

TLHAMATSI AFRICA PROJECTS



CONSTRUCTION MANAGEMENT PRESENTATION

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CONSTRUCTION MANAGEMENT - DEFINED

Act of managing the construction process

- Contractual arrangement
- Construction management personnel can represent owner or **contractor**
- Construction Manager manages the basic resources of construction



CONSTRUCTION MANAGEMENT - DEFINED

SUCCESSFUL PROJECT = RIGHT PEOPLE

■ DESIGN PHASE

- PROJECT MANAGER
- QUANTITY SURVEYOR
- ARCHITECT
- STRUCTURAL/CIVIL ENG
- ELECTRICAL ENG
- MECHANICAL ENG
- WET SERVICES ENG
- FIRE ENGINEER
- TRAFFIC ENG
- TOWN PLANNER

■ CONSTRUCTION PHASE

- MAIN CONTRACTOR

SUB-CONTRACTORS:

- ELECTRICAL
- PLUMBING
- BRICKWORK
- PAINTING/TILING - FINISHES
- ROOFING
- CIVILS / PAVING
- CABINETRY
- HEALTH & SAFETY



BASIC RESOURCES REQUIRED

- Workforce
- Subcontractors
- Equipment
- Construction Plant
- Materials
- Information
- Time
- Money



PROJECT MANAGEMENT

- Optimize the three attributes of: **quality**, **cost**, and **time**;
- Principle objective of a construction manager is to complete each project **on time** and **within budget**, while maintaining acceptable levels of quality safety and risk.

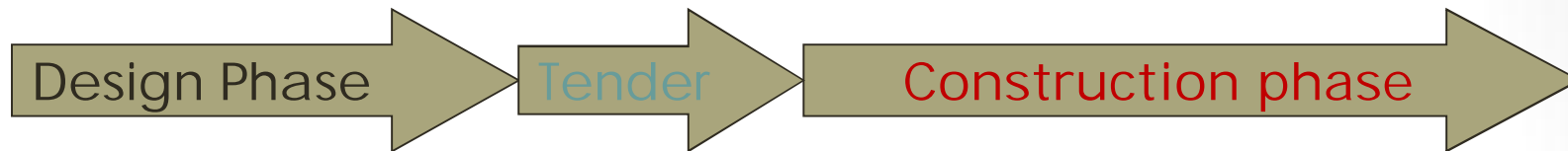


METHOD/SYSTEM OF PROJECT DELIVERY

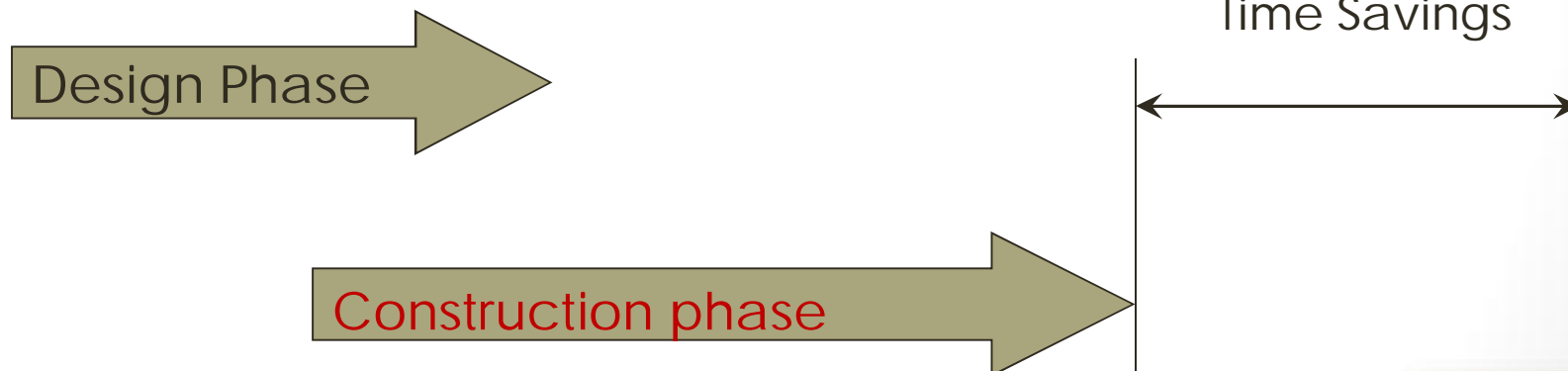
- Traditional design-bid-build
- Phased or Fast-track
- Design-build



METHOD/SYSTEM OF PROJECT DELIVERY



Traditional Design-Bid-Build



Phased or Fast-Track Construction



LEGAL CONTRACT

JBCC Docs = The Joint Building Contracts Committee

- PRINCIPAL BUILDING AGREEMENT
- MINOR WORKS AGREEMENT



APPOINTING A CONTRACTOR

Method of Award

1. *Competitive bidding*

- formally advertised public work
- selective invitation for private work
- awarding of contracts by:
 - Lowest responsible bid or
 - Best value i.e.: technical score ÷ price or price + time(f_t), and other variations



APPOINTING A CONTRACTOR

Method of Award

2. *Negotiated contracts*

- Generally private work
- Benefits include flexibility of pricing arrangement
- Often used on projects of large size and great complexity
- Owner may value expertise and integrity of a particular contractor and can award contract without competition that may otherwise exclude that contractor from the work



APPOINTING A CONTRACTOR

Method of Pricing

- *Fixed-price*

1. *Lump sum*

- Traditional, single fixed price
- Predetermined price that includes profit, overhead, and all other costs
- Greatest risk to contractor resulting in a higher markup (the greater the risk, the higher required rate of return)
- Most common contract form



APPOINTING A CONTRACTOR

Method of Pricing

- *Fixed-price*

2. *Unit-price contract*

- Prices of specified units of work are fixed or predetermined
- Actual cost to the owner will vary with actual quantities placed
- Best used when details and general character of the work are known, but quantities are subject to variation
- Risk of unbalanced bids



CONSTRUCTION CONTRACTS

Prequalification of bidders;

- Evidence of satisfactory previous experience
- Financial stability
- Advanced or specialized prequalification may be
required as dictated by the magnitude and
nature of the work
- Insurances / guarantees



ELEMENTS OF A LEGAL CONTRACT

- offer
- acceptance
- consideration
- legal in every respect
- requires a *meeting of the minds*
- offer + acceptance = binding obligation



CONSTRUCTION TENDER PROCESS

- Advertisement for Tenders
- Information for bidders
- Bid/Tender form
- General notices
- Notice of award
- Notice to proceed
- Insurance
- Payment bond
- Contract form or agreement
- General conditions or provisions
- Supplemental and/or special conditions
- Plans
- Specifications



CHARACTERISTICS OF A “GOOD” CONTRACT DOCUMENT

1. Carefully considered
2. Expressed clearly
3. Time-tested
4. Comprehensive
5. Fair
6. Balanced
7. Applicable to the elements of a construction projects



CONSTRUCTION CONTRACTS

Tenderers/bidders are required to:

- examine **all portions** of the contract documents
- examine the **physical conditions of the site**
- determine legal requirements affecting the work
- complete these investigations prior to bidding



CONSTRUCTION CONTRACTS

Contract documents should:

- Include a hierarchy to determine which documents govern in case of conflict.
- Not contain ambiguous language
- Not contain exculpatory (escape) clauses



CONSTRUCTION CONTRACTS – GENERAL CONDITIONS

- Contractor's warranties
- Defective drawings
- Approval of contractor's plans and equipment
- Approval of shop drawings other submittals
- Guarantee by the Contractor
- Conduct of the work
- Defective work
- Relations with other contractors and subcontractors
- Inspection of materials
- Inspection of field work
- Authority of the Eng'r.
- Duties of the QA
- Permits and licenses
- Labour considerations
- Work done by the owner
- Lines and grades
- Order and discipline
- Performance
- Final inspection & acceptance



SUBMITTALS REQUIRED IN THE CONTRACT

- copies of subcontracts
- shop drawings and support calculations
- catalogue cutsheets
- material or equipment samples
- schedule(s)
- certificates of insurance
- environmental test reports (where required)
- material test reports & certifications



SHOP DRAWINGS

- structural steel details & erection plan
- erection procedures (safety)
- shoring & scaffolding
- concrete formwork design and details
- construction sequencing diagrams
- pipe and ductwork fabrication details
- reinforcing steel bending diagrams and bar lists
- structural timber elements
- ornamental iron or steel



CHANGES IN SPECIFICATIONS AND PLANS

- clarification, correction, modifications prior to tender/bid are referred to as an “addendum”
- Owner/PM must maintain a system of distributing and acknowledging receipt of addendum
- plan and spec changes after award are referred to as “revisions”. (i.e. Drawing & Site instruction)



CONSTRUCTION PLAN - SUMMARY



	Contract Program Rev 1 Summary Barchart 10 April 2012	GRAYSTON HOTEL
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	Contract Program Rev 1 Summary Barchart 10 April 2012	GRAYSTON HOTEL
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CONSTRUCTION PROGRAMME - DETAILED

GRAYSTON HOTEL



Contract Program Rev 1
Detail Barchart
10 April 2012

T	Act N°	Activity Description	Durn	Current			2011												2012													
				Start	Finish	Float	December		January		February		March		April		May		June		July		August		Sep		October		November		December	
							9	23	6	20	3	17	2	16	30	13	27	11	25	8	22	6	20	3	17	31	14	28	12	26	9	23
1	1000	GRAYSTON HOTEL REFURBISHMENT	243	01 Dec 11	11 Dec 12	0																										
2	1003	PREPARATIONS	26	01 Dec 11	31 Jan 12	0																										
S	1006	Site handover	1	11 Jan 12	11 Jan 12	0																										
B	1009	Client strips FF&E	11	01 Dec 11	15 Dec 11	3																										
	1012	Mobilization + Site Establishment	15	11 Jan 12	31 Jan 12	3																										
	1015	Access to commence work	1	11 Jan 12	11 Jan 12	3																										
2	1018	DRAWINGS FOR MOCK UPS	1	11 Jan 12	11 Jan 12	0																										
B	1021	Issue full set drawings of 2 Mock ups	1	11 Jan 12	11 Jan 12	0																										
2	1024	SUBCONTRACTORS APPOINTMENTS REQUIRED FOR MOCK UPS:	1	12 Jan 12	12 Jan 12	0																										
	1027	Plumber	1	12 Jan 12	12 Jan 12	0																										
	1030	Electrician	1	12 Jan 12	12 Jan 12	0																										
	1033	Airconditioning	1	12 Jan 12	12 Jan 12	0																										
	1036	Sprinklers	1	12 Jan 12	12 Jan 12	0																										
	1039	Smoke detection	1	12 Jan 12	12 Jan 12	0																										
	1042	Tiling	1	12 Jan 12	12 Jan 12	0																										
	1045	Shopfitting	1	12 Jan 12	12 Jan 12	0																										
	1048	Ceilings	1	12 Jan 12	12 Jan 12	0																										
	1051	Glazed screens + shower doors	1	12 Jan 12	12 Jan 12	0																										
	1054	Vanities	1	12 Jan 12	12 Jan 12	0																										
2	1057	PROCUREMENT OF MOCK UP MATERIALS	8	13 Jan 12	24 Jan 12	0																										
	1060	Procure all mateials required for Mock Ups (Locally available)	8	13 Jan 12	24 Jan 12	0																										
2	1063	PACKAGE 1 : BEDROOMS + BATHROOMS	227	16 Jan 12	07 Dec 12	0																										
3	1066	LEVEL 5B - 14 Modules 14 Keys	149	16 Jan 12	20 Aug 12	0																										
4	1069	Wet Trades + 1st fixes to Tiling:-	45	16 Jan 12	16 Mar 12	47																										
S	1072	Strip + gut bedroom	7	16 Jan 12	24 Jan 12	53																										
S	1075	Brickwork	7	31 Jan 12	08 Feb 12	47																										
	1078	Slush entrance soffit + curing	7	02 Feb 12	10 Feb 12	48																										
	1081	Plaster entrance soffit	7	06 Feb 12	14 Feb 12	48																										
	1084	Install door jamb lining	7	07 Feb 12	15 Feb 12	48																										
	1087	Plaster walls 1st coat	7	08 Feb 12	16 Feb 12	48																										
	1090	Studwork to partition wall	7	10 Feb 12	20 Feb 12	48																										
	1093	Subframe for vanity	7	13 Feb 12	21 Feb 12	48																										
	1096	Plumbing to bathroom ceiling	7	02 Feb 12	10 Feb 12	47																										
	1099	Install FCU in bathroom ceiling	7	06 Feb 12	14 Feb 12	47																										
	1102	Electrical 1st fix to bathroom ceiling	7	06 Feb 12	14 Feb 12	62																										
	1105	A/C ducting to bathroom ceiling	7	08 Feb 12	16 Feb 12	47																										
	1108	Chilled water piping	7	10 Feb 12	20 Feb 12	47																										
	1111	Insulation to cw pipes	7	14 Feb 12	22 Feb 12	47																										
	1114	Plumbing 1st fix to whb/wc	7	16 Feb 12	24 Feb 12	47																										
	1117	Plumbing 1st fix to shower	7	17 Feb 12	27 Feb 12	47																										
	1120	Electrical 1st fix to walls	7	20 Feb 12	28 Feb 12	47																										
	1123	Core drilling	7	22 Feb 12	01 Mar 12	48																										
	1126	Plaster patching to chased services	7	22 Feb 12	01 Mar 12	47																										
	1129	Board partition wall	7	23 Feb 12	02 Mar 12	55																										
	1132	Screed showers	7	24 Feb 12	05 Mar 12	48																										
	1135	Skim soffits	7	24 Feb 12	05 Mar 12	47																										
	1138	Waterproofing to shower	7	28 Feb 12	07 Mar 12	48																										
	1141	Plaster walls skim coat	7	28 Feb 12	07 Mar 12	47																										
	1144	Electrical wiring	7	29 Feb 12	08 Mar 12	47																										
	1147	Paint first coats to walls + bedroom ceiling	7	02 Mar 12	12 Mar 12	56																										
	1150	Bulkheads + ceiling grids	7	02 Mar 12	12 Mar 12	47																										
	1153	Board + skim ceilings	7	06 Mar 12	14 Mar 12	49																										
Legend		Non-critical	Critical	Overrun	Progressed	Base Program	% complete	Weekends	Holidays	Non-work days																						

Legend: Non-critical Critical Overrun Progressed Base Program % complete Weekends Holidays Non-work days


CONSTRUCTION PROGRAMME - INFORMATION

		Information Critical = LATE	Grayston Hotel					
		Information required within 2 weeks : 24/04/12						
		Information required within 4 weeks : 08/05/12						
		Information required more than 4 weeks from update						
			Date:		10/04/12			
Structural Information Schedule			:- Rev. 1					
T	Act#	Activity Description	Item		Activity Start	Information		Remarks
			Durn	Resp		Required	Received	
1	1000	GRAYSTON HOTEL REFURBISHMENT			01/12/11			
2	6160	PACKAGE 2 : BOH LOWER GROUND FLOOR			27/02/12			
3	6256	LAUNDRY,LINEN STORES,REFUSE + LOADING			19/03/12			
	6298	Prep + cast ramp at loading entrance			22/06/12			
		Layouts + levels	10	SENG		08/06/12		
		Bending schedules	10	SENG		08/06/12		
		Fixing details	10	SENG		08/06/12		
2	6421	PACKAGE 3 : STAFF ENTRANCE / SECURITY BU			12/03/12			
3	6424	GATE HOUSE + MAINTENANCE WAREHOUSE + BEV			12/03/12			
4	6427	STRUCTURE + ROOF			12/03/12			
	6469	Timber roof structure			18/06/12			
		Layouts & details	20	SENG		21/05/12		Domestic
4	6586	FACADES + EXTERNALS			18/06/12			
5	6589	WALKWAY			18/06/12			
	6592	Excavate for walkway bases			18/06/12			
		Layouts + levels	7	SENG		07/06/12		
	6595	Rebar + cast bases			22/06/12			
		Bending schedules	10	SENG		08/06/12		
		Fixing details	10	SENG		08/06/12		
	6598	Stub columns			27/06/12			
		Casting levels	10	SENG		13/06/12		
		Bending schedules	10	SENG		13/06/12		
	6601	Steel structure to walkway			03/07/12			
		Layouts & details	40	SENG		08/05/12		

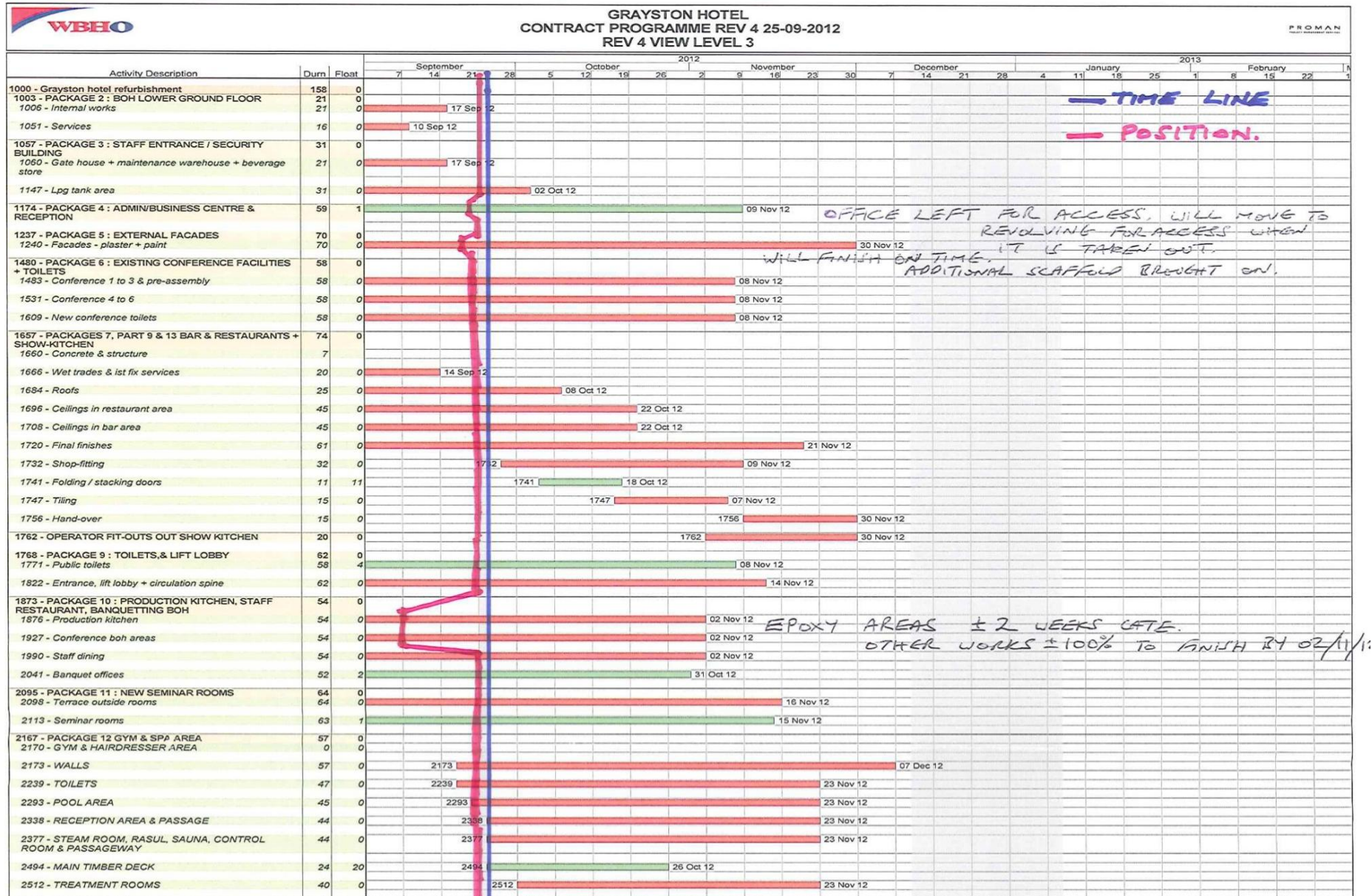
CONSTRUCTION PROGRAMME - APPOINTMENTS



DEDEKIND TIME MANAGEMENT

	Contracts & Sub-contracts awarded											
	Information hypercritical programme activities could be delayed	SELECTED SUBCONTRACT APPOINTMENT SCHEDULE										
	Information required within 28 days before : 08/05/12	GRAYSTON HOTEL REFURBISHMENT										
	Information required within 29 > 56 days before : 05/06/12	Report as at 10-Apr-12										
	Information required later than 56 days											
DEDEKIND TIME MANAGEMENT												
Pro-gramme activity number	Sub-contract description	Agree tender list by	Tender period start	Tender close	Appoint Sub-contractor	Contractors shop drawing/ samples reqd by	Consultants shop drg/ samples approval reqd by	Start manufacture	Programme activity start date	Completed (y or n)	Lead time (weeks)	Comments
7372	SHOPFITTING - BEDROOMS	24/11/11	25/11/11	01/12/11	08/12/11	15/12/11	17/01/12	18/01/12	09/02/12	y	5	CNH Joinery
1108	AIRCONDITIONING - BEDROOMS	25/11/11	28/11/11	09/12/11	11/01/12	18/01/12	25/01/12	26/01/12	10/02/12	y	4	Airgo
7330	GLAZED SCREENS IN BATHROOMS	18/11/11	21/11/11	02/12/11	11/01/12	18/01/12	25/01/12	26/01/12	10/02/12	y	4	Aluview
7381	VISUAL ART PANEL	23/11/11	24/11/11	07/12/11	16/01/12			17/01/12	15/02/12	y	4	CNH Joinery/Client
1162	TILING	28/11/11	29/11/11	12/12/11	19/01/12			20/01/12	19/03/12	y	8	Marble Classic
1192	VANITIES	07/12/11	08/12/11	16/01/12	30/01/12			31/01/12	29/03/12	y	8	Marble Classic
1150	CEILINGS + PARTITIONS	09/12/11	12/12/11	18/01/12	01/02/12			02/02/12	02/03/12	y	4	Abbeycon
6259	AIRCONDITIONING - HOTEL -EXCL.BEDROOMS	12/12/11	13/12/11	19/01/12	02/02/12	16/02/12	23/02/12	24/02/12	19/03/12	y	6	Airgo
1114	PLUMBING + DRAINAGE	24/01/12	25/01/12	31/01/12	07/02/12			08/02/12	16/02/12	y	1	Modern Plumbing
1147	PAINTER	25/01/12	26/01/12	01/02/12	08/02/12			09/02/12	02/03/12	y	3	Inter Spray
1120	ELECTRICAL INSTALLATION	26/01/12	27/01/12	02/02/12	09/02/12			10/02/12	20/02/12	y	1	Qaulilec
6991	ALUMINIUM WALL CLADDING - FACADES	08/02/12	09/02/12	22/02/12	07/03/12			08/03/12	14/05/12		8	
7198	STEEL ROOF STRUCTURE	17/02/12	20/02/12	02/03/12	16/03/12	02/04/12	11/04/12	12/04/12	23/05/12		8	
1243	WALLPAPER	15/03/12	16/03/12	30/03/12	17/04/12			18/04/12	19/06/12		8	
6289	SECURITY AND ACCESS CONTROL	19/03/12	20/03/12	03/04/12	19/04/12			20/04/12	07/06/12		6	
6289	SMOKE DETECTION	19/03/12	20/03/12	03/04/12	19/04/12			20/04/12	07/06/12		6	
6289	BMS SYSTEM	03/04/12	04/04/12	19/04/12	08/05/12			09/05/12	07/06/12		4	
6334	ROLLER SHUTTER DOORS	19/04/12	20/04/12	08/05/12	22/05/12			23/05/12	05/07/12		6	
7045	ALUMINIUM WINDOW,SHOPFRONTS + GLAZING	02/05/12	03/05/12	16/05/12	30/05/12	13/06/12	20/06/12	21/06/12	27/07/12		8	
7207	ROOF SHEETING	04/05/12	07/05/12	18/05/12	01/06/12			04/06/12	17/07/12		6	
6994	EXTERNAL WALL FINISHES (PAINT)	08/05/12	09/05/12	22/05/12	05/06/12			06/06/12	19/07/12		6	
1309	FIRE SIGNAGE	29/05/12	30/05/12	12/06/12	26/06/12			27/06/12	10/08/12		6	
7594	SHOPFITTING - HOTEL	31/05/12	01/06/12	14/06/12	28/06/12	12/07/12	19/07/12	20/07/12	28/08/12		8	
7876	COLDROOMS	06/06/12	07/06/12	20/06/12	04/07/12			05/07/12	20/08/12		6	
8587	LANDSCAPING	06/06/12	07/06/12	20/06/12	04/07/12			05/07/12	03/09/12		8	
7795	REVOLVING DOORS	14/06/12	15/06/12	28/06/12	12/07/12			13/07/12	10/10/12		12	
8623	WATERPROOFING TO ROOF SLABS	21/06/12	22/06/12	05/07/12	19/07/12			20/07/12	21/08/12	y	4	Domestic
7165	DIRECTIONAL SIGNAGE	09/07/12	10/07/12	23/07/12	06/08/12			07/08/12	20/09/12		6	

CONSTRUCTION PROGRAMME – REPORTING/ACTUAL



CLAIMS

- delay or disruption claim
- extra work claim
- acceleration
- impossibility-of-performance claim
- defective design claim (error or omission)
- interference claim
- Inclimate weather (i.e rain days)



CLAIMS AVOIDANCE

- Claims avoidance begins in the **pre-construction** phase
- Contract documents need to be clear, accurate, comprehensive, and fairly distribute risk



CLAIMS AVOIDANCE

- producing **comprehensive, accurate**, contract documents
- **constructability** / '**buildability**' review
- clear understanding of contract requirements prior to tendering/bidding
- having good administrative procedures in place
- **open** and **honest** communication
- timely troubleshooting



DISPUTE RESOLUTIONS

- Early settlement between parties
- Alternative dispute resolution negotiation
 - Arbitration (1 or 3 members)
 - Mediation – neutral advisors
 - Dispute Review Board
 - 3 or more odd number of board members selected evenly by both sides
- Litigation
 - sometimes unavoidable; usually undesirable; but sometimes best method

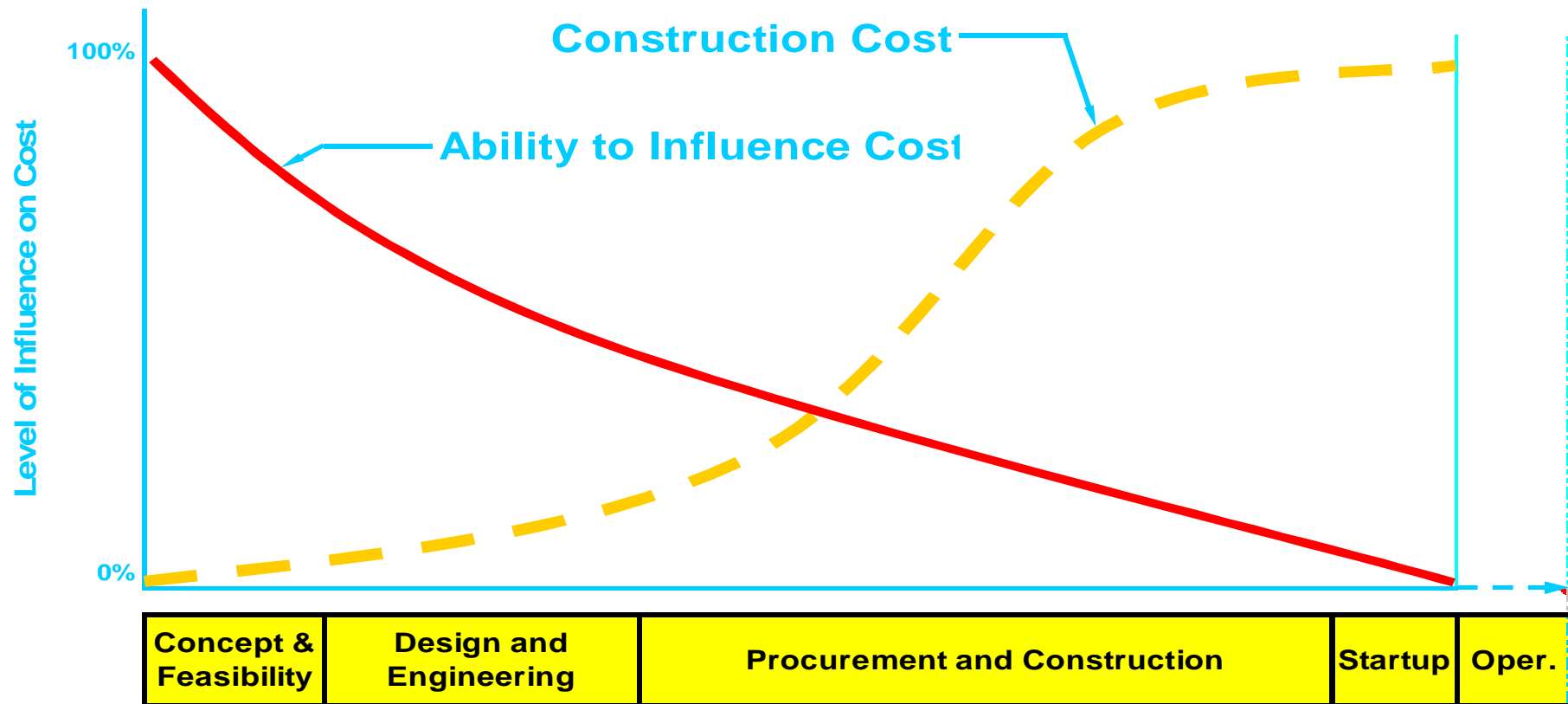


ABILITY TO INFLUENCE COST OVER TIME

- Greatest potential to influence cost is during the pre-construction design phase
- Claims avoidance begins during pre-construction
- Design phase – **Value engineering**
 - Intensive preparation and review of contract documents
 - Careful consideration of methods and equipment = consider overall constructability



ABILITY TO INFLUENCE COST OVER TIME



Ability to Influence Construction Costs over Time

DESIGN PROFESSIONALS

- Specify **locally** available material
- Allow substitution (equivalent) of equal quality material
- Avoid one-of-a-kind or non-standard/ custom items where possibly
- Design structures with as many redundant elements as possible
- Design should allow construction using the prevailing methods and equipment



DESIGN PROFESSIONALS

- Design to minimize required labour
- Specify a quality of workmanship consistent with the quality of the project
- Do not require the contractor to assume responsibility for information that should be furnished by the design engineer/architect
- Produce simple, straight-forward specs = clearly state what is expected



QUESTIONS?

