Lecture on
CE 208: Quantity Surveying



Material Estimation of Slab culvert

Culvert

- A small bridge used to carry water from one side to other
- Culvert may consist of one, two or three spans
- Generally, maximum span is 5-6 meter. Long span culvert may also be used

Uses of culvert

- Where natural streams intersects the roadway
- For passing surface drainage

Culvert vs Bridge

- Top- travel way
- Basis of span length (Culvert < 20 feet; Bridges > 20 feet)


Arch culvert


Box culvert


Slab culvert

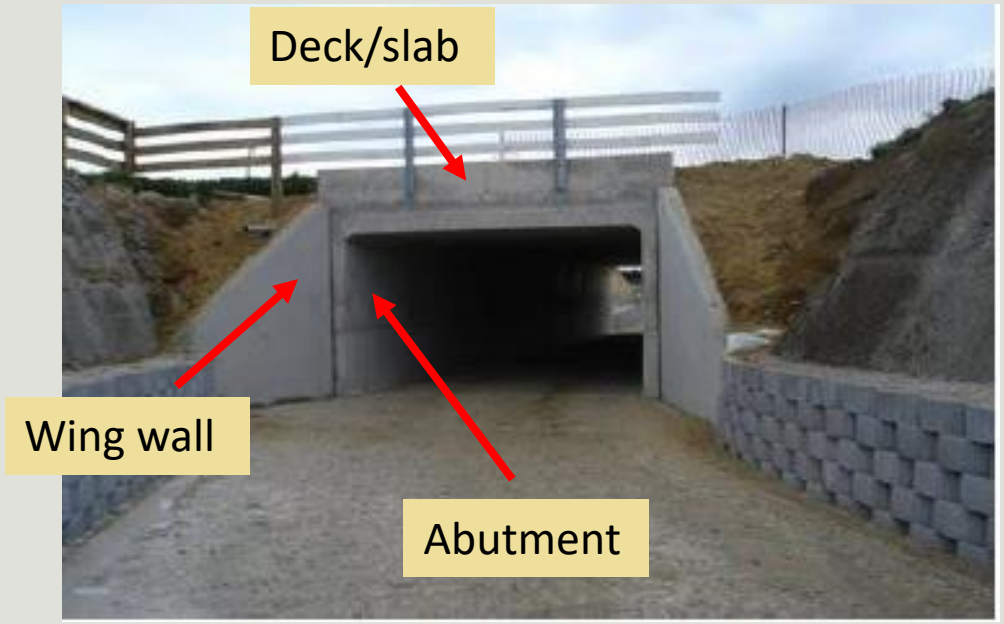

Pipe culvert

Slab Culvert

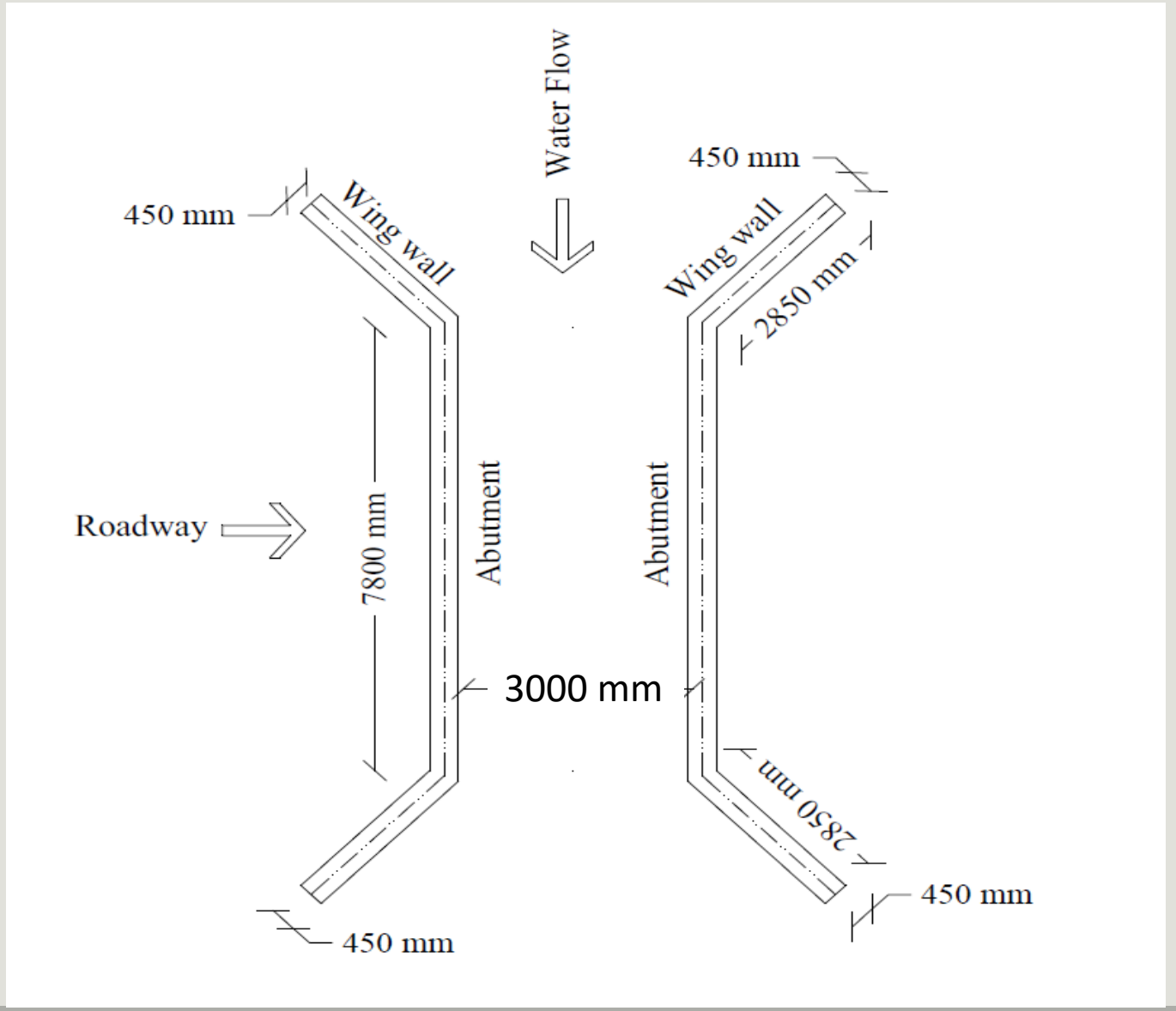
- Most commonly used in Bangladesh
- Materials- RCC

Advantages of Slab Culvert

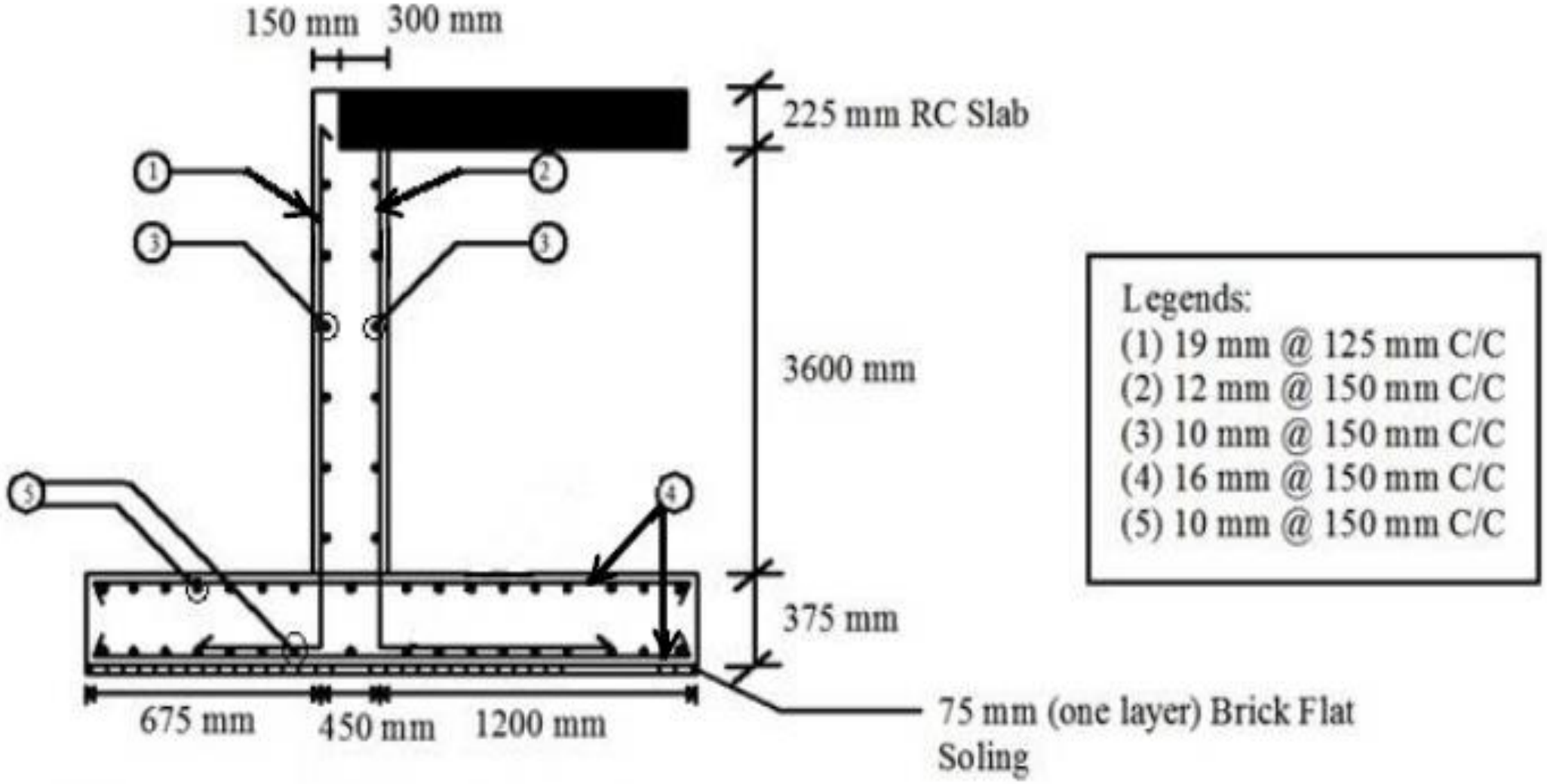
- Simple in construction
- Suitable for weak sub grade



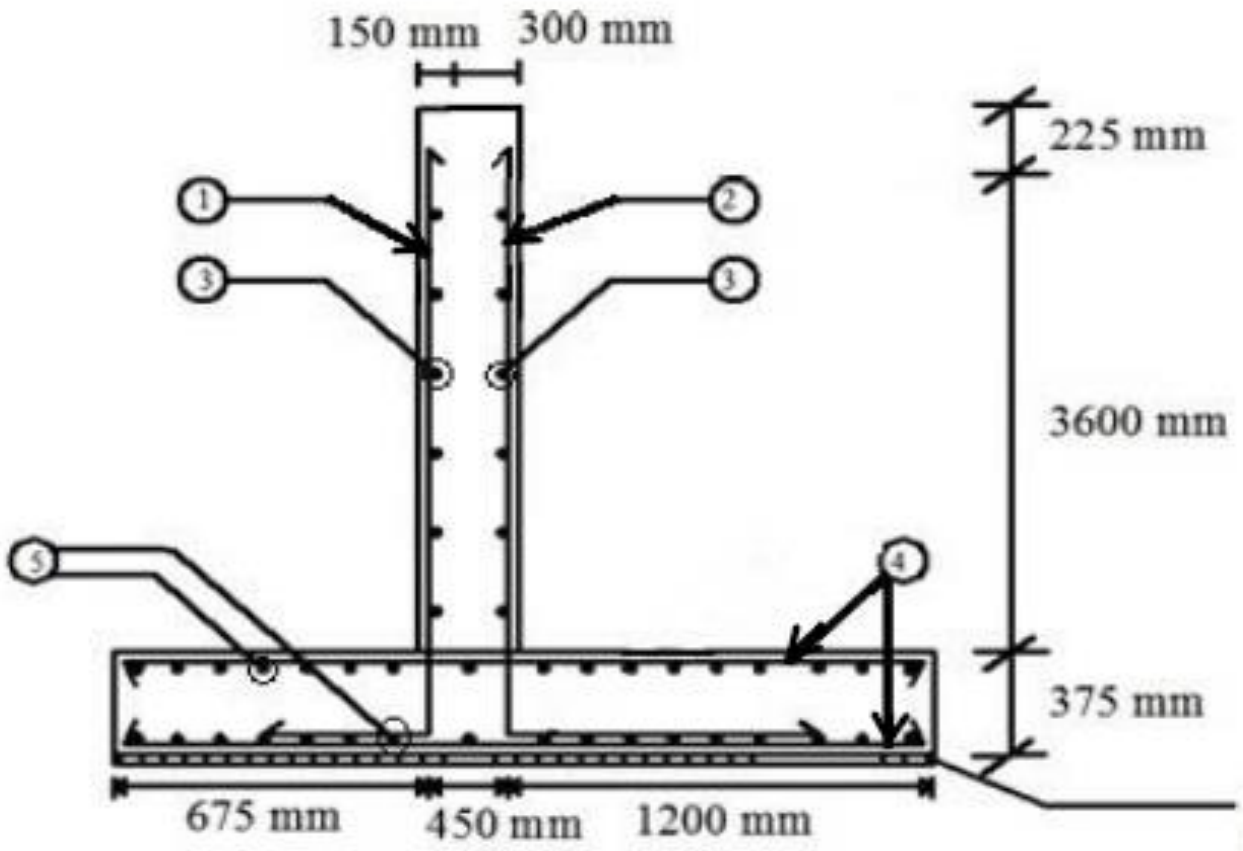
Worked out problem



Sectional Elevation through Abutment



Sectional Elevation through Wing wall

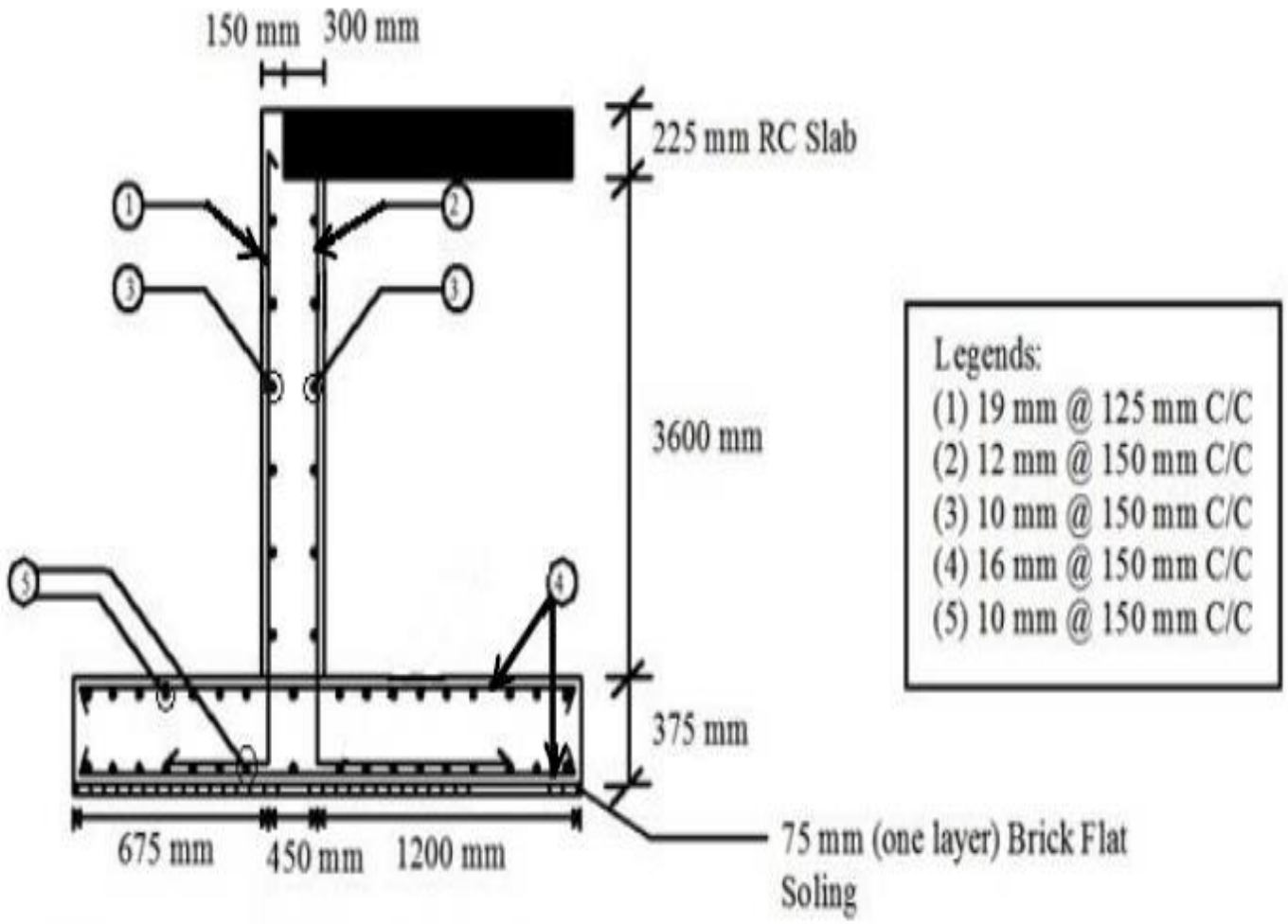


Legends:
(1) 19 mm @ 125 mm C/C
(2) 12 mm @ 150 mm C/C
(3) 10 mm @ 150 mm C/C
(4) 16 mm @ 150 mm C/C
(5) 10 mm @ 150 mm C/C

Calculation of concrete estimation

Item no.	No.	Length (m)	Width (m)	Height/ thickness (m)	Area/ volume
1. 75 mm brick flat soling					
Abutment	2	7.80	2.325	--	36.27
Wing wall	4	2.85	2.325	--	26.51
2. RCC in foundation (1:2:4)					
Abutment	2	7.80	2.325	0.375	13.60
Wing wall	4	2.85	2.325	0.375	9.94
3. RCC in superstructure (1:2:4)					
Abutment	2	7.80	0.45	3.825	26.85
Deduction due to slab bearing	2	7.80	0.30	0.225	-1.05
Wing wall	4	2.85	0.45	3.825	19.62
4. RCC in slab (1:1.5:3)					
	1	7.80	3.60	0.225	6.32

Calculation of reinforcement estimation in one Abutment



(1) Vertical rod in outside face

19 mm dia @ 125 mm c/c

$= (\frac{7800}{125} + 1) \times (3600+225+375-75-75+9dbx2+ 12x19)$

(2) Vertical rod in inside face

12 mm @150 mm c/c

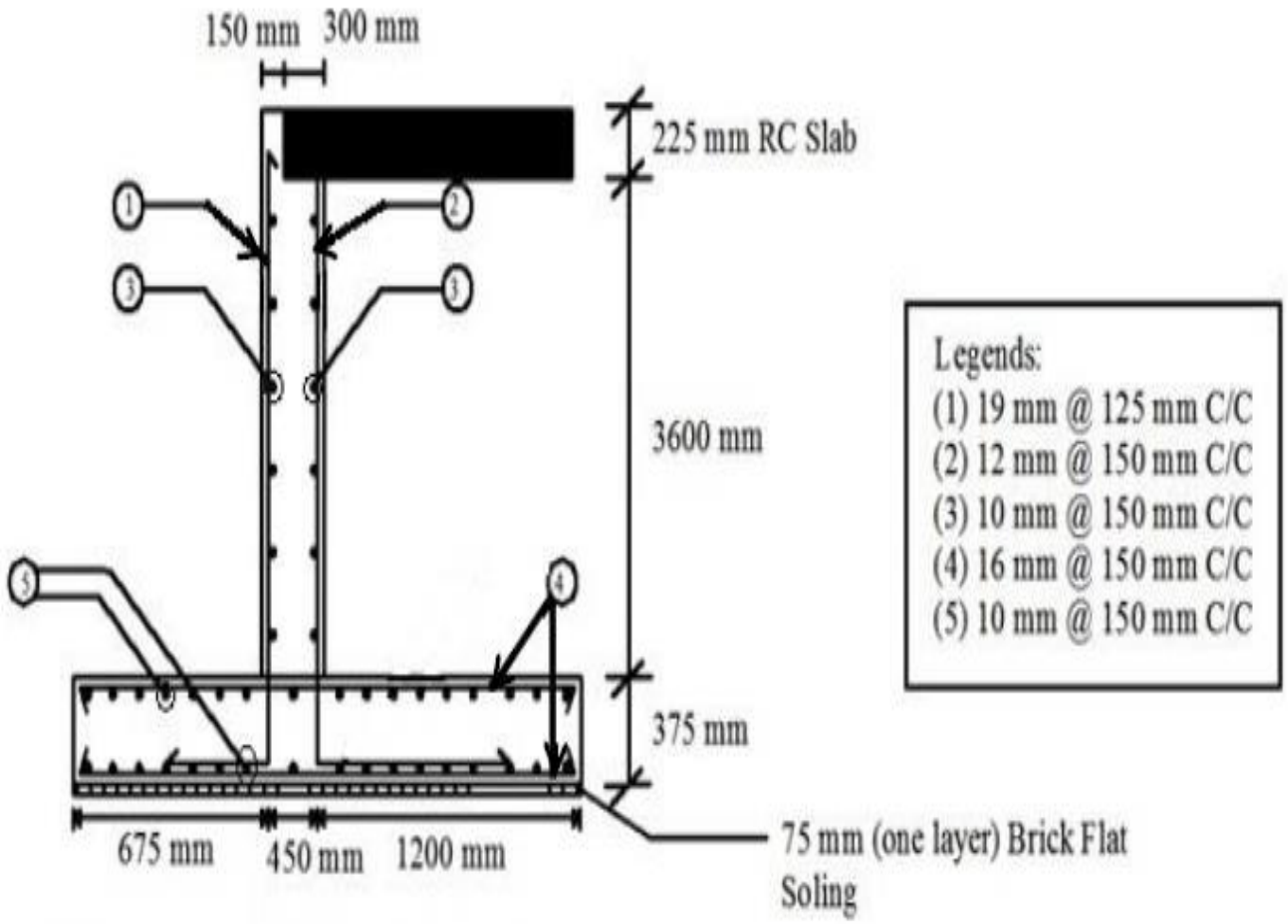
$= (\frac{7800}{150} + 1) \times (3600+375-75-75+12x12+9dbx2)$

(3) Horizontal rod in outside face

10 mm @ 150 mm c/c

$= (\frac{3600+225-75}{150} + 1) \times (7800+ 9db \times 2)$

Calculation of reinforcement estimation in Abutment



(3) Horizontal rod in inside face

10 mm dia @ 150 mm c/c

$= (\frac{3600-75}{150} + 1) \times (7800 + 9dbx2)$

(4) Horizontal rod in footing both layer

16 mm @150 mm c/c

$= (\frac{7800}{150} + 1) \times (1200+450+675-75-75-75+9db \times 2)x2$

(5) Horizontal rod in footing both face

10 mm @ 150 mm c/c

$= (\frac{1200+450+675-75-75}{150} + 1) \times (7800+9dbx2) \times 2$

Calculation of reinforcement estimation in one Wing wall

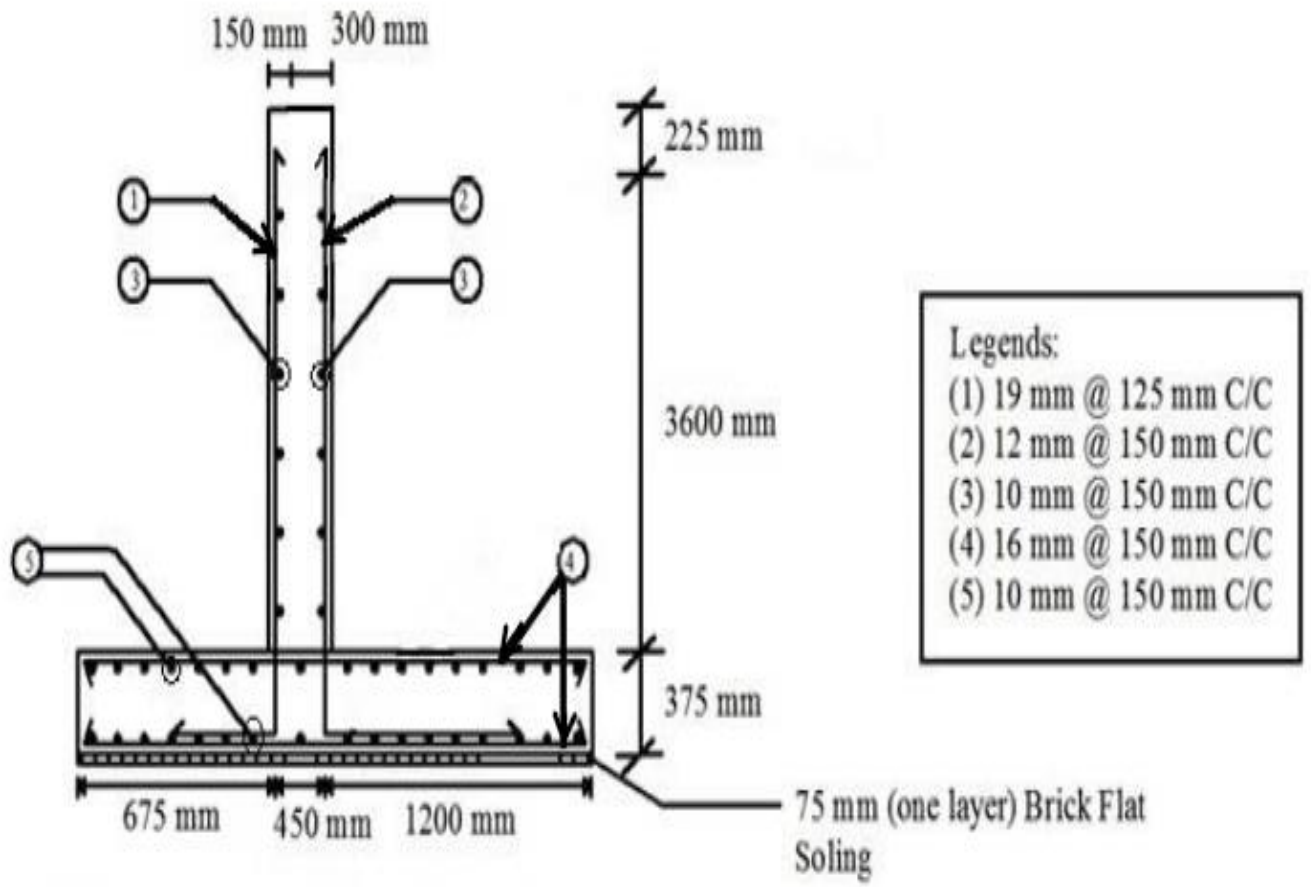


Figure 4.10: Sectional Elevation through Wing Wall

(1) Vertical rod in outside face

19 mm dia @ 125 mm c/c

$= (\frac{2850}{125} + 1)$ x (3600+225+375-75-75+9dbx2+ 12x19)

(2) Vertical rod in inside face

12 mm @150 mm c/c

$= (\frac{2850}{150} + 1)$ x (3600+225+375-75-75+12x12+9dbx2)

(3) Horizontal rod in wall both face

10 mm @ 150 mm c/c

$= (\frac{3825-75}{150} + 1)$ x (2850-75+9dbx2)x2

Calculation of reinforcement estimation in one Wing wall

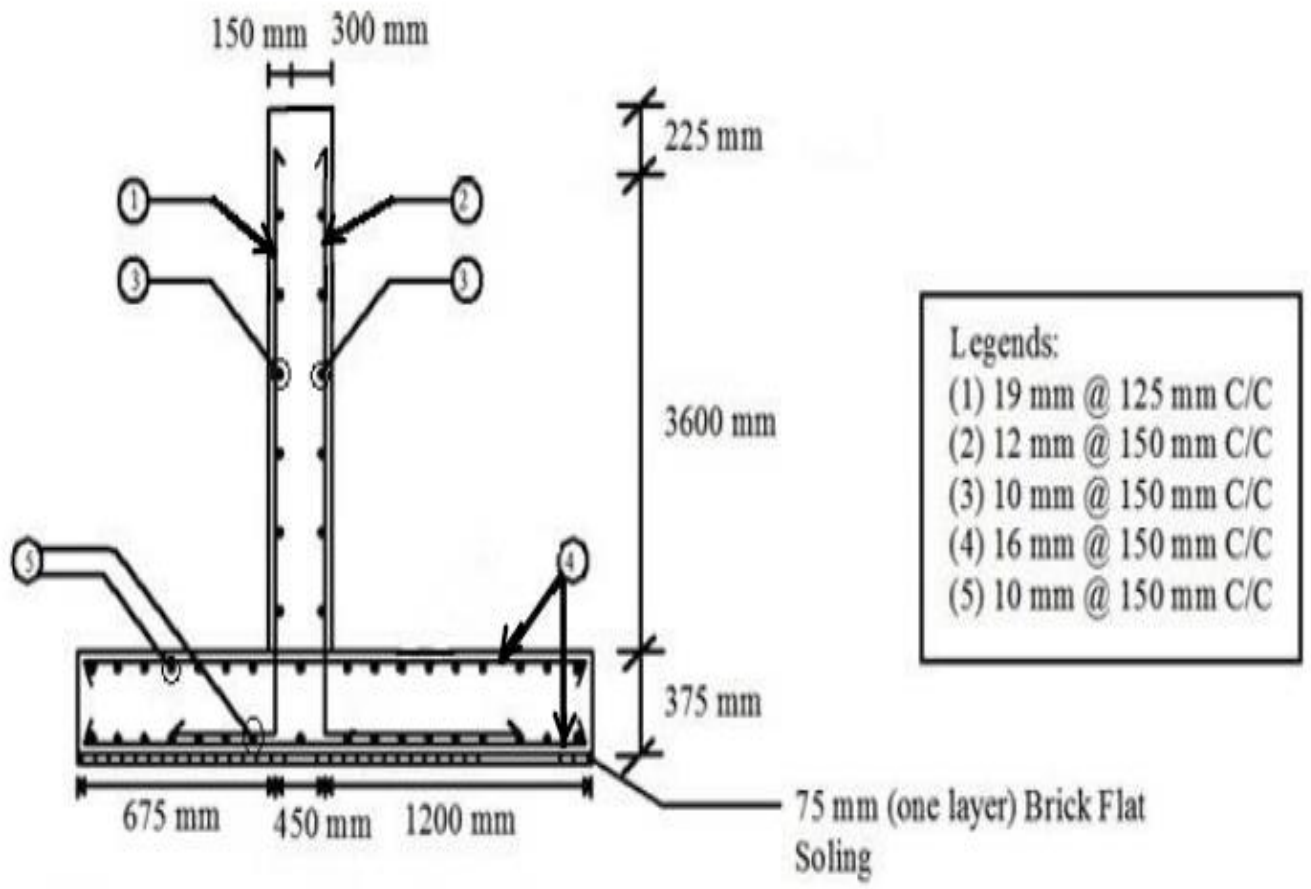


Figure 4.10: Sectional Elevation through Wing Wall

(4) Horizontal rod in footing both layer

16 mm @150 mm c/c

$= (\frac{2850}{150} + 1) \times (1200+450+675-75-75+9db \times 2) \times 2$

(5) Horizontal rod in footing both face

10 mm @ 150 mm c/c

$= (\frac{1200+450+675-75-75}{150} + 1) \times (2850-75+ 9db \times 2) \times 2$

THANK YOU!