

Drawing and estimation

Prepared, Arranged and Composed by:-Asad Iqbal

2.54
cub

ASSIGNMENT # 01

Question # 02:- Calculate material
Demand in Bar Bounding Schedule.
(ie Bricks, Sand, Cement, crush etc)

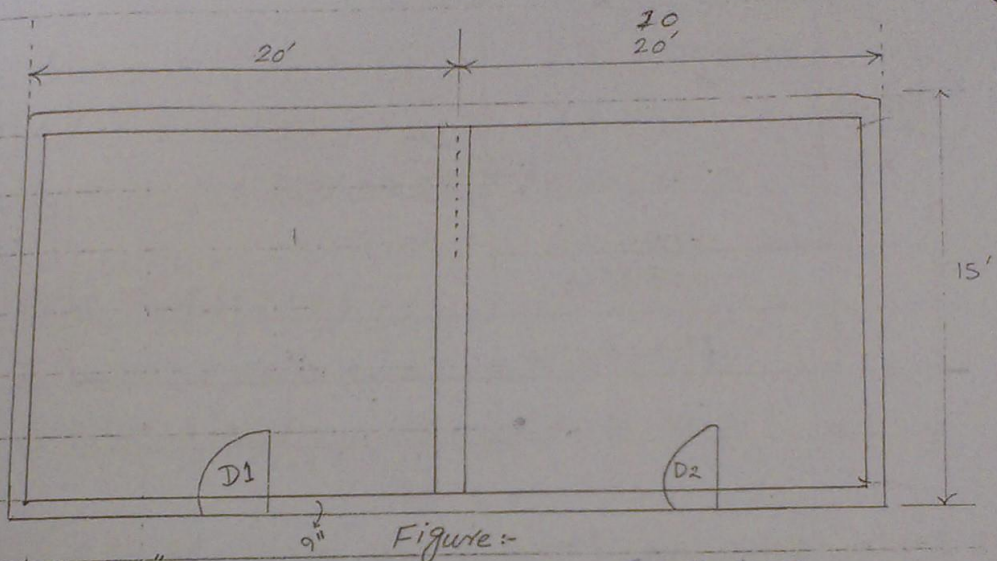
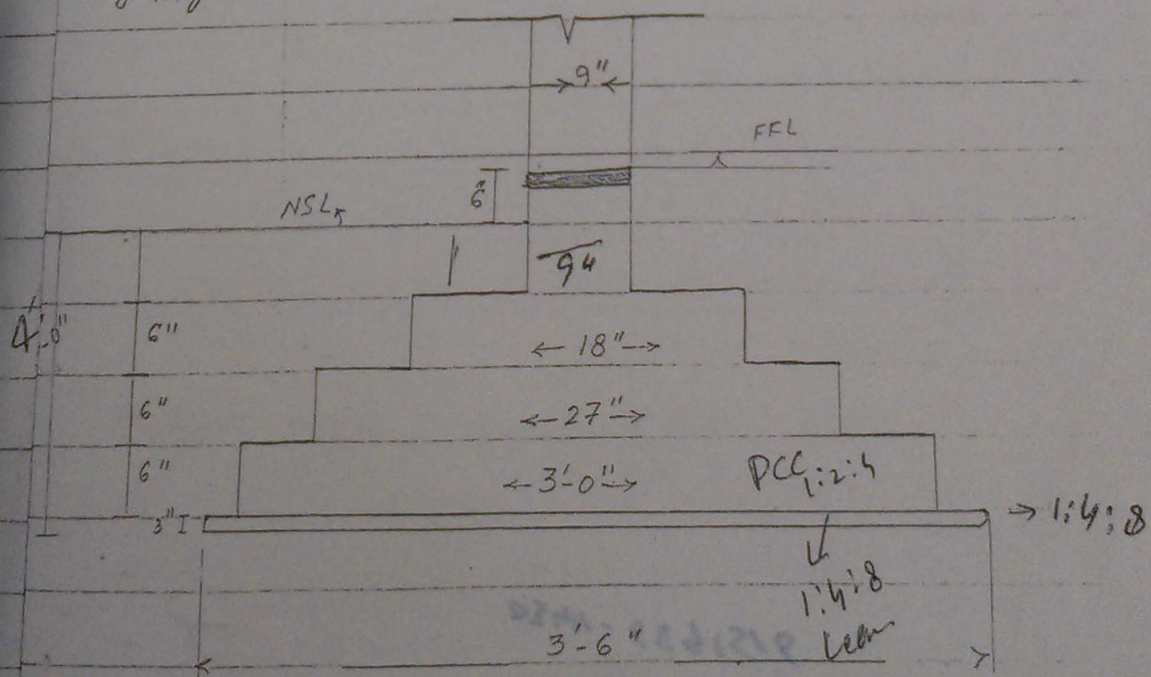


Figure:-

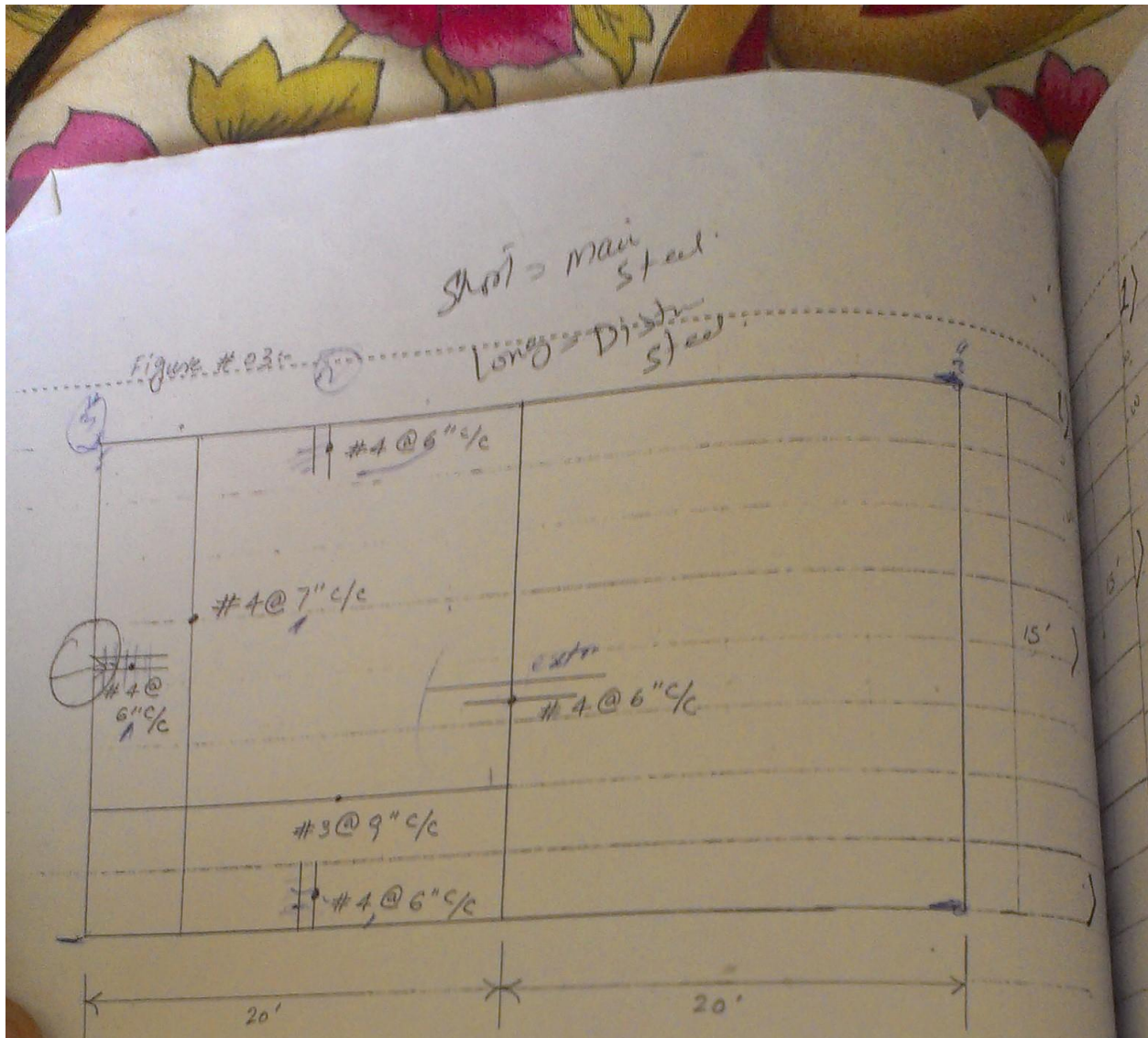
$D_1 = 3'-6'' \times 7'-0''$
 $D_2 = 4'-0'' \times 7'-0''$
 Story Height = 12'

Figure figure



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- * Binder Bars are Placed with #3 @ 12" c/c
- * Length of Extra bars = $\frac{1}{3}$ of Span.
- * All walls are 9" Thick.
- * Story Height = 12'

$$\frac{r}{r}$$

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Centre to
Centre

1) Excavation :-

$$2 / 39'3'' \times 3'6'' \times 4'0'' = 1099 \text{ cu. ft}$$

$$3 / 14'3'' \times 3'6'' \times 4'0'' = 598.5 \text{ cu. ft}$$

$$\text{Total :- } 1697.5 \text{ cu. ft}$$

15' } Lean :- { 1:4:8

$$2 / 39'3'' \times 3'6'' \times 0-3'' = 68.6875 \text{ cu. ft}$$

$$3 / 14'3'' \times 3'6'' \times 0-3'' = 37.40 \text{ cu. ft}$$

$$\text{Total :- } 106.0875 \text{ cu. ft}$$

1) PCC :- { 1:2:4

$$2 / 39'3'' \times 3'0'' \times 0-6'' = 117.75 \text{ cu. ft}$$

$$3 / 14'3'' \times 3'0'' \times 0-6'' = 64.125 \text{ cu. ft}$$

$$\text{Total} = 181.875 \text{ cu. ft}$$

1) Step 1 :-

$$2 / 39'3'' \times 2.27' \times 0-6'' = 88.3125 \text{ cu. ft}$$

$$3 / 14'3'' \times 2.27' \times 0-6'' = 48.09375 \text{ cu. ft}$$

$$\text{Total} = 136.40625 \text{ cu. ft}$$

1) Step 2 :-

$$2 / 39'3'' \times 1.5' \times 0-6'' = 58.875 \text{ cu. ft}$$

$$3 / 14'3'' \times 1.5' \times 0-6'' = 32.0625 \text{ cu. ft}$$

$$\text{Total} = 90.9375 \text{ cu. ft}$$

1) Brick Work below DPC :- { NSL

$$2 / 39'3'' \times 9'' \times 2.25' = 64$$

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* Back Fill:-

Excavation - all (i.e. Lean + PCC etc)

$$\Rightarrow 1697 - 719.43 \Rightarrow 977.75 \text{ Cu.ft}$$

977.75 cft

7) Brick work B.W NSL D DPC

$$2/39'3" \times 0-9" \times 0-6" = 29.43 \text{ cft}$$

$$3/14'3" \times 0-9" \times 0-6" = 16.03125 \text{ cft}$$

$$\text{Total} = 45.46125 \text{ cft}$$

8) Brick work Above DPC:-

$$2/39'3" \times 0-9" \times 12' = 706.5 \text{ cft}$$

{ Story Height }

$$3/14'3" \times 0-9" \times 12' = 384.75 \text{ cft}$$

$$\text{Total} = 1091.25 \text{ cft}$$

* Door Deduction:-

$$1/3'6" \times 7-0" \times 0-9" = 18.375 \text{ cft}$$

$$1/4'-0" \times 7'-0" \times 0-9" = 21 \text{ cft}$$

$$\text{Total} = 39.375 \text{ cft}$$

* Net Brick Work:-

Brick work above DPC - Door openings.

$$1091.25 - 39.375$$

$$\Rightarrow 1052.62 \text{ cft}$$

Net Total = 1052.62 cft

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PLASTER:- (1:4)

External Plaster :-

$$2 / 40'-0" \times 12'-6" = 1000 \text{ sqft} \quad \left\{ \begin{array}{l} \text{Story Height} = 12' \\ \text{Full length due to external.} \end{array} \right.$$

$$2 / 15'-0" \times 12'-6" = 375 \text{ sqft}$$

$$\text{Total} = 1375 \text{ sq. ft}$$

* Door deductions:-

$$1 / 3'-6" \times 7'-0" = 24.5 \text{ sq. ft}$$

$$1 / 4'-0" \times 7'-0" = 28 \text{ sq. ft}$$

$$\text{Total} = 52.5 \text{ sq. ft}$$

Net External Plaster:-

$$\Rightarrow 1375 - 52.5$$

$$= 1322.5 \text{ sq. ft}$$

Net Total

$$1322.5 \text{ sq. ft}$$

Internal Plaster:-

$$2 / 37.75' \times 12' = 906 \text{ sq. ft}$$

$$4 / 13.5' \times 12' = 648 \text{ sq. ft}$$

$$\text{Total} = 1554 \text{ sq. ft}$$

* Door deductions:-

$$1 / 3'-6" \times 7'-0" = 24.5 \text{ sq. ft}$$

$$1 / 4'-0" \times 7'-0" = 28 \text{ sq. ft}$$

$$\text{Total} = 52.5 \text{ sq. ft}$$

NET Internal Plaster:-

$$\Rightarrow 1554 - 52.5 = 1501.5 \text{ sq. ft}$$

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500000 (1/2) 1/2
 Ceiling Plaster = (1/2)

8/ 18.875' x 13.5' = 509.625 sq. ft
 1/ 18" = 18"

Total = 509.625 sq. ft

Paint =

which is always equal to the Plaster. i.e.

Concrete :-

i) Concrete for slab = (1:2:4)

1/ 43' x 18' = 387 cu. ft

(Because ceiling is extended 1.5 ft at every corner)

ii) Concrete for lintel = (1:2:4)

1/ (3'-6" + 8'-9") x 9" = 2.8125 cu. ft

1/ 5.5' x 9" x 9" = 3.09375 cu. ft

Total = 5.90625 cu. ft

class B

Concrete for DPC = (1:2:4)

2/ 39'3" x 0-9" x 0-2" = 9.8125 cu. ft

3/ 14'5" x 0-9" x 0-2" = 5.34375 cu. ft

Total = 15.15625 cu. ft

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Summary:-

i) Excavation :-

$$\text{earth work} = 1697 \text{ cft}$$

$$\text{back fill} = 977.75 \text{ cft}$$

Plaster: i) BB Work:-

$$45.46 + (1091.25 - 39.375) + 204.60$$

OR 1052.62
cft

$$+ 136.40625 + 90.9375 \Rightarrow 1530.02 \text{ cft}$$

Step 1 + Step 2 + BB below NSL + BB B.W NSL
+ BB work above DPC)

ii) Plaster :-

i) External :- $\{1:4\} \Rightarrow 1322.5 \text{ Sq. Ft}$

ii) Internal :- $\{1:6\} \Rightarrow 1506 + \text{Ceiling Plaster } (509.625)$
 $= 2015.625 \text{ Sq. Ft}$

iii) Concrete :-

* Lean $\{1:4:8\}$:- 106.0875 cu. Ft ✓

* Class B :- $\{1:2:4\}$:- PCC + Slab + Lintel + DPC
 $= 181.875 + 387 + 5.90625 + 15.15625$
 $= 589.78125 \text{ cu. Ft}$

only lean
 $1:4:8$

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6/mat

MATERIALS DEMAND

*** Excavation :-**
Earth work = 1697 cft
 $\frac{1697}{35.977} \Rightarrow 48.48 \text{ cu.m}$
48.48 cu.m

*** Concrete :- (1:4:8)**
Wet Volume = 106.08 cft
Dry Volume of Concrete (1:4:8)
 $106.08 \times 1.54 \Rightarrow 163.36 \text{ cft}$
Conversion fac wet

*** Cement :-**
 $\frac{1}{13} \times 163.36 = 12.566 \text{ cu.ft}$
AN $\frac{12.566}{1.25} \Rightarrow 10.0528 \text{ bags of cement}$

*** Sand :-**
 $\frac{4}{13} \times 163.36 = 50.26 \text{ cft}$

*** Crush :-**
 $\frac{8}{13} \times 163.36 \Rightarrow 100.529 \text{ cft}$

*** Concrete :- Class B (1:2:4)**
Wet Vol. = 599.15625 cft
Dry Vol. = 599.15625 $\times 1.54 \Rightarrow 908.5846 \text{ cft}$

*** Cement :-**
 $\frac{1}{7} \times 908.5846 = 129.7978 \text{ cft} \Rightarrow \frac{129.7978}{1.25} = 103.83 \text{ bags}$

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$$\text{Sand}:- \frac{2}{7} \times 908.5846 = 259.59 \text{ cft}$$

$$\text{Crush}:- \frac{4}{7} \times 908.5846 = 519.1912 \text{ cft}$$

Brick work :-

$$\text{Total} = 1530.02 \text{ cft}$$

$$\begin{aligned} \text{No. of Bricks} &= 1530.02 \times 13.5 \\ &= 20653.8255 \end{aligned}$$

Conversion
Factor:
 $\times 13.5$

Bricks.

Mortar.

Mortar :- $\{1:6\}$

wet vol. of Mortar :-

30% of BB is Mortar.

$$1529.913 \times 30 = 458.9739 \text{ cft}$$

$$\text{So, wet mark} = 458.9739 \text{ cft}$$

of Volume of Mortar =

$$\begin{aligned} 458.9739 \times 1.27 \\ = 582.89 \text{ cft} \end{aligned}$$

Mortar
Dry Factor
1.27

amount :-

$$\frac{1}{7} \times 582.89 = 83.27 \text{ cft}$$

$$\text{Sand}:- \frac{6}{7} \times 582.89 = 499.62 \text{ cft}$$

Crush = 154

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External

Plaster :- (1:4)

sq. ft \rightarrow cu. ft

Wet Vol. = $1322.5 \times \frac{0.04167}{0.11}$ Conversion $\frac{1}{2}$ i)

Wet Vol. = 55.108 cu. ft

Dry Vol. = $55.108 \times 1.27 \Rightarrow 69.9876$ cu. ft

Cement :- $\frac{1}{5} \times 69.9876 = 13.998$ cu. ft
or 7.9998 bags

Sand :- $\frac{4}{5} \times 69.9876 \Rightarrow 55.97728$ cu. ft

Wet Vol. = 205.625 cu. ft

Wet Vol. = $205.625 \times 0.0417 \Rightarrow 83.998$ cu. ft

Wet Vol. = 83.998 cu. ft

Dry Vol. = $83.998 \times 1.27 \Rightarrow 106.67746$ cu. ft

Cement :- $\frac{1}{7} \times 106.67746 = 15.239$ cu. ft
13.9 bags

Sand :-

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SUM:-

in
7

i) Cement:-

$$\Rightarrow 12.56 + 129.79 + 83.27 + 13.99 + 15.204$$
$$= 254.814 \text{ cu. ft}$$

$$\text{No. of bags of Cement} = \frac{254.814}{1.25} \Rightarrow 204 \text{ bags}$$

204 bags Ans.

ii) Sand:-

$$\Rightarrow 50.26 + 259.59 + 55.9846 + 91.43 + 499.62$$
$$= 959.63 \text{ cu. ft}$$

975 cu. ft
Ans.

iii) Crush :- (Aggregate)

$$\Rightarrow 100.52 + 519.19$$
$$= 619.71 \text{ cu. ft}$$

OR 625 cu. ft

625 cu. ft
Ans.

iv) Bricks:-

$$20653.83 \text{ bricks.}$$

20653.83
Bricks

Ans

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تعمیراتی
Reinforcement

Estimation of Reinforcing Steel :-

i) Main Steel :- 2/1

Bar No. of Bars #4 @ 7" c/c

2/35 | 15'-0" = 1050'

Now 1050' x 3020 kg/ft = 317.14 kg

317.14 kg

ii) Distribution Steel :-

#3 @ 9" c/c

2/21 | 20'-0" = 840'

Converting

Now 840' x 170 kg/ft = 142.81 kg

142.81 kg

iii) Extra Bars :- = 11 V/3

#4 @ 6" c/c

2/2/41 | 5'-0" $\Rightarrow \frac{2}{3} \Rightarrow \frac{15'}{3} \Rightarrow 5'$

= 820'

Now 820' x 3020 kg/ft = 260.022 kg

260.022 kg

Calculation for Main Steel:

No. of Bars = $\frac{\text{Clear Span} + 1}{\text{Space}}$

$\frac{19'9" + 1}{7"} \Rightarrow 34.58 \approx 35$

Calculation for Distribution Steel:

$\frac{D \times D}{24} \Rightarrow \frac{4 \times 4}{24} \Rightarrow .66$

$.666 \Rightarrow .3020 \text{ kg/ft}$

Calculation for Extra Bars:

No. of Bars = $\frac{\text{Clear Span} + 1}{\text{Space}}$

$\frac{14'-6" + 1}{9"} \Rightarrow 21$

$\frac{3 \times 3}{24} \Rightarrow .375 \Rightarrow .17$

$.17 \times 220426 \Rightarrow 37472.42$

Final Total:

317.14 kg + 142.81 kg + 260.022 kg = 720.072 kg

720.072 kg

247.64 kg

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\therefore # 4 @ 6" c/c = $\left\{ \begin{array}{l} \text{No. of Bars:-} \\ \text{Clear Span} + 1 \\ \text{Spacing} \\ 14.5' + 1 \Rightarrow 30 \\ 6'' \\ 14'6'' \end{array} \right.$

$2/1/30/6.66$
 $= 400'$
 $\Rightarrow 400 \times 3020 \text{ kg/ft}$
 $\{ \text{Converting factor} \}$
 $= 120.8 \text{ kg}$

120.8 kg

\nearrow MID of Room
 \therefore # 4 @ 6" c/c = $\left\{ \begin{array}{l} \text{No. of Bars:-} \\ \text{Clear Span} + 1 \\ \text{Spacing} \\ 14'6'' + 1 = 30 \\ 6'' \end{array} \right.$

$01/1/30/13.3'$
 $\Rightarrow 400'$
 $400' \times 3020 \text{ kg/ft}$
 120.8 kg

120.8 kg

iv) Binder Bars:- # $\left\{ \begin{array}{l} \text{At Start} \\ \text{Given in Question} \end{array} \right.$

$\# 3 @ 12'' \text{ c/c}$

$2/8/15 \Rightarrow 240'$
 $\Rightarrow 240' \times 170 \text{ kg/ft}$
 $\Rightarrow 40.8 \text{ kg}$

40.8 kg

$\left\{ \begin{array}{l} \text{No. of Bars:-} \\ \frac{L}{3} \\ 3 \times 6.66' + 1 \\ 12'' \\ 7.66' \Rightarrow 8 \\ 3 \times 3 \Rightarrow 375 \\ 24 \\ \Rightarrow 375 \Rightarrow 170 \text{ kg/ft} \end{array} \right.$

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#3 @ 12" c/c :: No. of Bars :-

2/6/20 $\frac{5' + 1}{12''} \Rightarrow 6$

$\Rightarrow 480'$

Now Converting.

$480' \times .170 \text{ kg/ft}$

$\Rightarrow 81.6 \text{ kg}$

#3 @ 12" c/c

2/1/15/15 No. of Bars. $\frac{\text{clear span} + 1}{\text{span}} \Rightarrow \frac{40}{3}$

$\Rightarrow 225'$

Converting $\frac{13.3' + 1}{12''} \Rightarrow 15 \#$

$225' \times .170 \Rightarrow 38.25 \text{ kg}$

#3

#4

Total:

Conversion factor #3 .170 kg/ft

#4 .3025 kg/ft

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Summary :-

#	Bar Name	Bar Dia.	Weight (Total)
1	Main Bars.	# 4	317.14 kg
2	Distribution Bars.	# 3	142.81 kg
3	Extra Bars.	# 4	247.64 260.02 + 125.8 + 120.8 = 494.5
4	Binder Bars.	# 3	40.8 kg + 81.6 + 38.25 = 160.65
	n.	n.	n.

Material Demand:-

Steel:-	Weight.
# 3	$142.81 + 160.65 \Rightarrow 303.35 \text{ kg}$
# 4	$317.14 + 506.6 \Rightarrow 823.74 \text{ kg}$
Total =	1127.09 kg

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Bar Binding Schedule :-

NO. of Bars \times Length = Total

Bar Dia. #	Cut Length	No. of Bars	Figure.	Remark.	Total
#4 @ 7"	15'-0"	35 \times 2 = 70		Main Steel	317.415
#3 @ 9"	40'-0"	21 \times 2 = 42		Distribution	142.8
#4 @ 6"	5'-0"	14 \times 2 = 28		Extra Bars.	260.28
#4 @ 6"	6.66 \times 2 = 13.32	30 \times 2 = 60		Extra Bars	125.51
#4 @ 6"	13.3'	30		Extra Bars	120.9
#3 @ 12"	15	8 \times 2 = 16		Binder Bars	40.8
#3 @ 12"	40	12		Binder Bars	81.6
#3 @ 12"	15	15		Binder Bars	38.25

\therefore #3 Σ Total length = 1785'

#4 Σ Total length = 2726.2'

And Total Weight = 1127.63 kg

Am

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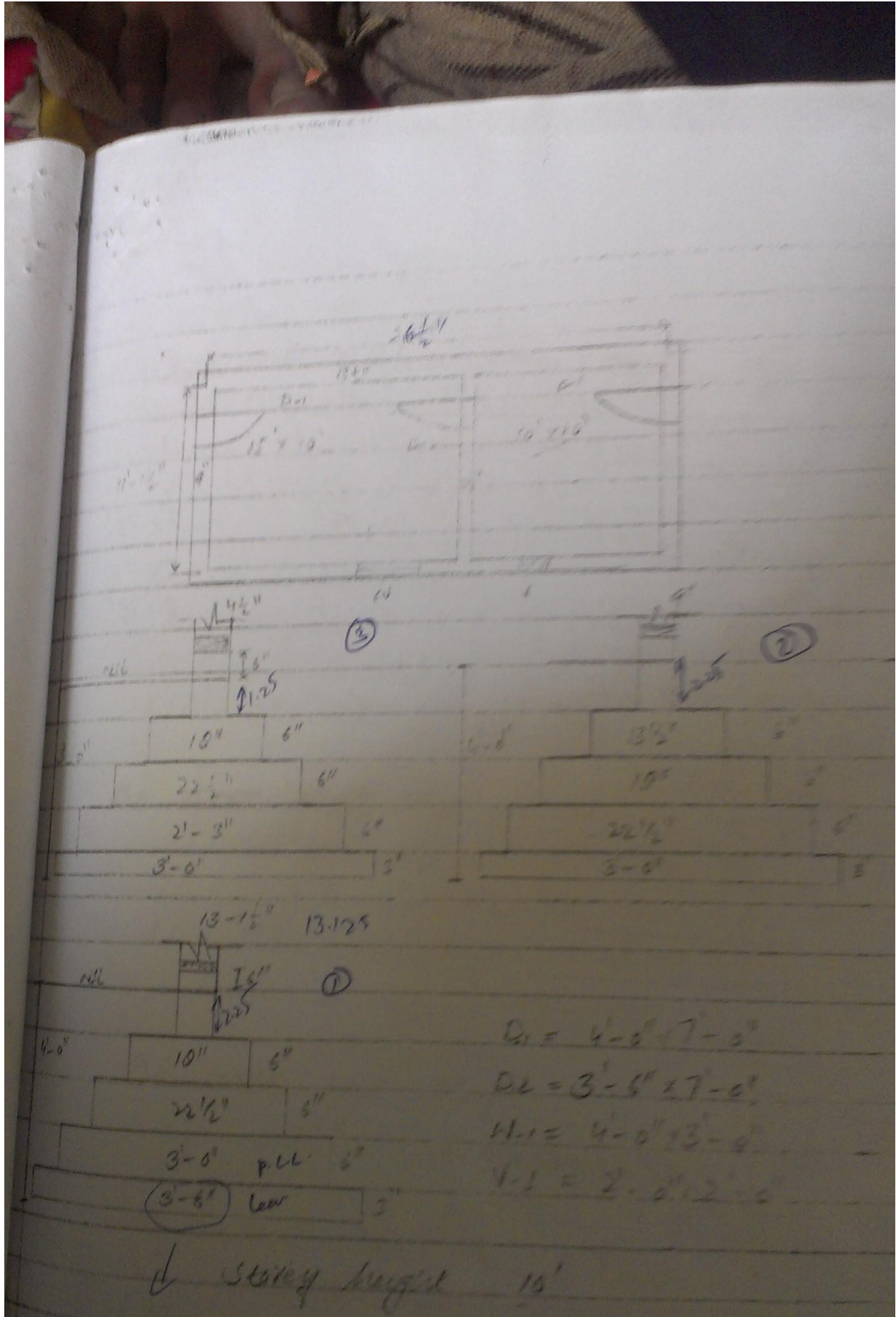
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The End.

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width	Length of wall c/c	Long of short wall	Length of short
	13 1/2"	0'-9"	4 1/2"
	(+) 26'-1 1/2"	(-) 12'-1 1/2"	(-) 12'-1 1/2"
Lein (1:4:8)	29'-7 1/2"	7'-7 1/2"	7'-7 1/2"
3'-6"			
P/c	29'-1 1/2"	8'-1 1/2"	8'-1 1/2"
3'-0"			
BB work 1st step	28'	9'-3"	9'-3"
1'-10 1/2"			
2nd step	27'-7 1/2"	9'-7 1/2"	9'-7 1/2"
1'-6"			
BB below NSL	27'-3"	10'	10'
13 1/2"			
BB above P/c	27'-3"	10'	10'
13 1/2"			

Excavation:-

$$2 / 29'-7 \frac{1}{2}'' \times 3'-6'' \times 4'-0'' = 829.5 \text{ cft}$$

$$2 / 7'-7 \frac{1}{2}'' \times 3'-0'' \times 4'-0'' = 183 \text{ cft}$$

$$1 / 7'-7 \frac{1}{2}'' \times 3'-0'' \times 3'-0'' = 68.625 \text{ cft}$$

$$+$$

$$\hline 1081.125$$

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Lean (1:4:0)

$$2 / 29' - 7\frac{1}{2}'' \times 3' - 6'' \times 0' - 3'' = 51.043 \text{ cft } 4w$$

$$2 / 7' - 7\frac{1}{2}'' \times 3' - 0'' \times 0' - 3'' = 11.4375 \text{ cft } 5w$$

$$1 / 7' - 7\frac{1}{2}'' \times 3' - 0'' \times 0' - 3'' = 5.7187 \text{ cft}$$

$$+ \quad \underline{\hspace{2cm}}$$
$$68.1992$$

P.C.C (1:2:4)

$$2 / 29' - 1\frac{1}{2}'' \times 3' - 0'' \times 0' - 6'' = 87.375 \text{ cft } 4w$$

$$2 / 8' - 1\frac{1}{2}'' \times 1' - 10\frac{1}{2}'' \times 0' - 6'' = 15.2343 \text{ cft } 5w$$

$$1 / 8' - 1\frac{1}{2}'' \times 2' - 3'' \times 0' - 6'' = 9.1406 \text{ cft } 5w$$

BB work First step:- 111.7499 cft

$$2 / 28' - 0'' \times 1' - 10\frac{1}{2}'' \times 0' - 6'' = 52.5 \text{ cft}$$

$$2 / 9' - 3'' \times 1' - 6'' \times 0' - 6'' = 13.875 \text{ cft}$$

$$1 / 9' - 3'' \times 1' - 10\frac{1}{2}'' \times 0' - 6'' = 8.6718 \text{ cft}$$

$$\underline{\hspace{2cm}}$$
$$75.0468 \text{ cft}$$

BB work 2nd step:-

$$2 / 27' - 7\frac{1}{2}'' \times 1' - 6'' \times 0' - 6'' = 41.4375 \text{ cft}$$

$$2 / 9' - 7\frac{1}{2}'' \times 1' - 1\frac{1}{2}'' \times 0' - 6'' = 10.8281 \text{ cft}$$

$$1 / 9' - 7\frac{1}{2}'' \times 1' - 6'' \times 0' - 6'' = 7.2187 \text{ cft}$$

$$\underline{\hspace{2cm}}$$
$$59.4843 \text{ cft}$$

BB work below NSL:-

$$2 / 27' - 3'' \times 1' - 1\frac{1}{2}'' \times 2' - 3'' = 137.4531$$

$$2 / 10' - 0'' \times 0' - 9'' \times 2' - 3'' = 33.75$$

$$1 / 10' - 0'' \times 0' - 4\frac{1}{2}'' \times 1' - 3'' = 4.6875$$

$$\underline{\hspace{2cm}}$$
$$176.3906 \text{ cft}$$

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Back fill:-

$$= 1081.125 - 491.67$$

$$= 589.4542 \text{ cft}$$

BB work below NSL & DPC:-

$$2/ 27'-3'' \times 1'-1\frac{1}{2}'' \times 0'-6'' = 30.6562 \text{ cft}$$

$$2/ 10'-0'' \times 0'-9'' \times 0'-6'' = 7.5 \text{ cft}$$

$$1/ 10'-0'' \times 0'-4\frac{1}{2}'' \times 0'-6'' = 1.975 \text{ cft}$$

+

$$40.0312$$

BB work above DPC:-

$$2/ 27'-3'' \times 1'-1\frac{1}{2}'' \times 10'-0'' = 613.125 \text{ cft}$$

$$2/ 10'-0'' \times 0'-9'' \times 10'-0'' = 150 \text{ cft}$$

$$1/ 10'-0'' \times 0'-4\frac{1}{2}'' \times 10'-0'' = 37.5 \text{ cft}$$

$$800.625 \text{ cft}$$

Deduction:-

$$2/ 4'-0'' \times 7'-0'' \times 0'-9'' = 42 \text{ cft}$$

$$1/ 3'-6'' \times 7'-0'' \times 0'-4\frac{1}{2}'' = 9.1875 \text{ cft}$$

$$4/ 4'-0'' \times 3'-0'' \times 1'-1\frac{1}{2}'' = 13.5 \text{ cft}$$

$$1/ 2'-0'' \times 2'-0'' \times 1'-1\frac{1}{2}'' = 4.5 \text{ cft}$$

+

$$69.1875 \text{ cft}$$

Net BB work

$$800.625 - 69.1875$$

$$= 731.4375 \text{ cft}$$


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D.P.C:- (1:2:4)

$$\begin{aligned} 2/ 27'-3'' \times 1'-1\frac{1}{2}'' \times 0'-2'' &= 10.2391 \text{ cft} \\ 2/ 10'-0'' \times 0'-9'' \times 0'-2'' &= 2.505 \text{ cft} \\ 1/ 10'-0'' \times 0'-4\frac{1}{2}'' \times 0'-2'' &= 0.626 \text{ cft} \\ &+ \\ &= 13.3703 \text{ cft} \end{aligned}$$

Lintel:- (1:2:4)


$$\begin{aligned} 2/ 5'-6'' \times 0'-9'' \times 0'-9'' &= 6.1875 \text{ cft} \\ 1/ 5'-0'' \times 0'-4\frac{1}{2}'' \times 0'-9'' &= 1.4062 \text{ cft} \\ 1/ 5'-6'' \times 1'-1\frac{1}{2}'' \times 0'-9'' &= 4.6406 \text{ cft} \\ 1/ 3'-6'' \times 1'-1\frac{1}{2}'' \times 0'-9'' &= 2.9531 \text{ cft} \\ &+ \\ &= 15.1874 \text{ cft} \end{aligned}$$

External plaster (2:4):-

$$\begin{aligned} 2/ 26'-10\frac{1}{2}'' \times 10'-6'' &= 564.375 \text{ sft} \\ 2/ 12'-3'' \times 10'-6'' &= 257.25 \text{ sft} \\ &+ \\ &= 821.625 \text{ sft} \end{aligned}$$

Deduction:-

$$\begin{aligned} 2/ 4'-0'' \times 7'-0'' &= 56 \text{ sft} \\ 1/ 4'-0'' \times 3'-0'' &= 12 \text{ sft} \\ 1/ 2'-0'' \times 2'-0'' &= 4 \text{ sft} \end{aligned}$$

$$\begin{aligned} \text{net external plaster} &= 72 \text{ sft} \\ &= 821.625 - 72 \\ &= 749.625 \text{ sft} \end{aligned}$$

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Internal plaster (2:6):-

$$2/ 25'-0'' \times 10'-0'' = 500 \text{ sft}$$

$$4/ 10'-0'' \times 10'-0'' = 400 \text{ sft}$$

$$900 \text{ sft}$$

Deduction:-

$$2/ 4'-0'' \times 7'-0'' = 56 \text{ sft}$$

$$4/ 3'-6'' \times 7'-0'' = 24.5 \text{ sft}$$

$$1/ 4'-0'' \times 3'-0'' = 12 \text{ sft}$$

$$1/ 2'-0'' \times 2'-0'' = 4 \text{ sft}$$

$$96.5 \text{ sft}$$

Net internal plaster:-

$$= 900 - 96.5$$

$$= 803.5 \text{ sft}$$

Ceiling plaster:- (1:4)

$$1/ 15'-0'' \times 10'-0'' = 150 \text{ sft}$$

$$1/ 10'-0'' \times 10'-0'' = 100 \text{ sft}$$

$$250 \text{ sft}$$

Concrete roof Slab:- (1:2:4)

$$26'-10\frac{1}{2}'' \times 12'-3'' \times 0'-6'' = 164.6093 \text{ cft}$$

Drawing and estimation

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Summary:-

① Earth work:-

$$\text{Excavation} = 1081.125 \text{ cft}$$

$$\text{Back fill} = 589.4342 \text{ cft}$$

② Concrete:-

$$\text{Leorn (1:4:8)} = 68.9992 \text{ cft}$$

$$\text{Sand (1:2:4)} = 13.7812 + 13.3703 + 164.6293 + 111.7499$$

$$= 303.510 \text{ cft}$$

③ BB work:-

$$75.0468 + 59.4043 + 176.3906 + 40.0312 + 731.4375$$

$$= 1082.3904 \text{ cft}$$

④ plaster:-

$$\text{Cement (1:4)} = 921.625 + 999.62$$

$$\text{Cement (1:6)} = 803.5 \text{ cft}$$

Concrete (1:2:4):-

$$\text{Dry weight} = 303.510 \times 1.54 = 467.40 \text{ cft}$$

$$\text{Cement} = \frac{1}{7} \times 467.40 = 66.76 \text{ cft}$$

$$\frac{66.76}{1.25} = 53.41 \text{ bags}$$

$$\text{Sand} = \frac{2}{7} \times 467.40 = 133.41 \text{ cft}$$

$$\text{Aggregate} = \frac{4}{7} \times 467.40 = 267.045 \text{ cft}$$

Drawing and estimation

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plaster (1:4):-

$$\text{wet volume} = \frac{999.62}{1071.625} \times 0.04167 = 44.65 \text{ cft}$$

$$\begin{aligned} \text{Dry volume} &= 44.65 \times 1.27 \\ &= 56.7115290 \text{ cft} \end{aligned}$$

$$\begin{aligned} \text{Cement} &= \frac{1}{5} \times 56.711 = 11.342 \text{ cft} \\ 11.342 &= \frac{9.073}{1.25} \text{ bags} \end{aligned}$$

$$\text{Sand} = \frac{4}{5} \times 56.711 = 45.3608 \text{ cft}$$

plaster (1:6):-

$$\text{wet volume} = 803.5 \times 0.04167 = 33.4818 \text{ cft}$$

$$\begin{aligned} \text{Dry volume} &= 33.4818 \times 1.27 \\ &= 42.52 \text{ cft} \end{aligned}$$

$$\begin{aligned} \text{Cement} &= \frac{1}{7} \times 42.52 = 6.074 \text{ cft} \\ 6.074 &= \frac{4.859}{1.25} \text{ bags} \end{aligned}$$

$$\begin{aligned} \text{Sand} &= \frac{6}{7} \times 42.52 = 36.44 \text{ cft} \\ &= 36.44 \text{ cft} \end{aligned}$$

Drawing and estimation

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Concrete (1:4:8):-

$$\text{Dry weight} = 68.9992 \times 1.54 = 106.25 \text{ cft}$$

$$\text{Cement} = \frac{1}{13} \times 106.25 = 8.173 \text{ cft}$$
$$\frac{8.173}{1.25} = 6.539 \text{ bags}$$

$$\text{Sand} = \frac{4}{13} \times 106.25 = 32.69 \text{ cft}$$

$$\text{Aggregate} = \frac{8}{13} \times 106.25 = 65.38 \text{ cft}$$

BB work

$$\text{no of bricks} = 1082.3904 + 135 = 14613$$

mortar (1:6) 30% of mortar in BB work

wet volume of mortar

$$0.3 \times 1082.39 = 324.717$$

$$\text{dry volume} = 324.717 \times 1.27$$
$$= 412.39 \text{ cft}$$

$$\text{Cement} = \frac{1}{7} \times 412.39 = 58.912 \text{ cft}$$
$$\frac{58.912}{1.25} = 47.13 \text{ bags}$$

$$\text{Sand} = \frac{6}{7} \times 412.39 = 353.477 \text{ cft}$$

Drawing and estimation

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Material demand:-

Cement ✓

$$= 4.059 + 9.073 + 47.13 + 6.539 + 53.419$$
$$= 121.02$$

Sand ✓

$$= 36.44 + 45.3608 + 353.477 + 32.69 + 135.52$$
$$= 603.495 \text{ cft}$$

Crush ✓

$$= 271.049 + 65.30$$
$$= 336.429 \text{ cft}$$

BRICKS ✓

14613 ✓

* NO of BRICKS =

14650

* Aggregate =

350 cft

* Sand =

625 cft

* cement =

122 bags