Management of Wastage

by

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Topics Covered
Management of Wastage

- Definition
- Types of wastage
- How to control resources from wastage
- Tools used to control wastage

Management of Wastage

The **definition** of material waste can be as follows:

- *Superfluous – no longer serving the purpose*
- *Left over after use*
- *Bringing into a bad condition by neglect*
- *Expend to no purpose or for in adequate results*
- *Use extravagantly*
- *Useless*

Management of Wastage

But to the building contractor, material waste is defined as:

"The total loss of building materials, materials or components arising from avoidable or unavoidable material waste however caused"

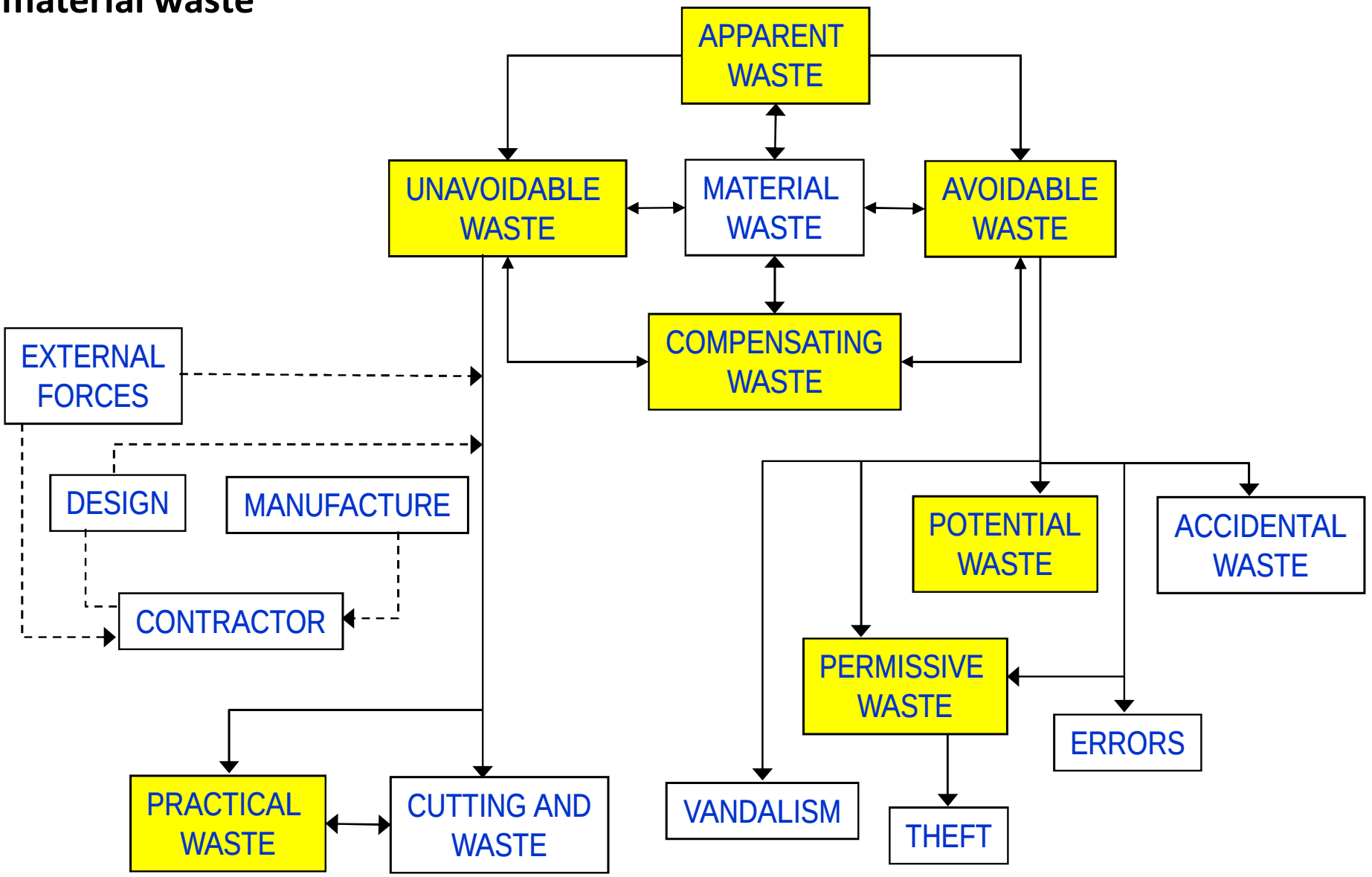
Types of Wastage

- The term **MATERIAL WASTE** is not precise and it may infer material losses such as from theft or wastage during production or manufacturing.
- It should include avoidable and unavoidable wastage.
- Material wastage figure expressed as percentage (%) is really only an **apparent wastage**.

Construction Materials Wastage Planning Norms

Sl No.	Type of Materials	Planned Wastage
1.	Cement	2%
2.	Sand	10%
3.	Aggregate	5%
4.	Concrete structural	2%
5.	Concrete blinding (lean)	10%
6.	Reinforcement steel bar	3%
7.	Reinforcement steel mesh	10%
8.	PVC sheeting	15%
9.	Steel for windows	7%
9.	Timbering in trenches	5%
10.	Stone masonary	5%
11.	Marble work	20%
12.	Wood for door frames	5 to 7.5%
13.	Wood for shutters	10%
14	Wood for flooring/walling	5 to 10%
15.	Sheet sheet roofing	2.1/2%
16.	Tile roofing	5%
17.	Floor tiling	2 to 5%
18.	Wall tiling	3%
19.	Pigments (for colours other than natural grey)	5%
20.	Paints	5%

Diagrammatic relationship of material waste



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Apparent Material Waste

- Any loss expressed as a percentage without any analysis of its make-up and causes is merely the record of the discrepancy of a past event.
- Apparent material waste not always be conveyed to the estimator, contract manager or buyer or director, whether or not the loss is a matter of concerned

Apparent Material Waste

- To infer from a site a loss of 15% that there was a lot of wastage or that 30% losses are outrages indicate an inadequate understanding of the site.
- It is essential to appreciate those factors which contribute to the percentage loss of the materials, the material category and the type of construction work.
- It must also be clear that to use values derived from outside the firm is a serious error.

Compensating Waste

- This is where the material order for one special use or purpose may be used for another.
- It may cause the material waste to appear to be higher than actual or in the case where one material being used in preference lower than actual (e.g. for convenience or not, using blocks in place of bricks).

Unavoidable waste

- Unavoidable waste is the allowance that the contractor MUST provide for in his tender, in his schedule and ordering activities.
- This waste arises from factors outside his control and usually occur where a manufacturer's or supplier's materials or components sizes do not match the designer's requirements.

Unavoidable waste

- The allowance falls under the head cutting and waste can be incurred when the contractor has to operate under difficult working conditions, where in spite of taking all the precautions, the site must accept the waste in order to maintain the required progress

Practical waste

- Practical waste may also arise from situation where it would cost more to reduce material waste that to let it occur.
- e.g. Stockpile clearance of remnants at the end of the contract i.e. upon completion of the work.

Avoidable waste

- While unavoidable waste is outside the control of the contractor, he must minimise his avoidable waste which may arise from misuse or non-use of the materials and or components.
- Avoidable waste can be attributed to:
  - Theft
  - Vandalism and breakages
  - Error in use
  - Accidental wastages

Potential and Permissive Waste

- Potential material waste situations normally arise where materials and/or components remain unused or utilised at the end of a phase or contract and cannot be redeployed or credited to the site.
- If the site agent or site supervisor condones the destruction of these materials, or condones site practices which result in material losses, this may be said to be PERMISSIVE WASTE.

Question

- ***How can we make some saving from materials ?***

and at the same time

- ***how do we make sure that the material waste is kept to the minimum so that we can maximize our profit?***

It bores down to the issue of:

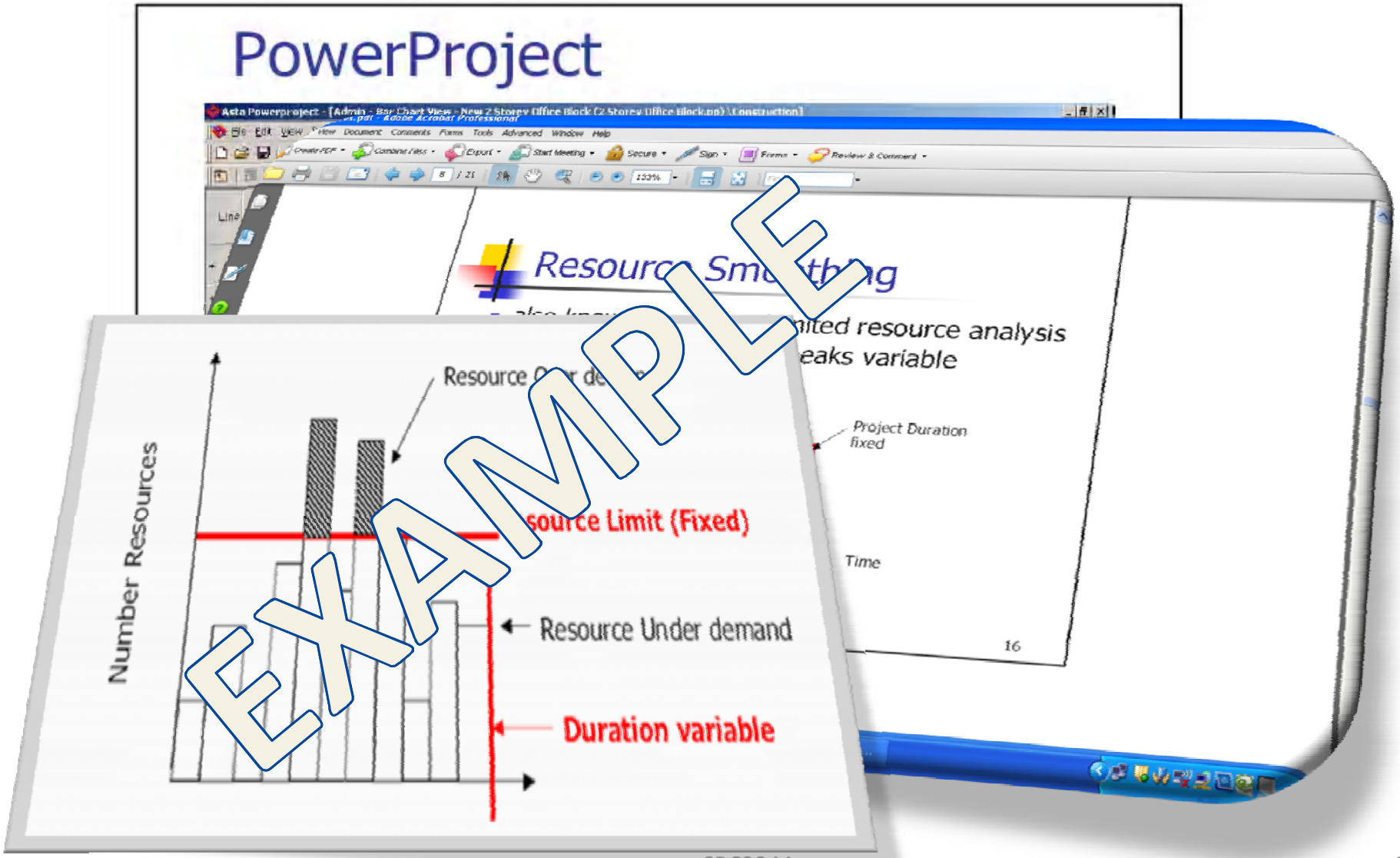
- what materials are needed?
- when are they needed?
- how much each material is needed at one time?
- when to order and purchase?
- when to get delivery?
- how and where to store?
- how much to be taken out?
- how to ensure efficient use and less wastage?

How to control resources from wastage?

Why this is important?

- To lead to more effective site management - affects utilisation of labour, materials and plant
- To keep Master Plan under constant review, to achieve completion by planned date

Tools used to control wastage



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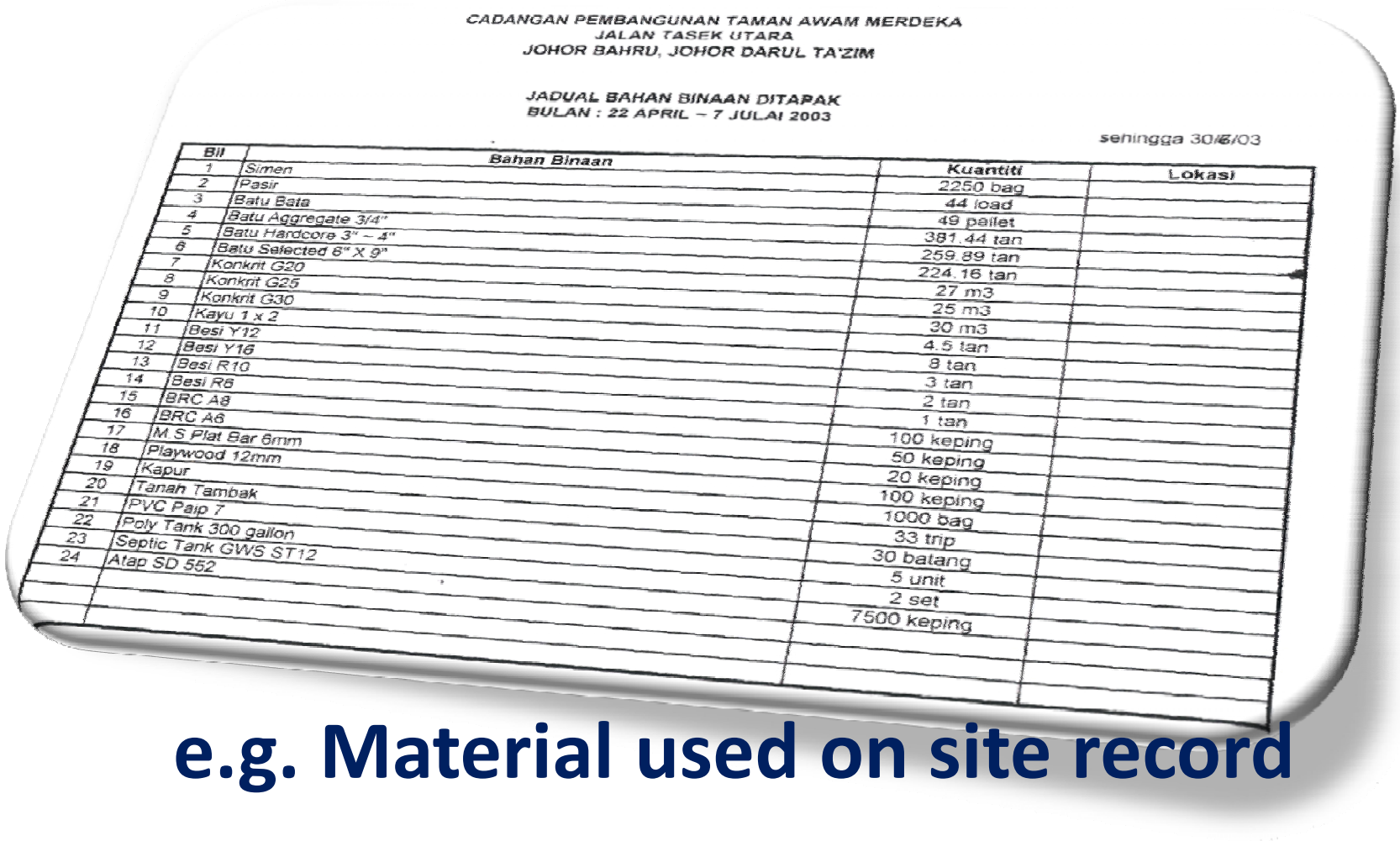


CADANGAN PEMBANGUNAN TAMAN AWAM MERDEKA
JALAN TASEK UTARA
JOHOR BAHRU, JOHOR DARUL TA'ZIM

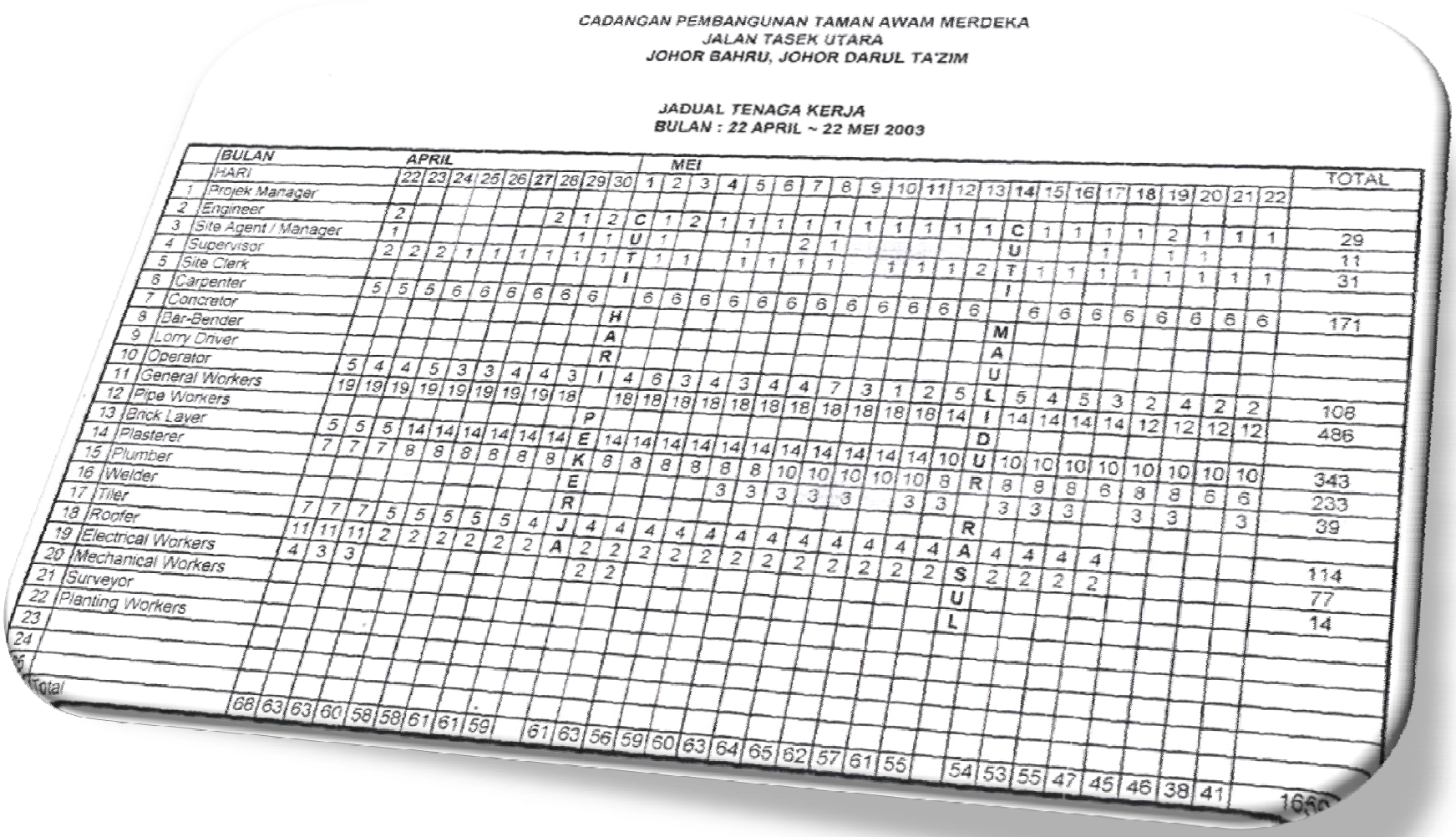
JADUAL BAHAN BINAAN DITAPAK
BULAN : 22 APRIL – 7 JULAI 2003

sehingga 30/6/03

Bil	Bahan Binaan	Kuantiti	Lokasi
1	Simen	2250 bag	
2	Pasir	44 load	
3	Batu Bata	49 pallet	
4	Batu Aggregate 3/4"	381.44 tan	
5	Batu Hardcore 3" – 4"	259.89 tan	
6	Batu Selected 6" X 9"	224.16 tan	
7	Konkrit G20	27 m3	
8	Konkrit G25	25 m3	
9	Konkrit G30	30 m3	
10	Kayu 1 x 2	4.5 tan	
11	Besi Y12	8 tan	
12	Besi Y16	3 tan	
13	Besi R10	2 tan	
14	Besi R6	1 tan	
15	BRC A8	100 keping	
16	BRC A6	50 keping	
17	M.S Plat Bar 6mm	20 keping	
18	Playwood 12mm	100 keping	
19	Kapur	1000 bag	
20	Tanah Tambak	33 trip	
21	PVC Paip 7	30 batang	
22	Poly Tank 300 gallon	5 unit	
23	Septic Tank GWS ST12	2 set	
24	Atap SD 552	7500 keping	

e.g. Material used on site record

Tools used to control wastage



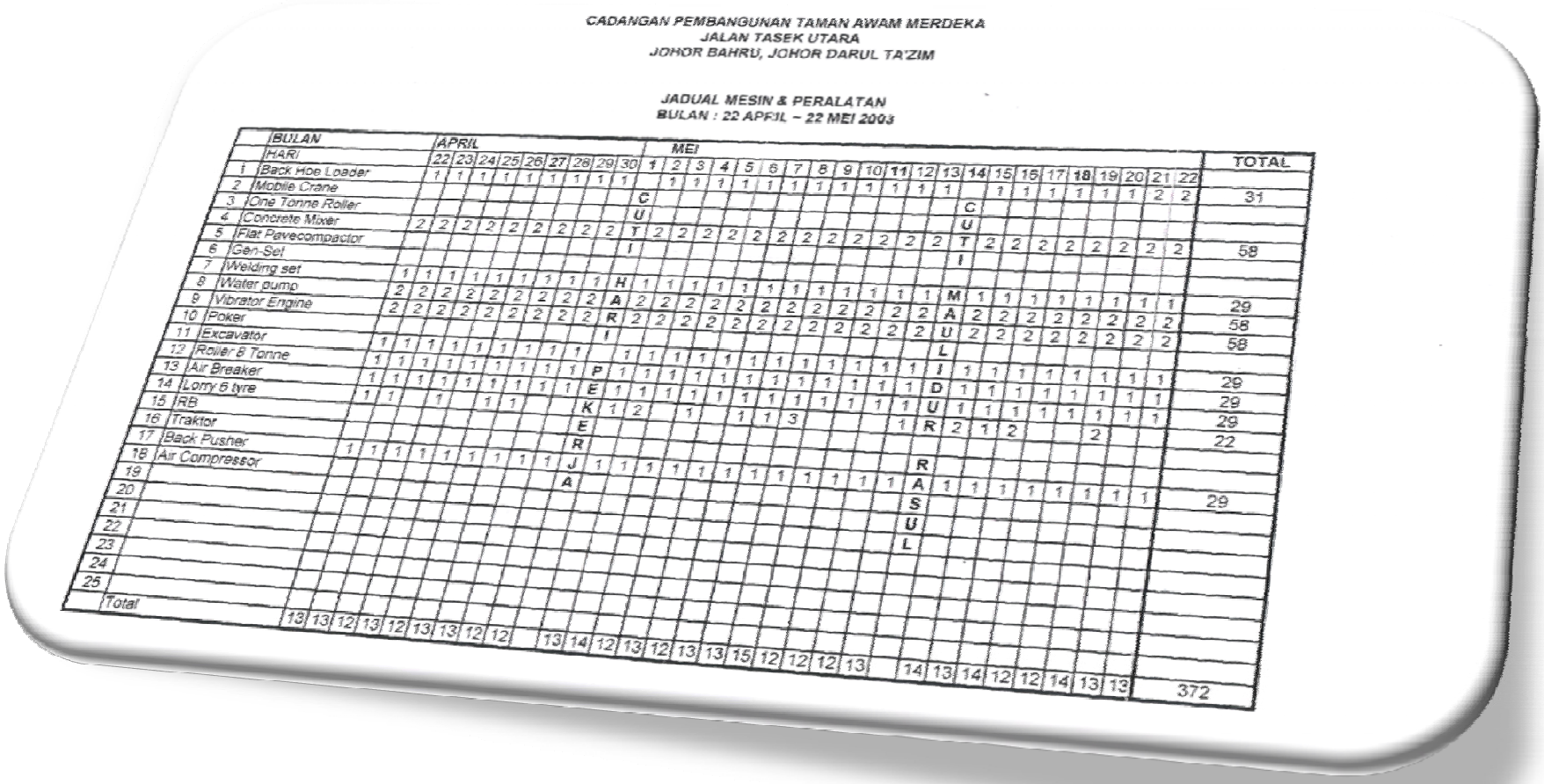
CADANGAN PEMBANGUNAN TAMAN AWAM MERDEKA
JALAN TASEK UTARA
JOHOR BAHRU, JOHOR DARUL TA'ZIM

JADUAL TENAGA KERJA
BULAN : 22 APRIL ~ 22 MEI 2003

BULAN	APRIL									MEI																								TOTAL
HARI	22	23	24	25	26	27	28	29	30	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22			
1 Projek Manager																																		
2 Engineer	2						2	1	2	C	1	2	1	1	1	1	1	1	1	1	1	C	1	1	1	1	2	1	1	1			29
3 Site Agent / Manager	1						1	1	U	1			1		2	1						U			1		1	1					11
4 Supervisor	2	2	2	1	1	1	1	1	T	1	1		1	1	1	1		1	1	1	2	T	1	1	1	1	1	1	1	1			31
5 Site Clerk									I													I											
6 Carpenter	5	5	5	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6		6	6	6	6	6	6	6	6			171
7 Concretor									H													M											
8 Bar-Bender									A													A											
9 Lorry Driver									R													U											
10 Operator	5	4	4	5	3	3	4	4	3	I	4	6	3	4	3	4	4	7	3	1	2	5	L	5	4	5	3	2	4	2	2		
11 General Workers	19	19	19	19	19	19	19	19	18		18	18	18	18	18	18	18	18	18	18	18	14	I	14	14	14	14	12	12	12	12		108
12 Pipe Workers									P													D											486
13 Brick Layer	5	5	5	14	14	14	14	14	E	14	14	14	14	14	14	14	14	14	14	14	10	U	10	10	10	10	10	10	10	10			
14 Plasterer	7	7	7	8	8	8	8	8	K	8	8	8	8	8	8	10	10	10	10	10	8	R	8	8	8	6	8	8	6	6			343
15 Plumber									E				3	3	3	3	3			3	3		3	3	3		3	3		3			233
16 Welder									R													R											39
17 Tiler	7	7	7	5	5	5	5	5	4	J	4	4	4	4	4	4	4	4	4	4	4	A	4	4	4	4							
18 Roofer	11	11	11	2	2	2	2	2	2	A	2	2	2	2	2	2	2	2	2	2	2	S	2	2	2	2							114
19 Electrical Workers	4	3	3								2	2										U											77
20 Mechanical Workers									2	2												L											14
21 Surveyor																																	
22 Planting Workers																																	
23																																	
24																																	
25																																	
Total	68	63	63	60	58	58	61	61	59		61	63	56	59	60	63	64	65	62	57	61	55		54	53	55	47	45	46	38	41		1666

e.g. Manpower on site record book

Tools used to control wastage



CADANGAN PEMBANGUNAN TAMAN AWAM MERDEKA
JALAN TASEK UTARA
JOHOR BAHRU, JOHOR DARUL TA'ZIM

JADUAL MESIN & PERALATAN
BULAN : 22 APRIL – 22 MEI 2003

	BULAN	APRIL									MEI																					TOTAL
	HARI	22	23	24	25	26	27	28	29	30	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	
1	Back Hoe Loader	1	1	1	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1		1	1	1	1	1	1	2	2	31
2	Mobile Crane										C													C									
3	One Tonne Roller										U													U									
4	Concrete Mixer	2	2	2	2	2	2	2	2	2	T	2	2	2	2	2	2	2	2	2	2	2	2	T	2	2	2	2	2	2	2	2	58
5	Flat Pavecompactor										I													I									
6	Gen-Set																																
7	Welding set	1	1	1	1	1	1	1	1	1	H	1	1	1	1	1	1	1	1	1	1	1	M	1	1	1	1	1	1	1	1	1	
8	Water pump	2	2	2	2	2	2	2	2	A	2	2	2	2	2	2	2	2	2	2	2	2	A	2	2	2	2	2	2	2	2	2	29
9	Vibrator Engine	2	2	2	2	2	2	2	2	R	2	2	2	2	2	2	2	2	2	2	2	2	U	2	2	2	2	2	2	2	2	2	58
10	Poker									I													L										58
11	Excavator	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	I	1	1	1	1	1	1	1	1	1	
12	Roller 8 Tonne	1	1	1	1	1	1	1	1	1	P	1	1	1	1	1	1	1	1	1	1	1	D	1	1	1	1	1	1	1	1	1	29
13	Air Breaker	1	1	1	1	1	1	1	1	1	E	1	1	1	1	1	1	1	1	1	1	1	U	1	1	1	1	1	1	1	1	1	29
14	Lorry 6 tyre	1	1		1		1	1			K	1	2		1		1	1	3			1	R	2	1	2			2				29
15	RB										E																						22
16	Traktor										R												R										
17	Back Pusher	1	1	1	1	1	1	1	1	1	J	1	1	1	1	1	1	1	1	1	1	1	A	1	1	1	1	1	1	1	1	1	
18	Air Compressor										A												S										29
19																							U										
20																							L										
21																																	
22																																	
23																																	
24																																	
25																																	
	Total	13	13	12	13	12	13	13	12	12	13	14	12	13	12	13	13	15	12	12	12	13	14	13	14	12	12	14	13	13			372

e.g. Machineries used on site record book

How to control resources?

- Within **weekly planning**
- Objectives:
  - Allows for forward planning
  - Check on use and wastage
  - Influence site layout and planning
  - …

How to control resources?

Weekly Planning

- **Presentation**
  - Operations to be undertaken
  - Location of operations
  - Number of operatives/gang involved

- **Meetings**
  - Minutes and actions recorded
  - Draft schedules discussed
  - Work schedule agreed and instructions issued

Weekly Planning and Targeting

- **Why important?**
- **Objectives**
  - Key dates for receipt of information
  - Detail record of resource use
  - Highlight potential problems
  - Look at co-ordination and requirements of sub-contractors
  - Summarise major instructions received
  - Provide weekly cost control

Other ways to control resources

- **Liaise with other departments**
  - Plant, M&E, Temporary Works, Purchasing
- **Key Considerations**
  - Continuity of similar trades
  - Availability of certain materials
  - Availability of skilled and unskilled labour
  - Availability of subcontractors and suppliers
  - Number of visits to site

How to increase resources?

- **Working Overtime** – increase work hours without employ more staff. Will increase labour rate & reduce productivity
- **Working Shifts** – increase the utilisation of machines, equipment, and no. of man/hours
- **Subcontractors –** Will increase workforce (but will increase labour cost; higher)
- **Increase Productivity** – Education and training should improve productivity. But only for long term needs.
- **Learning Curve** – e.g manhours vs. repetitive work
- **Reduce scope of work** – to meet fixed end date

Summary

- It must be noted that, all materials and components delivered to site are potentially at risk.

- Therefore the contractor must manage and control his materials/components systematically, effectively and efficiently.

Reading list

Gould, Frederick E . (2000) – Construction Project Management – Prentice Hall, London

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Chitkara, KK (2005) – Construction Project Management – Planning, Scheduling and Controlling