

Estimating-2 (Question Bank)

① Detailed estimate of culverts and bridges

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- (1) According to IRC, a culvert is one which has linear water way upto how much length and minor and major bridges has how much length?
- (2) Define abutment and wing wall.
- (3) Define return wall and curtain wall.
- (4) What is the purpose of parapet wall in culvert?
- (5) Define BBS.
- (6) How can you calculate the unit weight of a steel bar? Also give example.
- (7) How much percentage of steel is taken for RCC work in roof slab, beam, column?
- (8) For a bent up bar how much quantity of extra steel bar length is taken and what is the overlap length in steel?

(9) what is the difference between main and distribution bar?

(10) How much additional length is ~~take~~ added to steel bar length for each hook and 90° bend?

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(1) From fig-1 (^{slab}culvert), estimate quantity of excavation, cement concrete, I-class brickwork.

(2) From fig-2 (hume pipe culvert), estimate the quantity of excavation, filling, brick flat soling, cement concrete, Hume pipe length, shuttering for concrete for hume pipes.

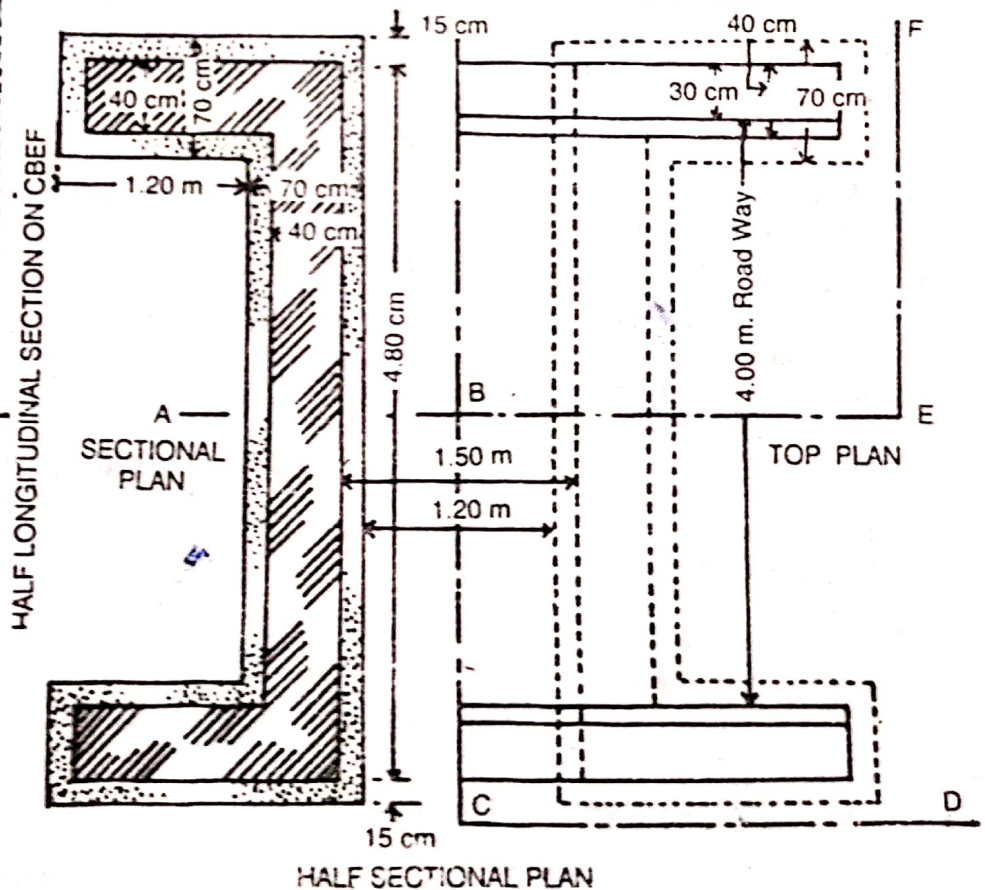
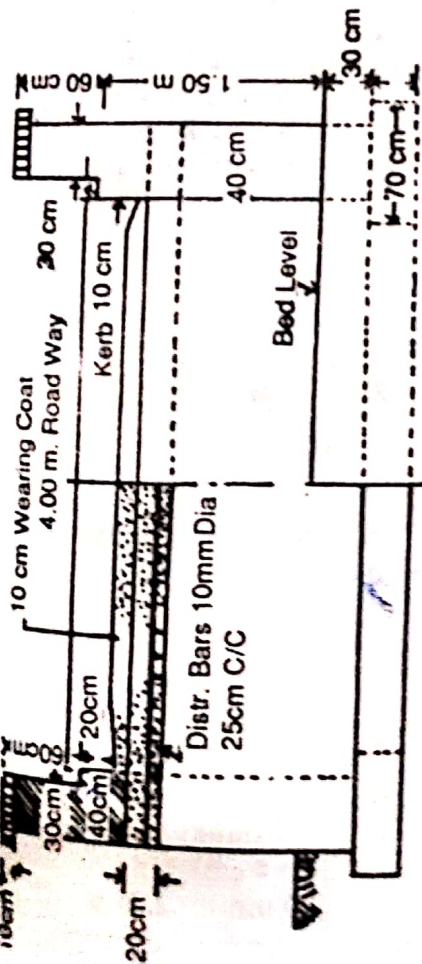
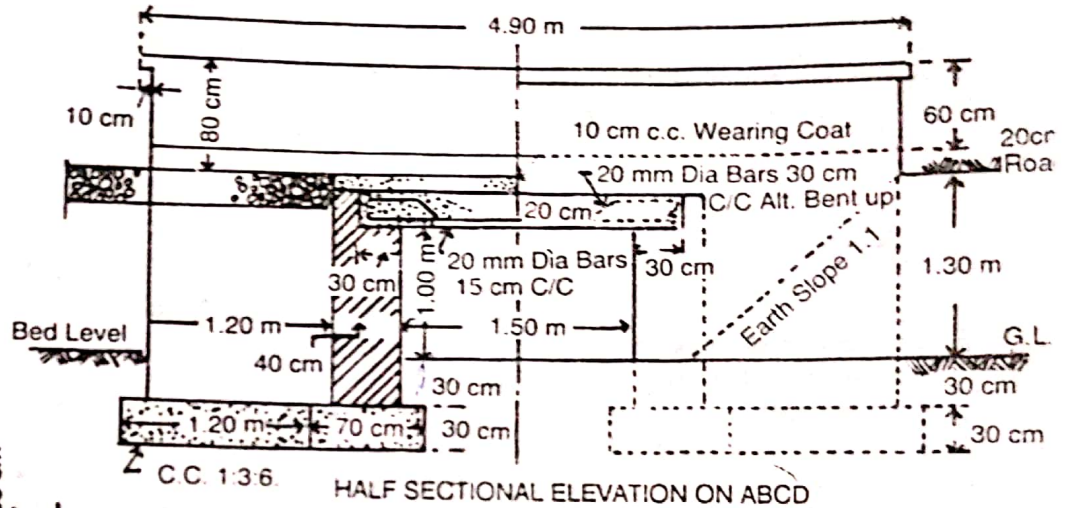
(3) From figure-3 (splayed wing wall culvert), estimate excavation qty., cement concrete in foundation, RCC work and wearing coat quantity.

(4) From figure-4 (a rectangular beam), estimate total quantity of steel by drawing a BBS.

Example 1. – Prepare a detailed estimate of a slab culvert of 1.50 metre span and 4.00 metre roadway from the given drawing (Fig. 8.5). The general specifications are as follows :—

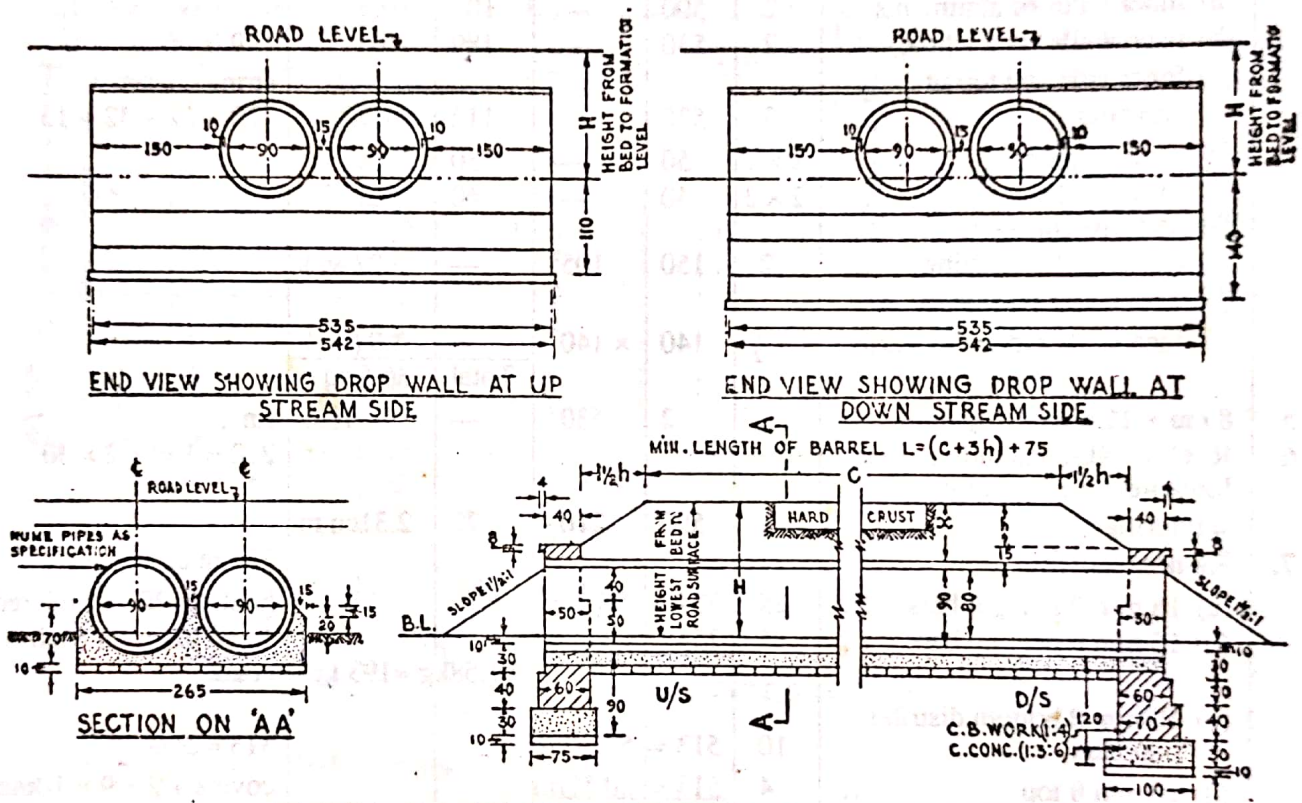
Foundation concrete shall be of cement concrete 1 : 3 : 6 with stone ballast and coarse sand. Masonry shall be of first class brickwork in 1 : 4 cement coarse sand mortar. Slab shall be of R.C.C. 1 : 2 : 4 with reinforcement as per drawing. Exposed surface of brick masonry shall be cement pointed 1 : 2. Road shall be provided with 10 cm thick wearing coat of 1 : 2 : 4 cement concrete. Assume suitable rates.

R.C.C. SLAB CULVERT 1.50 m SPAN with standard modular bricks



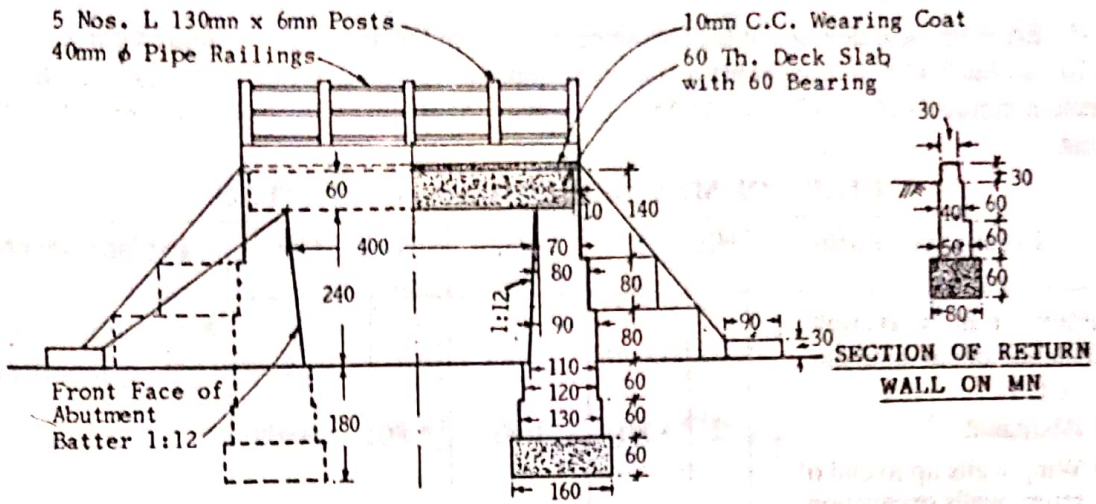
(fig-1)

Example - 3. Estimate of a 90 cm dia. double barrel Hume pipe culvert (as used in National High-way).
 Prepare a quantity estimate for a barrel of 30 cm length (total length depends on the bank height) and the drop walls. In the estimate, the earth cushion whose depth has been indicated by $X = 60$ cm minimum and the Hard Crust are not to be included. General specification of works are same as mentioned in the drawing. Extra earthwork in excavation shall be considered in the estimate to provide a side slope of 1 : 2 in order to prevent collapsing of earthwork at water level.

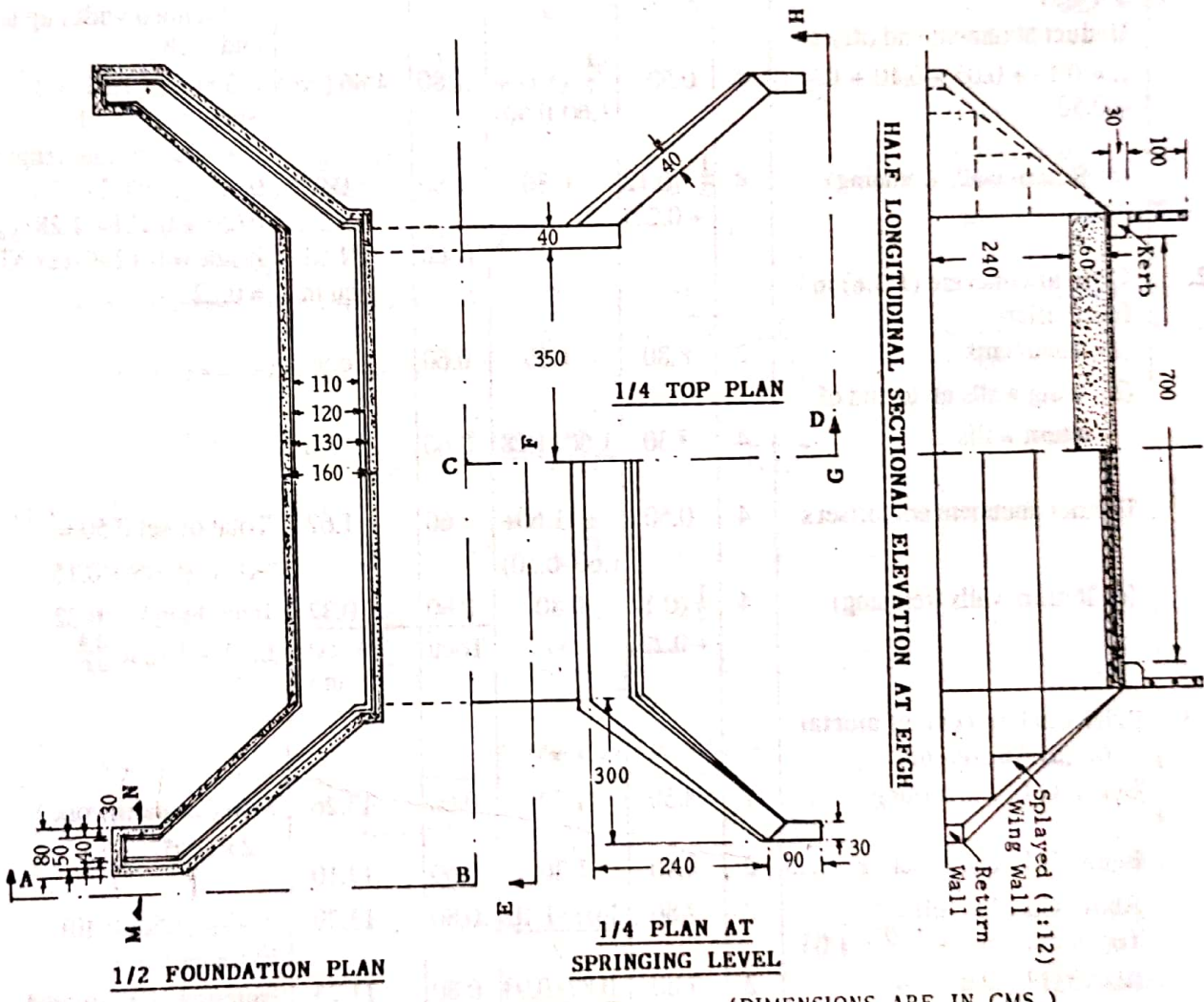


**LONGITUDINAL SECTION SHOWING DETAILS OF DROP WALLS
 ALL DIMENSIONS ARE IN CENTIMETRE**

fig - 2



HALF CROSS SECTIONAL ELEVATION AT ABCD



(DIMENSIONS ARE IN CMS.)

SLAB CULVERT

fig-3

Example 3. A R.C.C. (prop 1:2:4) rectangular beam 20 cm wide x 30 cm deep x 3.0 m overall length is reinforced with Tor Steel bars 3 nos. 16 mm dia. (wt. 1.58 kg/m) two outer bars straight and L-hooked at ends and the inner bar bent up at 45° at appropriate places with L-hooked at ends. At top, two outer hanger bars are 10 mm in dia. (wt. 0.62 kg/m) straight and L-hooked at ends. Stirrups are 6 mm in dia. M.S. bar (Wt. 0.22 kg/m) and spaced at 20 cm centers. All concrete cover = 2.5 cm. (i) Draw sketches showing arrangements of reinforcements for the beam. (ii) Show the appropriate method of entering the measurements in the columns of a Measurement Book (M.B.) and prepare a bill of quantities for four such beams.

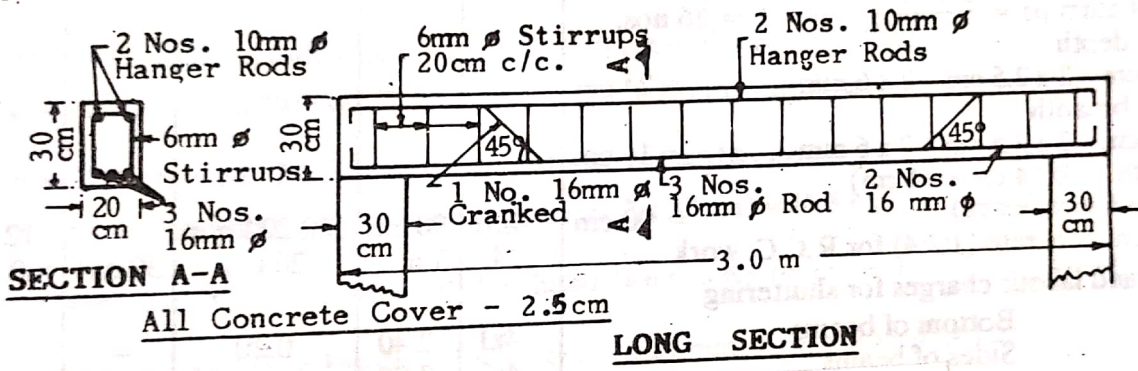


fig-4

Items.	Qty
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ESTIMATE OF R.C.C. ROOF SLAB

Example 2 — Prepare a detailed estimate of a R.C.C. Roof Slab of 3 metres clear span and 6 metres long from the given drawings (Fig. 5-4). R.C.C. work including centering and shuttering and steel reinforcement in detail shall be taken separately.

Also prepare a schedule of bars.

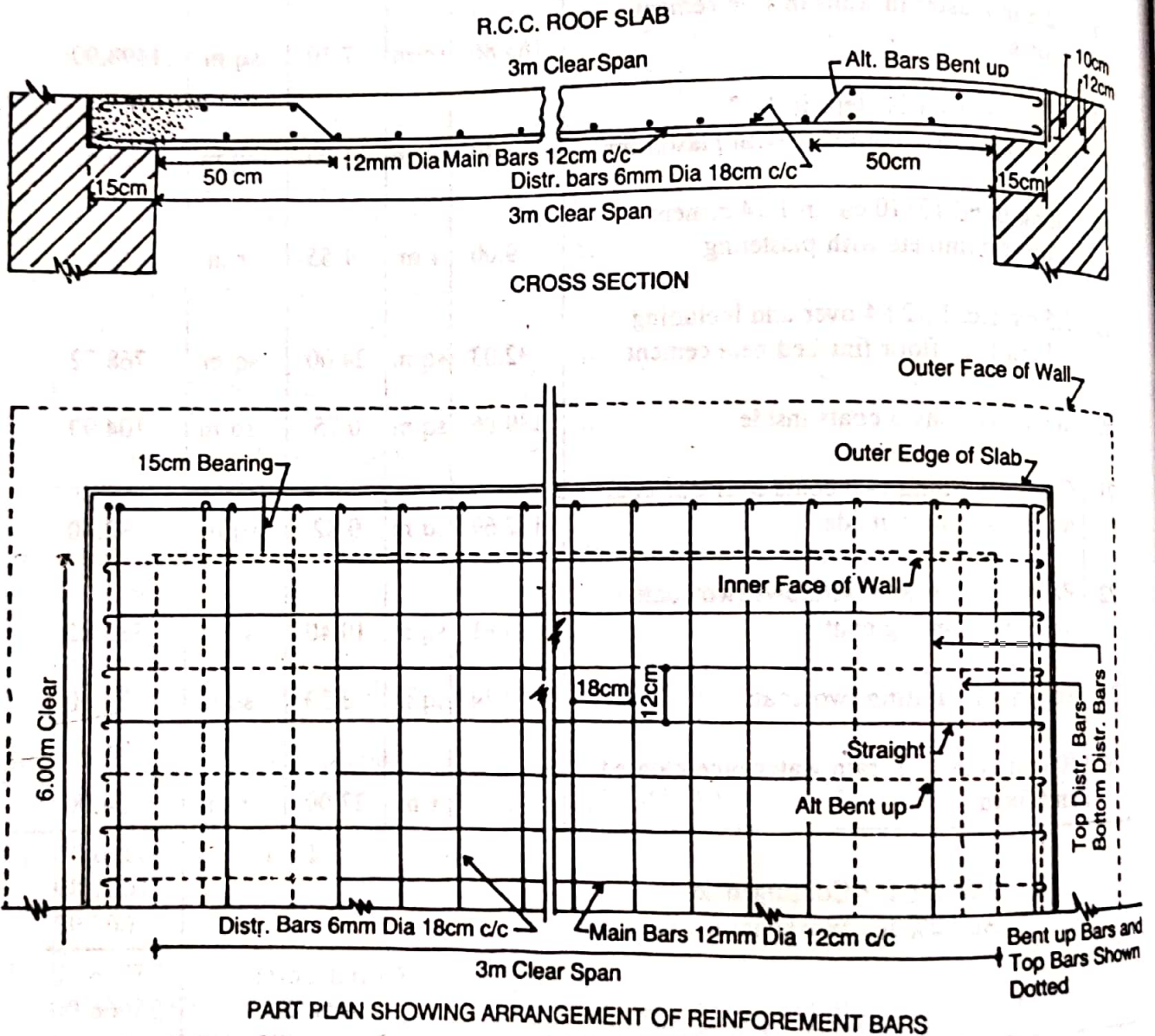


fig-5

Note— In plan bent up and top bars have been shown in dotted lines.

(5) From Figure-5 (roof slab), estimate quantity of steel by BBS.

(6) Draw BBS for the slab in fig-1 and estimate total quantity of steel required.

~~(7)~~

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(1) Details of a simply supported RCC slab of mix 1:2:4 are as follows -

(i) Size 4.05 m x 5 m x 12 cm deep.

(ii) Reinforcement 12 mm dia. bar placed in direction of 4.05 m at 15 cm c/c. Of the total no. of rods, 16 no.s have been cranked at 45° at appropriate places and hooked at ends. Other rods are straight and hooked at ends. The 12 mm dia. rod wt. 0.89 kg/m. To hold the cranked portions 4 no.s 10 mm dia st. and hooked rods have been used. 10 mm dia rods are placed in direction of 5 m at rate of 20 cm c/c and all are st. and hooked at ends.

(ii) Cover 1.5 cm at bottom and 2.5 cm on all sides.

(iv) Assume any other dimensions not given.

(a) Draw sketches (plan & secⁿ) showing details of reinfⁿ of slab.

(b) Estimate quantities of cement, sand & stone aggregate for slab.

(c) Prepare a BBS and estimate the total qty of steel.

(2) - From figure-2, estimate qty of excavation, filling, soling, cement concrete and brick work, cement plaster for drop walls.

(3) - From figure-3, estimate brick work for abutments, wing walls and return walls.

- (2) Estimate of irrigation etc.
& (3) Detailed estimate of roads

2

- (1) Write the formula for mid-section area method of highway filling.
- (2) Why vertical fall is required in an irrigation canal?
- (3) Define siphon Aqueduct.
- (4) What do you mean by siphon duct?
- (5) What is the purpose of cement pointing in brick floor and walls in canals?
- (6) Define Lead and Lift.
- (7) Write prismatic formula to calculate earthwork in filling or cutting.
- (8) Write the formula to calculate the area of turfing or pitching on sloping side of embankments.
- (9) Define L-section of a highway.

~~(10)~~

(10) For single coat, surface dressing or first coat of two coat surface dressing how much quantity of material required per 100 sqm area.

15

(1) For the road secⁿ as in figure-6, prepare a detailed estimate for constructing 500m length of road.

(2) Calculate the quantity of materials, stone grit and binder or paint required for 1st coat of painting for 1km length of a 3.7m wide bituminous road.

(3) A secⁿ of road crust 7.2m wide b/w the edgings is shown in fig - 7. Estimate the quantities of materials required for the road.

(4) For Fig - 8 (drainage syphon), estimate, Excavation, Cement Conc, brickwork, RCC Qty.

Example - 4. Detailed dimensioned sketch cross-section of a city street having metalled portion of 8 metre for the carriageway is shown in fig. 10-38. Prepare a detailed estimate for constructing 500 metre length of this street. Indicate also quantities of materials.

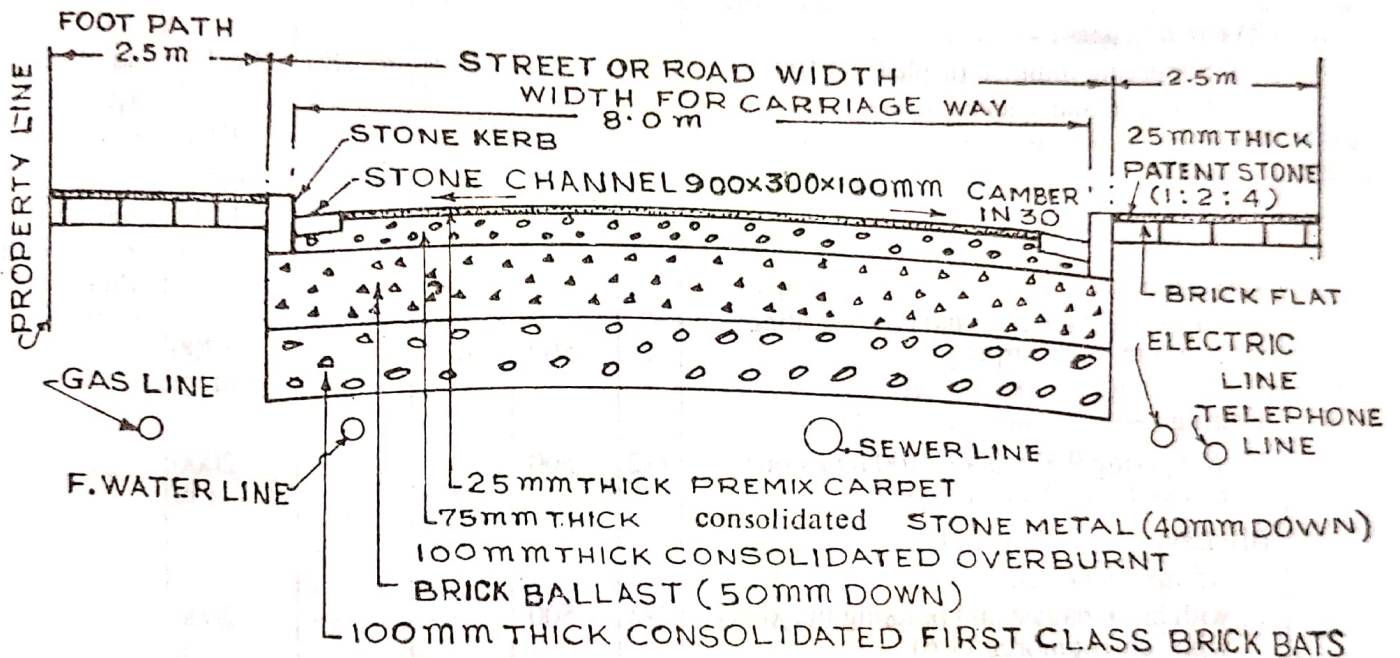


fig-6

Example – 3. A dimensioned sketch of a road crust 7.2 metres wide between the edgings is shown below. Prepare a detailed estimate for constructing 2.5 km long road and calculate quantities of materials required for the road. The crust is constructed with the following : –

- (i) Two layers of brick flat soling with overburnt bricks.
- (ii) 100 mm thick consolidated overburnt brick metal with 75 mm thick consolidated stone.
- (iii) 25 mm thick premix chipping carpet with bitumen.
- (iv) brick on-end edging with overburnt bricks.

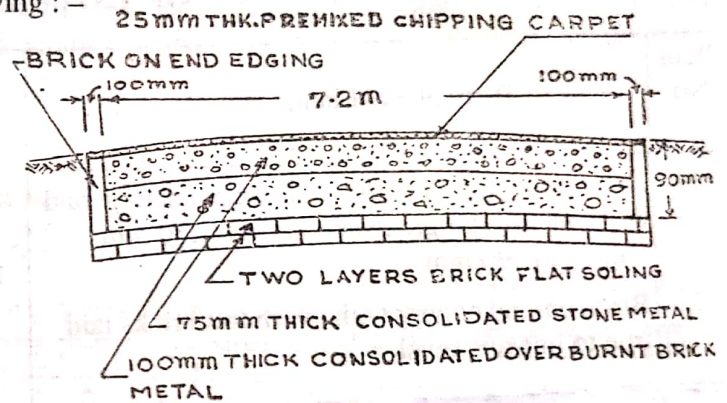


fig-7

DRAINAGE SYPHON ACROSS A MINOR

Example 7. — Prepare a detailed estimate of a Drainage Syphon across a minor from the given drawing, Figs. 9-8 and 9-9.

Foundation concrete shall be of 1 : 4 : 8 cement concrete with brick ballast. All brickwork shall be of 1 : 4 cement mortar. Exposed surfaces of brickwork shall be struck pointed with 1 : 2 cement mortar. Brick pitching shall be of dry brick with straight over burnt bricks.

Assume suitable rates for the different items of work.

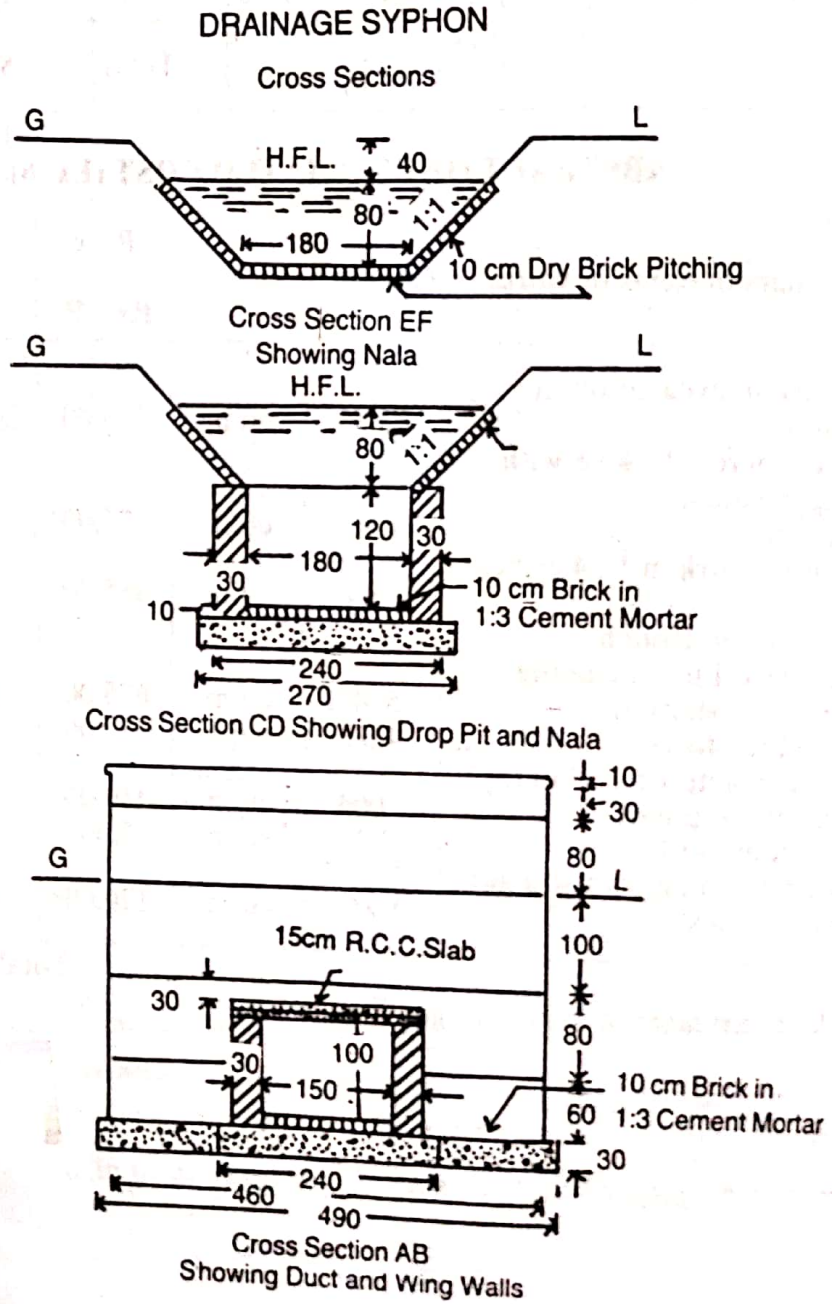


fig-8

DRAINAGE SYPHON ACROSS A MINOR

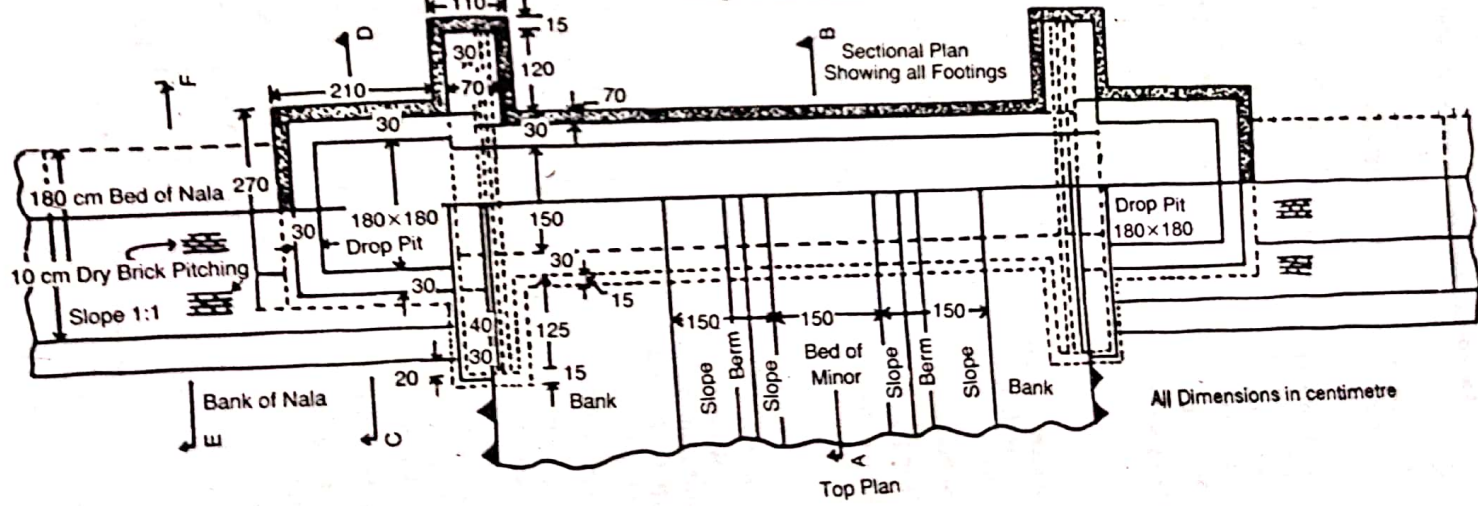
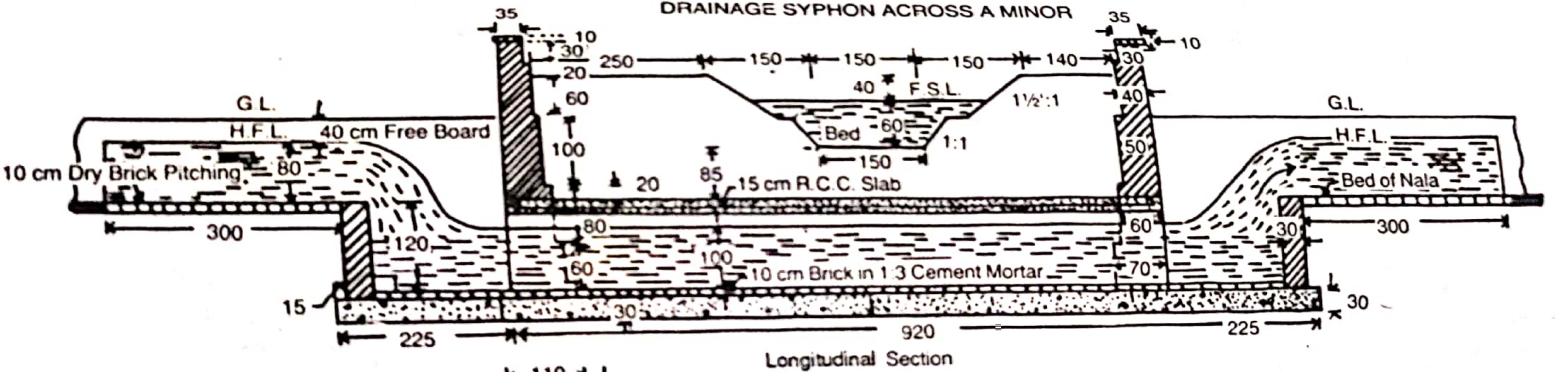


fig-8

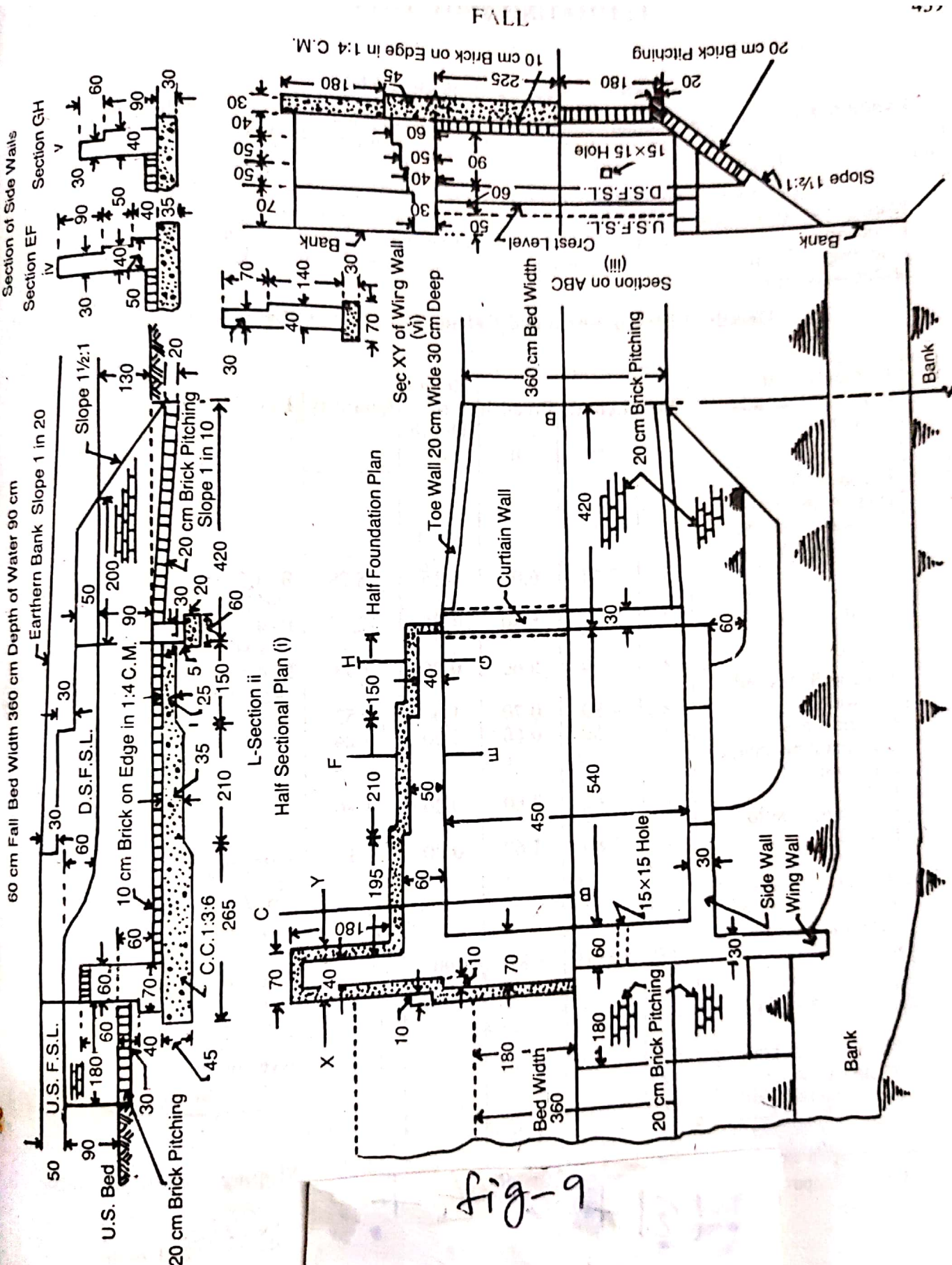


fig-9

All Dimensions in centimetre

Example 7.— Prepare a detailed estimate for the construction of a new State Highway for one kilometre length. The formation width of road is 10 metre, average height of bank is 1 metre and side slope 2 : 1. The metalled width is 3.70 m and three coats of metalling are to be provided as per cross section (Fig. 7.23). The surface shall be finished with two coats of painting.

Assume other data required and suitable rates.

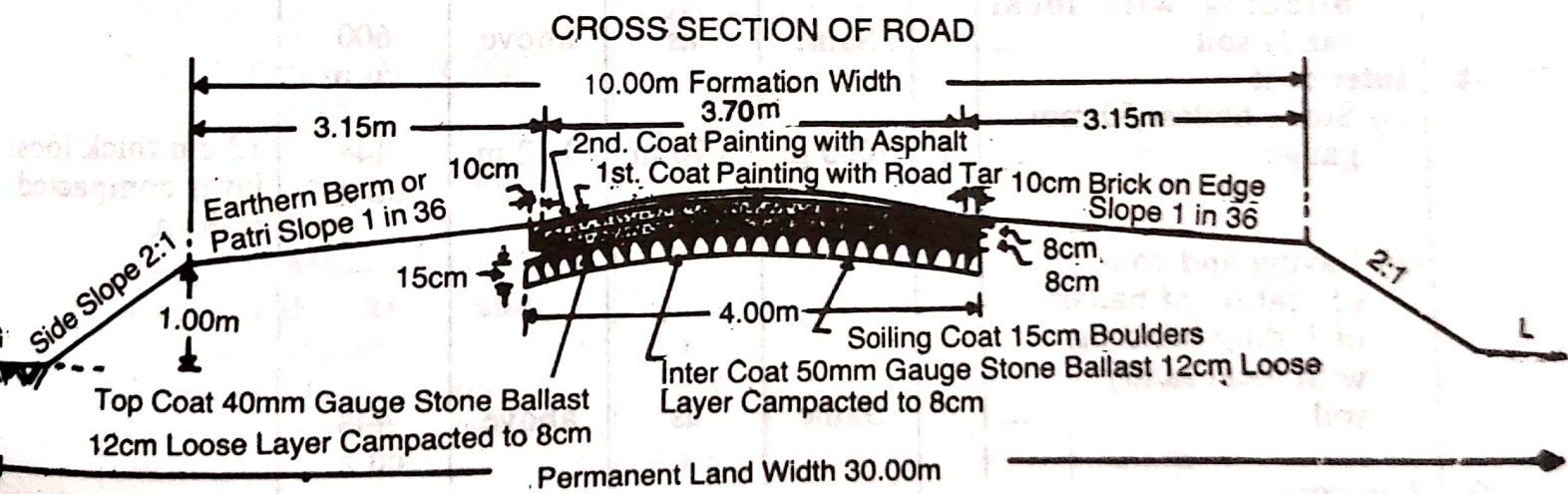


fig-10

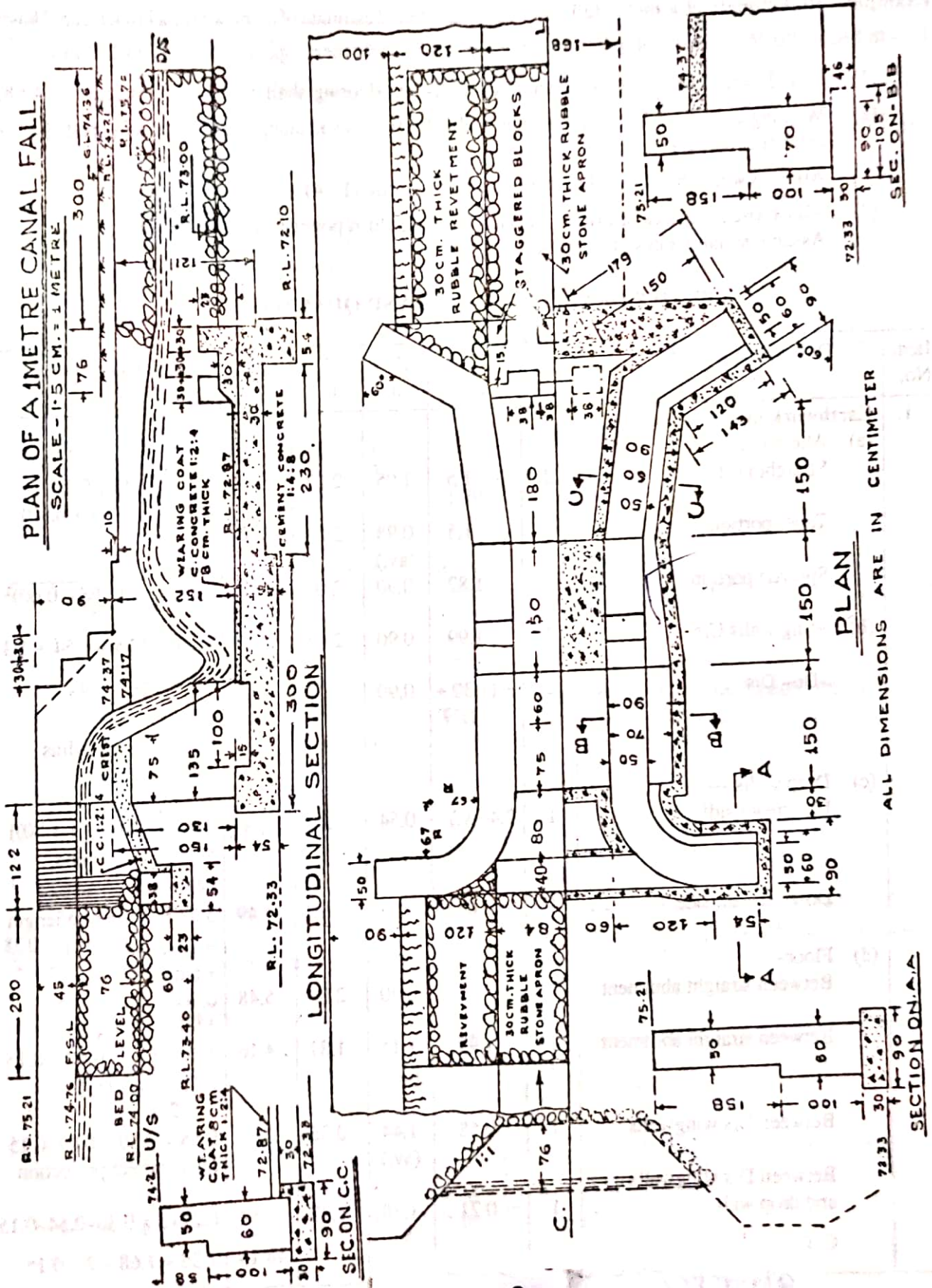


fig-11

(5) From fig-9 (vertical fall) estimate qty of excⁿ, cement conc. and brickwork.

F
S
C

(6) Calculate the quantity of earthwork for 200m length for a portion of a road in an uniform ground the heights of banks at the two ends being 1m & 1.6m. The formation width is 10m and side slope 2:1 (H:V). Assume no transverse slope.

(2)-

(3)

to
be
no
a

(10)

(1) Prepare a detailed estimate for earthwork for a portion of a road from following data-

(17)-

Dist. (in m)	0	100	200	300	400	500	600	700	800	900	1000	1100	1200
RL of ground	114.5	114.75	115.25	115.2	116.1	116.85	118.0	118.25	118.1	117.9	117.5	117.9	119.5

RL of formation 115 Upward grad. 1 in 200 → ← Downward gradient 1 in 400 up to 600m

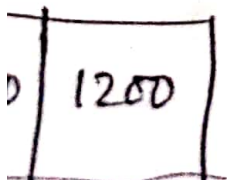
Formation width of road is 10m side slope 2:1 in banking and $1\frac{1}{2}$:1 in cutting. Adopt suitable rates.

(2) - From fig-9, estimate, 1st class brickwork, Brick-on-edge floor, Cement pointing & Brick pitching quantity.

(3) Prepare a detailed estimate for the constⁿ of a new SH for 1 km length. The formation width of road is 10m, avg. ht. of bank is 1m and side slope 2:1, The metalled width is 3.70m & 3 coats of metallings are to be provided.

Refer fig-10.

(4) - From fig-11, estimate excavation, C.C., Brick work, pointing & pitching quantity of vertical fall.



(4.1) works

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- (1) Define petty work.
- (2) Define quadrantal repairs.
- (3) Define item rate contract.
- (4) Define PWA.
- (5) Define BOQ.
- (6) Define Earnest money.
- (7) Define ~~co~~ a contractor.
- (8) Define a tender.
- (9) What do you mean by a major work?
- (10) What is a labour contract.
- (11) Define administrative approval.
- (12) Define contingency budget.
- (13) What is advance payment?
- (14) Define technical sanction.

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- (1) Briefly explain security money.
- (2) Describe the difference between scheduled and cost plus percentage contract.
- (3) Describe work order.
- (4) Describe about regular and temporary establishment.
- (5) What is difference b/w bill and voucher?
- (6) Describe about different heads in account secⁿ of PWD.

10

- (1) Classify and describe different types of works in PWD.
- (2) Describe the method of execution of works through the contractors.
- (3) Describe various types of contracts.

(4.2) Accounts of works

(2)

- (1) Define NIT.
- (2) Define advance payment.
- (3) what do you mean by running bill?
- (4) Define suspense account.
- (5) Define a invoice.
- (6) what is debit and credit?
- (7) Define cash.
- (8) Define imprest.
- (9) Define indent.
- (10) - what do you mean by acquittance roll?

- (11) Name various types of stores.
- (12) what is muster roll?
- (13) what is credit note?
- (14) what is a stock account?

- (1) Describe issue rate.
- (2) Explain how to prepare Stock account?
- (3) Explain Bin card.
- (4) How to verify stocks and maintain the shortage and surpluses? Explain briefly.
- (5) Explain an indent.
- (6) Describe about unstamped receipt.
- (7) Classify various subheads of stock.

- (1) Describe about MB, its procedure of entering in it and SMB.
- (2) Describe about muster roll system.
- (3) Describe about acquittance roll system.

(4) Describe about accounting procedure of stores in PWD.

(5) Describe the procedure of NIT. Also explain about Quotations.

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