXILIARY FACILITIES, RAW MATERIALS	X		
	PRODUCT HANDLING AND STORAGE REQUIREMENTS	X		
	HISTORICAL DATA FROM SIMILAR PLANTS	X		
PROCESS DATA	BLOCK FLOW DIAGRAM	X		
	PRELIMINARY PROCESS CRITERIA AND PROCESS FLOW DIAGRAMS		X	X
	FINAL PROCESS FLOW DIAGRAMS			X
EQUIPMENT SELECTION AND LAYOUT	PRELIMINARY EQUIPMENT LIST, SIZING & SPECS, VERBAL QUOTES		X	
	EQUIPMENT SPECIFICATIONS, WRITTEN QUOTATIONS			X
	FIRM EQUIPMENT BIDS, FINAL EQUIPMENT			X
	CONCEPTUAL PLANT LAYOUTS		X	
	PRELIMINARY GENERAL ARRANGEMENT DRAWINGS			X
	APPROVED GENERAL ARRANGEMENT DRAWINGS			X
SITE PREPARATION	LOCATION OF SITE		X	
	GENERAL DESCRIPTION OF SITE AND FACILITIES		X	X
	GEOTECHNICAL REPORT			X
	DESCIP & DIMENSIONS ROADS, RAIL, FENCES, PONDS & OTHER SITE IMPROVEMENTS		X	
	TOPOGRAPHICAL MAPS, GENERAL SITE PREPARATION DRAWINGS		X	
	FINAL PLANT ROADS, RAIL & OTHER SITE PREPARATION DRAWINGS			X
BUILDINGS AND STRUCTURES	PRELIMINARY SIZES AND TYPE OF CONSTRUCTION		X	
	PRELIMINARY STRUCTURAL DESIGNS			X
	FOUNDATION SKETCHES			X
	ARCHITECTURAL CRITERIA			X
	GENERAL ARRANGEMENTS AND ELEVATIONS			X
	DETAIL DESIGNS AND SPECIFICATIONS			X
PROCESS PIPING AND INSTRUMENTATION	PRELIMINARY PIPING AND INSTRUMENTATION DIAGRAMS AND CRITERIA			X
	APPROVED PIPING AND INSTRUMENTATION DIAGRAMS AND SPECIFICATIONS			X
	PIPING LAYOUT DRAWINGS			X
ELECTRICAL & INSTRUMENTATION	SUBSTATION DESIGNS AND SPECIFICATIONS			X
	PRELIMINARY POWER DISTRIBUTION SINGLE LINE DIAGRAMS			X
	FINAL SINGLE LINE DIAGRAMS, INTERLOCK CONTROL & INST DIAGRAM			X
	PRELIMINARY LIGHTING AND POWER PLANS			X
UTILITIES	APPROX QUANTITIES STEAM, WATER, POWER		X	
	PRELIMINARY FLOW DIAGRAMS AND HEAT AND MASS BALANCES			X
	FINAL FLOW DIAGRAMS AND HEAT AND MASS BALANCES			X
	DETAIL DESIGNS AND SPECIFICATIONS			X
OTHER CONSTRUCTION COSTS	INCLUDED WITH FACTORED COSTS		X	
	PERCENTAGE OF DIRECT COSTS			X
	DETAIL ESTIMATE			X
PROFESSIONAL SERVICES	PERCENTAGE OF CONSTRUCTED COSTS			
	DETAIL MANHOUR ESTIMATE		X	
SCHEDULE	MASTER SCHEDULE WITH MILESTONES			X
	DETAILED CPM			X

PLANNING LEVELS



**LEVEL 1 MANAGEMENT
OVERALL PROGRAMME
AREA SUMMARY**

ID	Task Name	Durn	Start	Finish	2000									
					Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	
1														
2	ACME MATERIALS HANDLING - LEVEL 1 MANAGEMENT	180 d	03/01/00	08/09/00										
3														
4	AREA 100 - BULK HANDLING	180 d	03/01/00	08/09/00										
5														
6	Design & Detailing Area 100	55 d	03/01/00	17/03/00										
31														
32	Procurement Area 100	120 d	07/02/00	21/07/00										
86														
87	Construction Area 100	115 d	03/04/00	08/09/00										

Project: planlevels
Date: 13/10/99

Task



Progress

Milestone

Summary

**LEVEL 2 CLASS / FUNCTION
AREA PLANNING
BY DISCIPLINES
INTERMEDIATE MILESTONES**

ID	Task Name	Durn	Start	Finish	2000															
					Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep							
1	ACME MATERIALS HANDLING - LEVEL 2 CLASS / FUNCTION	180 d	03/01/00	08/09/00																
2	AREA 100 - BULK HANDLING	180 d	03/01/00	08/09/00																
3	Design & Detailing Area 100	55 d	03/01/00	17/03/00																
4	Civil & Structural	35 d	17/01/00	03/03/00																
13	Mechanical	40 d	03/01/00	25/02/00																
18	Electrical	35 d	31/01/00	17/03/00																
23	Control & Instrumentation	35 d	31/01/00	17/03/00																
28	Procurement Area 100	120 d	07/02/00	21/07/00																
29	Civil & Structural	60 d	14/02/00	05/05/00																
48	Mechanical	100 d	07/02/00	23/06/00																
69	Electrical	105 d	28/02/00	21/07/00																
77	Control & Instrumentation	100 d	06/03/00	21/07/00																
82	Construction Area 100	115 d	03/04/00	08/09/00																
83	Civil & Structural	95 d	03/04/00	11/08/00																
102	Mechanical	49 d	22/05/00	27/07/00																
123	Electrical	40 d	17/07/00	08/09/00																
131	Control & Instrumentation	35 d	24/07/00	08/09/00																

Project: planlevels
Date: 13/10/99

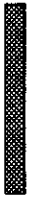
Task  Progress  Milestone  Summary 

**LEVEL 3 WORK PACKAGES
DETAILED PLANNING
BY DISCIPLINES
WORK PACKAGES**

ID	Task Name	Durn	Start	Finish	2000														
					Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep						
121	Miscellaneous	1 d	25/07/00	25/07/00															
123	Electrical	40 d	17/07/00	08/09/00															
124	Motors	1 d	17/07/00	17/07/00															
126	Miscellaneous	40 d	17/07/00	08/09/00															
131	Control & Instrumentation	35 d	24/07/00	08/09/00															
132	Instrumentation	35 d	24/07/00	08/09/00															
134	Miscellaneous	35 d	24/07/00	08/09/00															

Project: planlevels
Date: 13/10/99

Task



Progress



Milestone



Summary



**LEVEL 4 DELIVERABLES
DETAILED PLANNING
DOCUMENT SCHEDULES
PROCUREMENT SCHEDULES
CONSTRUCTION DETAILS**

ID	Task Name	Durn	Start	Finish	2000															
					Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep							
22	Specns & Reqns	20 d	21/02/00	17/03/00																
23	Control & Instrumentation	35 d	31/01/00	17/03/00																
24	Design & Detailing	35 d	31/01/00	17/03/00																
25	Conceptual	10 d	31/01/00	11/02/00																
26	Schedules & Details	15 d	14/02/00	03/03/00																
27	Specns & Reqns	20 d	21/02/00	17/03/00																
28	Procurement Area 100	120 d	07/02/00	21/07/00																
29	Civil & Structural	60 d	14/02/00	05/05/00																
30	Civils - Foundations	20 d	06/03/00	31/03/00																
31	Trestle Foundations	20 d	06/03/00	31/03/00																
32	Transfer House Foundations	20 d	06/03/00	31/03/00																
33	Structural - Conveyor Steelwork	50 d	14/02/00	21/04/00																
34	Conveyor Gantries	40 d	14/02/00	07/04/00																
35	Conveyor Trestles	30 d	14/02/00	24/03/00																
36	Flooring & Handrailing	40 d	14/02/00	07/04/00																
37	Sheeting	50 d	14/02/00	21/04/00																
38	Head Frame Steel	50 d	14/02/00	21/04/00																
39	Tail Frame Steel	30 d	14/02/00	24/03/00																
40	Structural - Building Steelwork	50 d	21/02/00	28/04/00																
41	Transfer House Steelwork	30 d	21/02/00	31/03/00																
42	Transfer House Flooring/H/Railing	40 d	21/02/00	14/04/00																





Project: planlevels
Date: 13/10/99

Task Progress Milestone Summary

**LEVEL 4 DELIVERABLES
 DETAILED PLANNING
 DOCUMENT SCHEDULES
 PROCUREMENT SCHEDULES
 CONSTRUCTION DETAILS**

ID	Task Name	Durn	Start	Finish	2000														
					Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep						
127	Electrical Equipment	5 d	24/07/00	28/07/00															
128	Racking	15 d	17/07/00	04/08/00															
129	Cabling	15 d	31/07/00	18/08/00															
130	Terminations	20 d	14/08/00	08/09/00															
131	Control & Instrumentation	35 d	24/07/00	08/09/00															
132	Instrumentation	35 d	24/07/00	08/09/00															
133	Instruments	35 d	24/07/00	08/09/00															
134	Miscellaneous	35 d	24/07/00	08/09/00															
135	Miscellaneous	35 d	24/07/00	08/09/00															

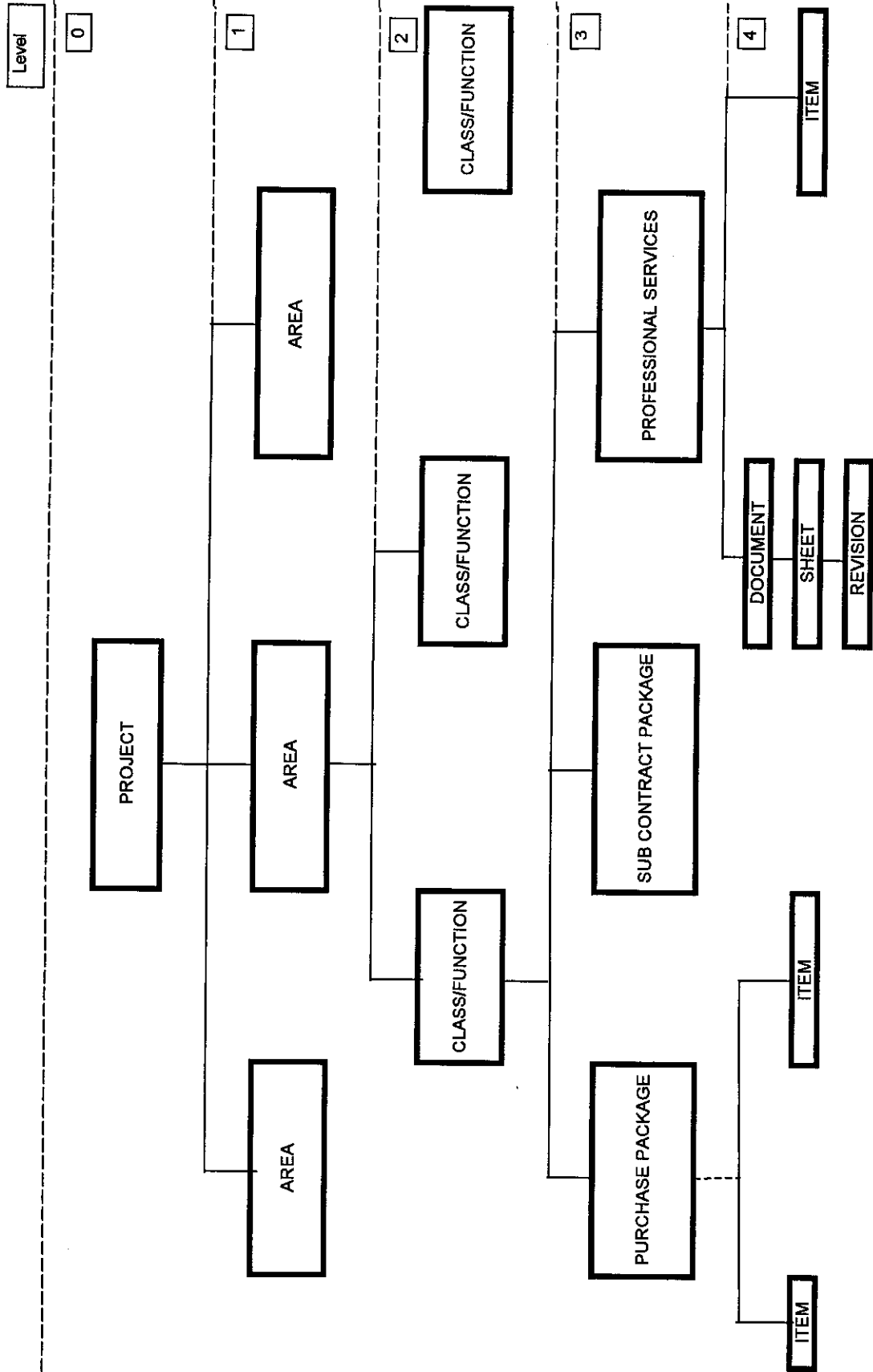
Project: planlevels
 Date: 13/10/99

Task  Progress  Milestone  Summary 

**Appendix No. 6.4
 Level 4 - Deliverables - Detailed Planning**

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TYPICAL WORK BREAKDOWN STRUCTURE



TYPICAL EXAMPLE OF CODE OF ACCOUNTS

The purpose of a coding system is to provide the means by which the project data may be processed and recorded for the purpose of Accounting, Job Control, Estimating and Cost Control and if required can be extended to record and identify equipment, specifications, requisitions, enquiries, orders etc. It is not always necessary or convenient to use the full coding system and the discretion of the project leader should be called upon to set it up AT THE ESTIMATING PHASE.

Typical Format :-

Job Number 1 alpha/numeric and 3 numerics
Plant Area 3 alpha/numerics
Class 1 alpha
Sub-class 2 alphas

DIRECT CLASS CODES

Equipment :-

B Blowers/Fans/Compressors/Pumps
C Materials Handling
E Electrical
H Heat Transfer

I Instrumentation and Controls
K Platework
M Machinery
P Piping, Valves and Fittings
Q Special Equipment
S Structural Steelwork
T Transport
V Vessels, Columns and Tanks

INDIRECT CLASS CODES :-

W Site Management Manhours
X Site Indirect Procurement
Y Head Office Manhours
Z Head Office Indirect
 Procurement

Sub-contracts :-

A Civil and Building Works
D Erection / Installation
F Painting / Insulation

CLASS C - MATERIALS HANDLING

MECHANICALS

CMA	Motor
CMB	Reducer & Base Plate
CMC	H.S.Coupling
CMD	L.S.Coupling
CME	V-Drive
CMF	Motor Mount & Guard
CMG	Brake
CMH	Holdback
CMI	Belting
CMJ	Belt Splicing
CMK	Primary Cleaner
CML	Secondary Cleaner
CMM	V - Plough
CMN	Take-ups

IDLERS

CIA	Transition
CIB	Impact
CIC	Trough
CID	Return
CIE	Trough Training
CIF	Return Training

PULLEYS

CPA	Head
CPB	Head Snub
CPC	Tail
CPD	LT Bend
CPE	Take-up
CPF	Tail Snub
CPG	Drive
CPH	Drive Snub HT
CPI	Drive Snub LT
CPJ	HT Bend

