## J. II. CONCRETE WORKS:

### I. FOOTING

F-1 @ 13 sets

L: 3800mm

W: 3800 mm

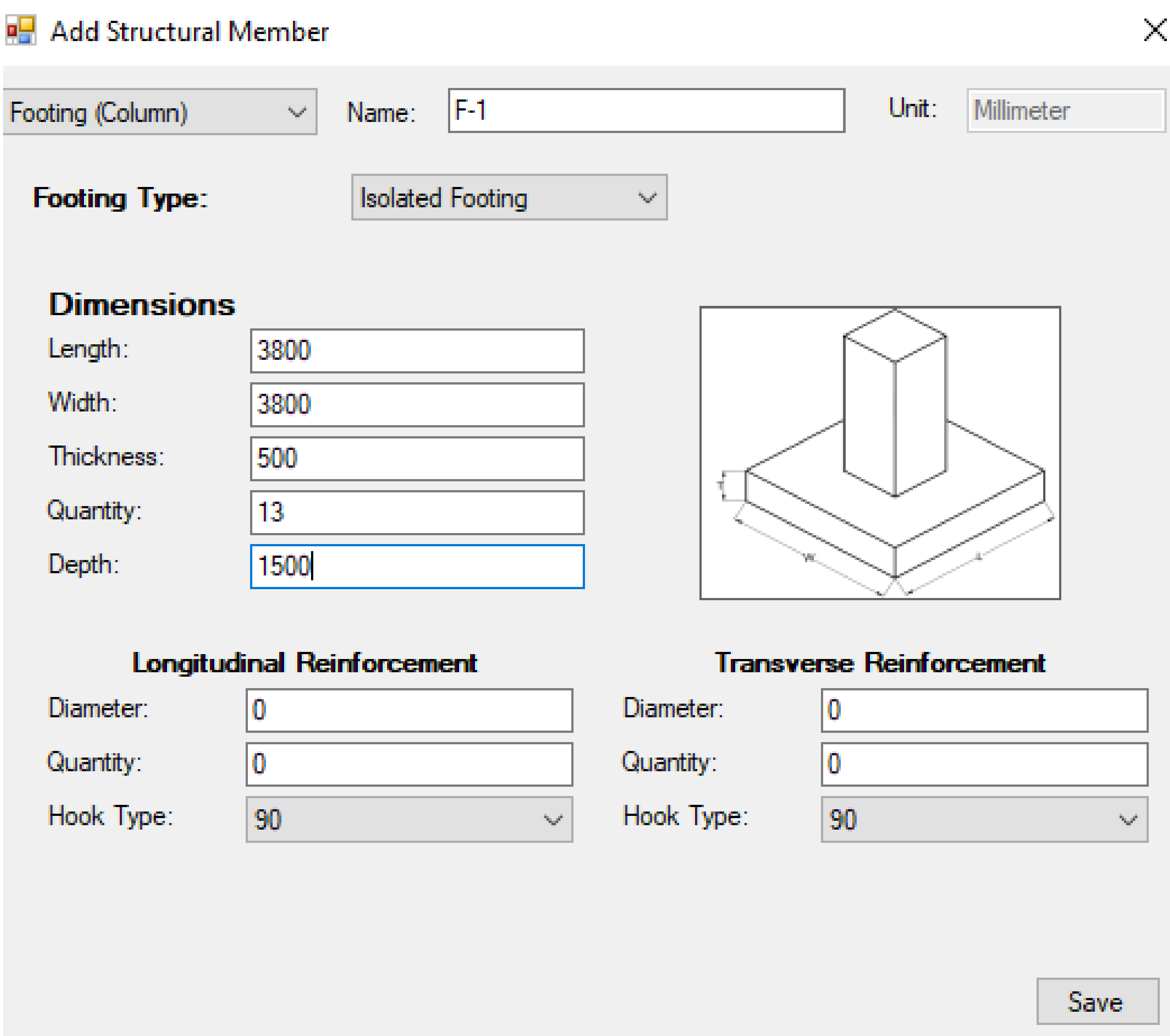
T: 500mm

D: 1500mm

$$V = L \times W \times T \times QTY$$

$$V = (3800) \times (3800) \times 500 \times 13 = (9.386X10^{10}\ mm3 / 10^{9}) = 93.86\ m3$$

To Convert mm3 to m3, divide the answer with 10^9



CF-1 @ 13 sets or qty

L: 5500mm

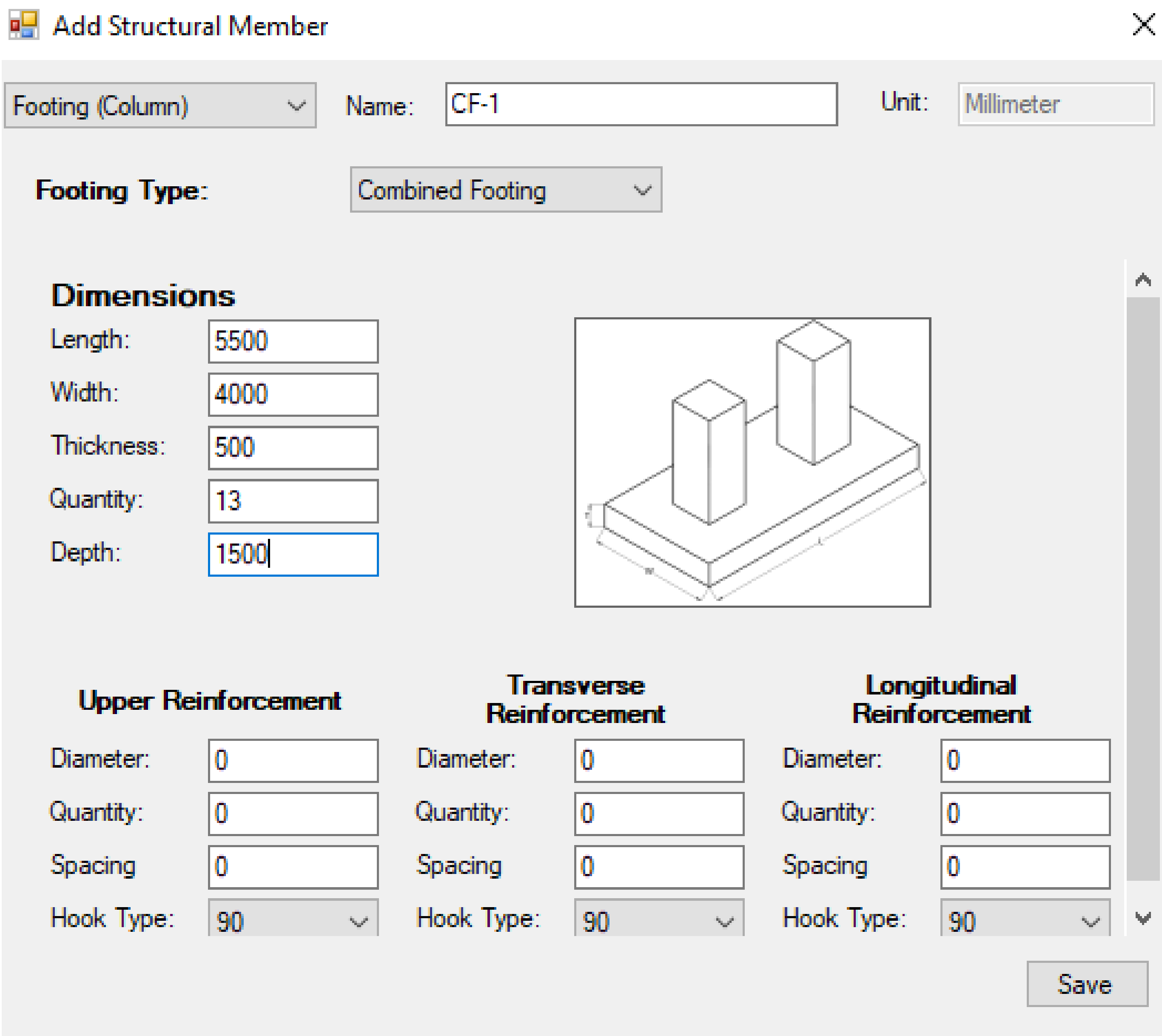
W: 4000mm

T: 500mm

D:1500mm

$$V = L \times W \times T \times QTY$$

$$V = (5500) \times (4000) \times 500 \times 13 = \mathbf{143\ m3}$$



WF-1

L: 30.44m

L f-f: 22.19

BT: 500mm

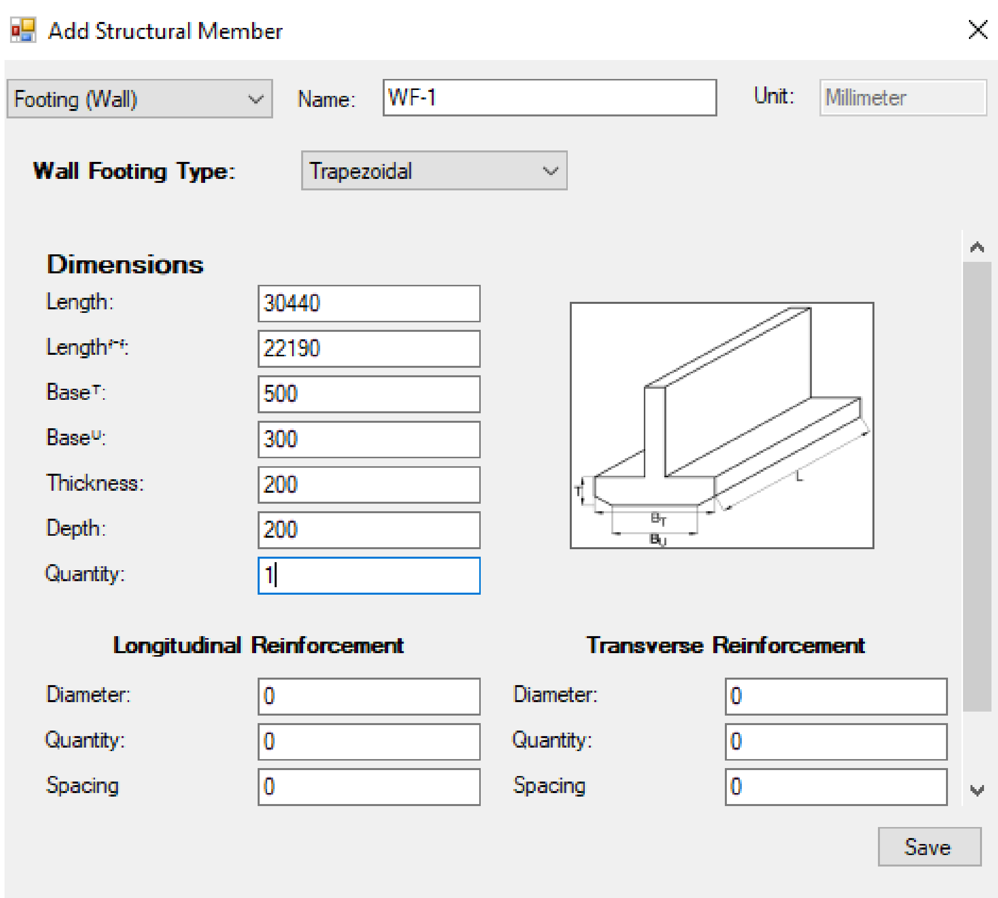
BU: 300mm

T: 200mm

D: 200mm

V= (((BT+BU)/2) *T) *L*QTY

V= (((500+300)/2) *200) *30440 * 1=2.4352 m3




VOLUME TOTAL (FOOTINGS) = 93.86 + 143 + 2.4352 = 239.2952 or **239.3 m3**

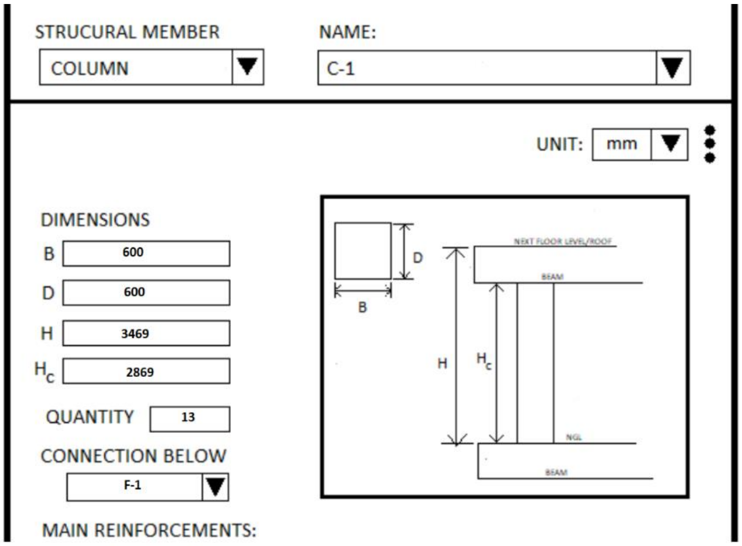
239.3 m @ 4000psi (P 4910.00 / m3) = 239.3 m3 x P 4910.00 / m3
**= P 1,174,963.00**

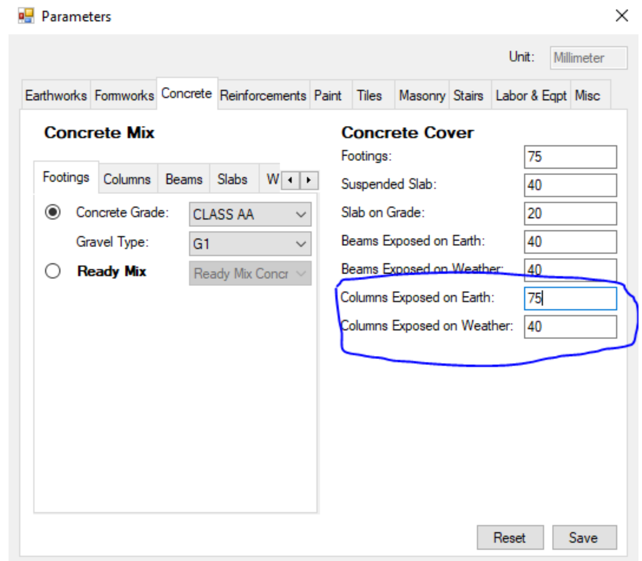
F.S. 5% = 239.3 x 5% = 11.965 or 11.97 m3 x 4910 = **Php 58,772.70**

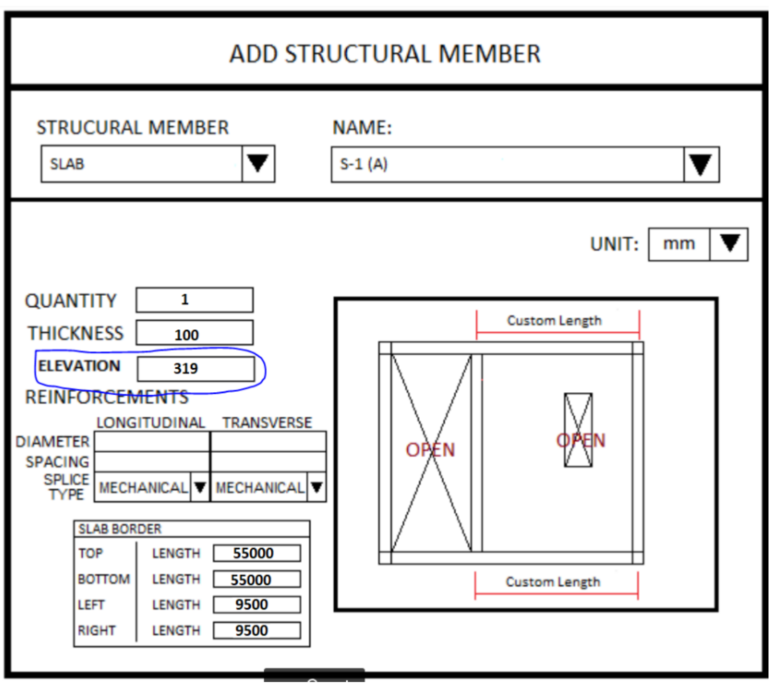
Labor cost = P 400.00/ m3 = 239.3 x 400 = **P 95,720.00**

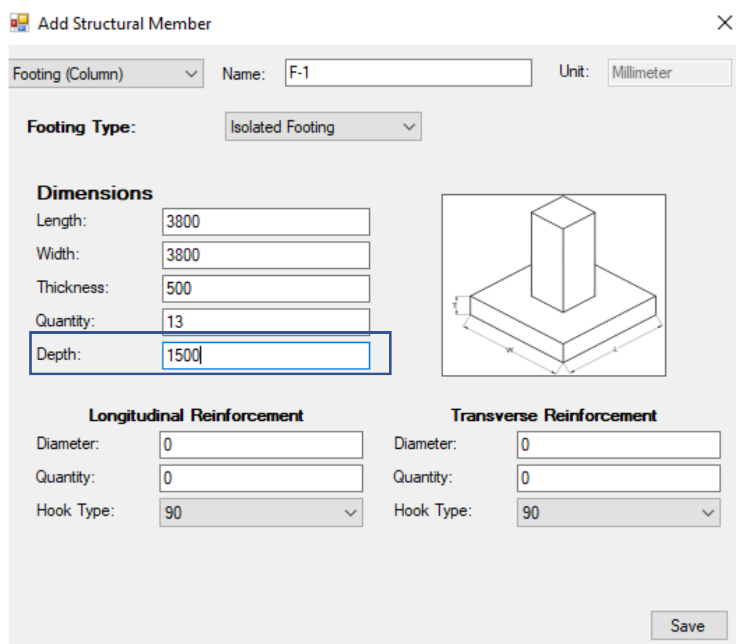
## II. COLUMN

**C-1 @ 13 sets** (GROUND FLR AND FIRST FLOOR)
H1: 3469 mm
B: 600 mm
D: 600 mm



$$V_T = V_1 + V_2$$

$V_1 = (DEPTH\ OF\ FOOTING + AVERAGE\ SLAB\ ELEVATION - THICKNESS\ OF\ FOOTING)$(B+2($CC_{\text{COLUMN EXPOSED TO EARTH}} - CC_{\text{COLUMN EXPOSED TO WEATHER}}$) (D+2($CC_{\text{COLUMN EXPOSED TO EARTH}} - CC_{\text{COLUMN EXPOSED TO WEATHER}}$)

$$V_2 = B * D * (H - AVERAGE\ SLAB\ ELEVATION)$$

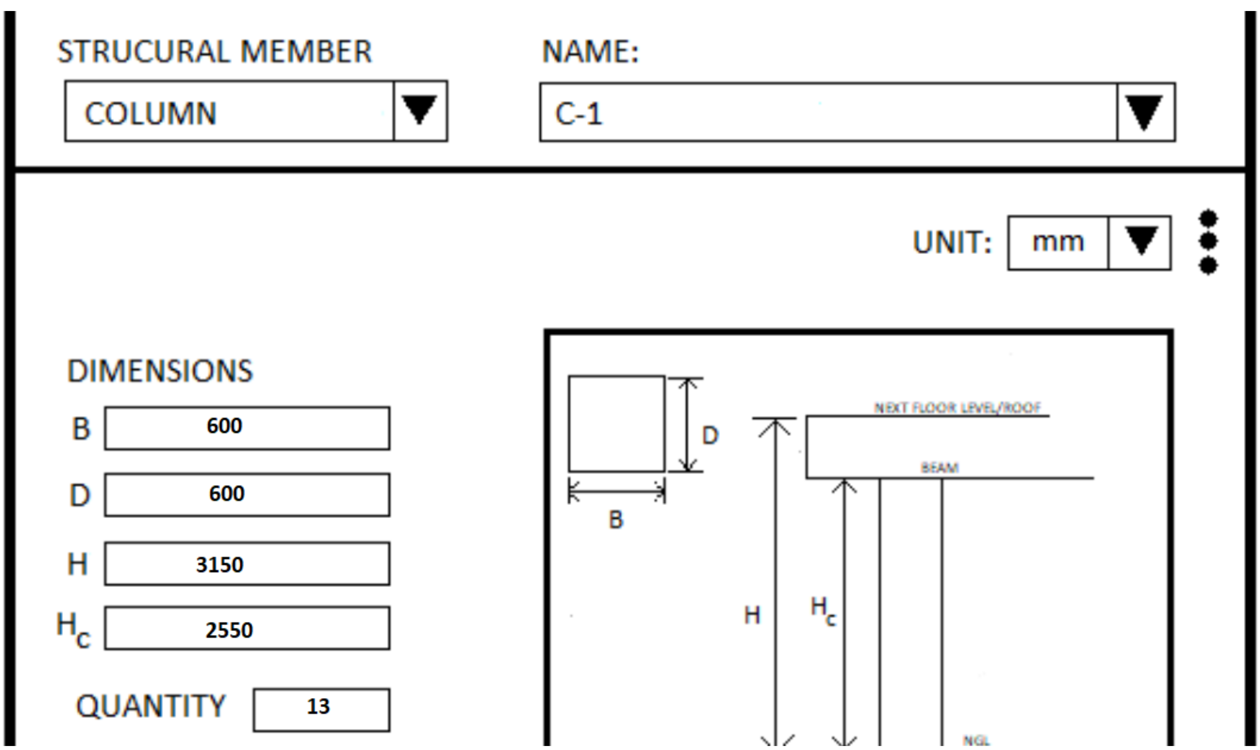
$$V_1 = (1500 + 319 - 500)(600 + 2(75 - 40)(600 + 2(75 - 40) = 0.5920991\ m3$$

$$V_2 = 600 * 600 * (3469 - 319) = 1.134\ m3$$

$$V_T = 0.592 + 1.134 = 1.726\ m3 * 13\ sets = 22.438\ m3$$

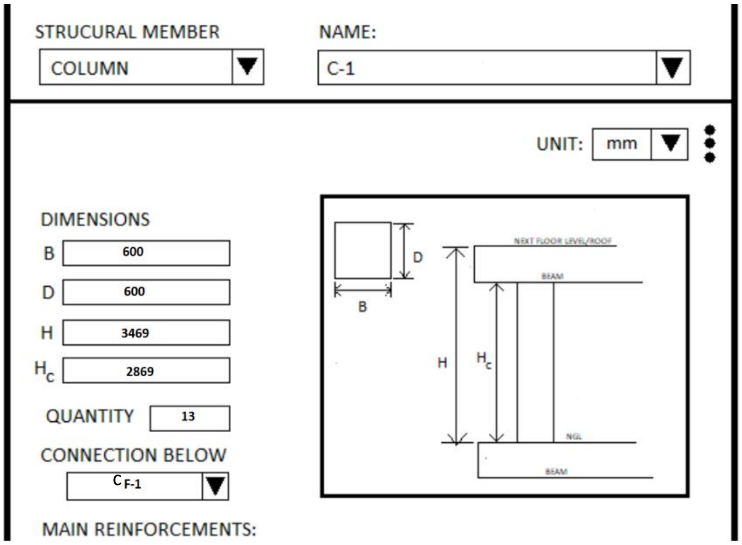
**C-1 @ 13 sets (2$^{ND}$ FLOOR – 4$^{TH}$ FLOOR)**
H: 3150 mm
B:600
D:600

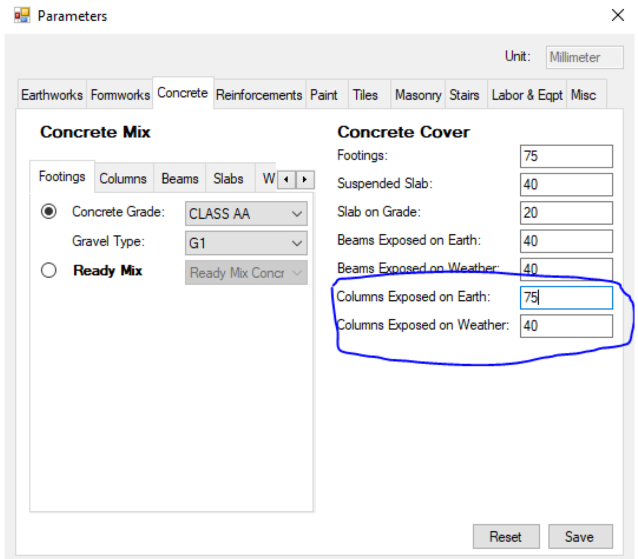
v =3150x 600 x 600 x 13 = **14.742 m3**

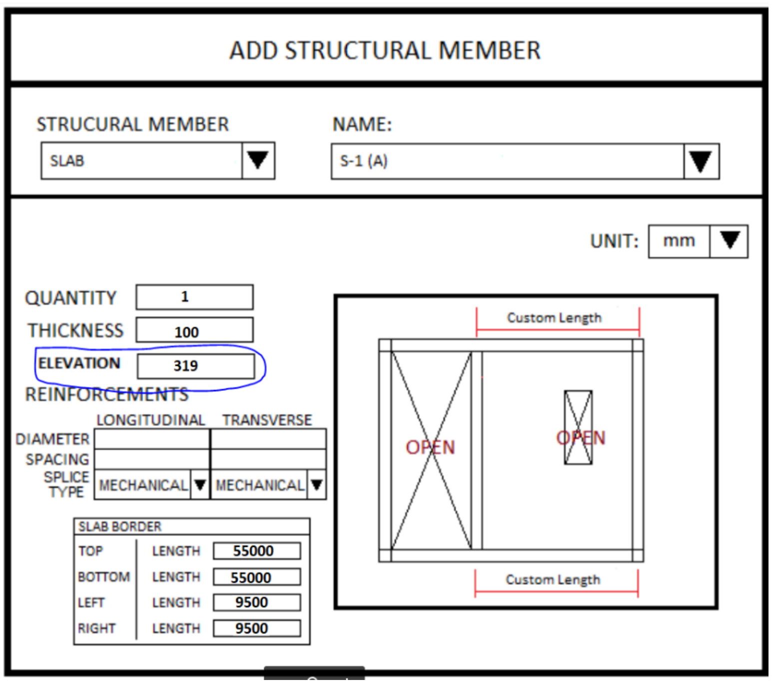


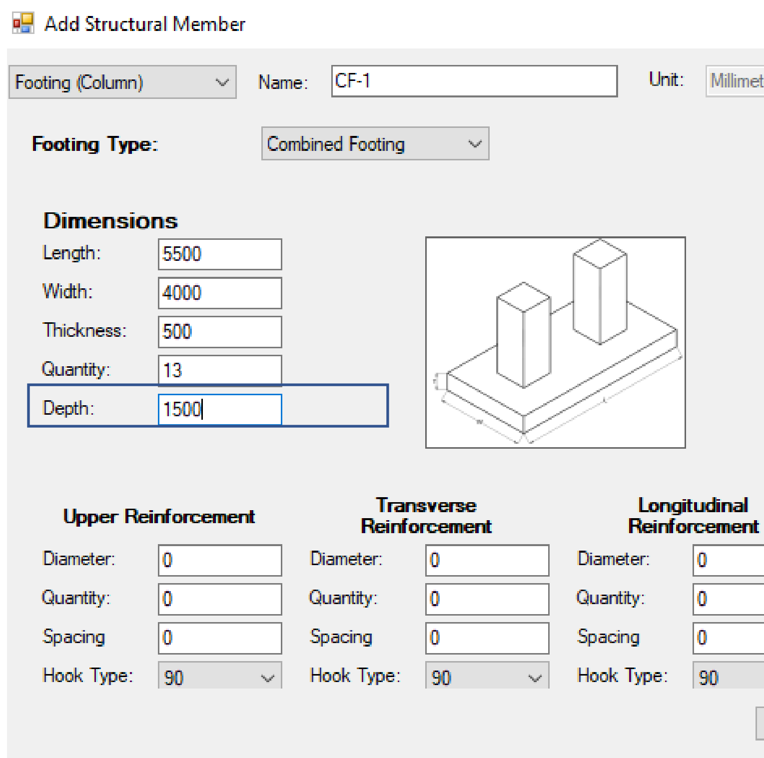

**C-2 @ 13 sets** (GROUND FLR AND FIRST FLOOR)
H1: 3469 mm

B: 600 mm
D: 600 mm




$$V_T = V_1 + V_2$$

$V_1 = (DEPTH\ OF\ FOOTING + AVERAGE\ SLAB\ ELEVATION - THICKNESS\ OF\ FOOTING)$(B+2($CC_{\text{COLUMN EXPOSED TO EARTH}} - CC_{\text{COLUMN EXPOSED TO WEATHER}}$) (D+2($CC_{\text{COLUMN EXPOSED TO EARTH}} - CC_{\text{COLUMN EXPOSED TO WEATHER}}$)

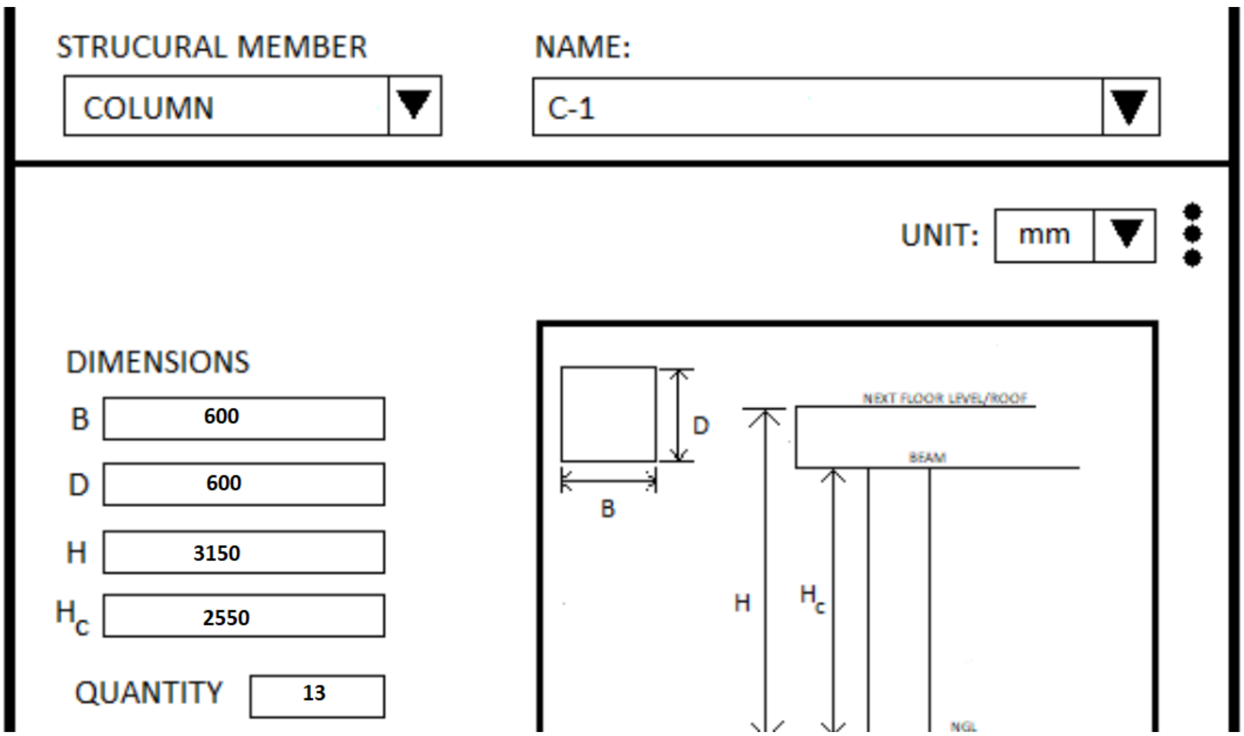
$$V_2 = B * D * (H - AVERAGE\ SLAB\ ELEVATION)$$

$$V_1 = (1500 + 319 - 500) * [600 + 2 * (75 - 40)] * [600 + 2 * (75 - 40)] = 0.5920991\ m3$$

$$V_2 = 600 * 600 * (3469 - 319) = 1.134\ m3$$

$$V_T = 0.592 + 1.134 = 1.726\ m3 * 13\ sets = 22.438\ m3$$

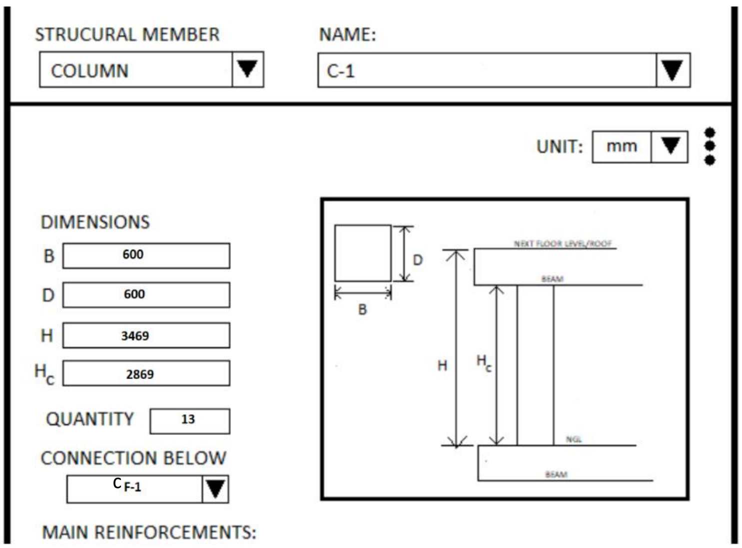
**C-2 @ 13 sets ($2^{ND}$ FLOOR – $4^{TH}$ FLOOR)**
H: 3150 mm
B:600s
D:600

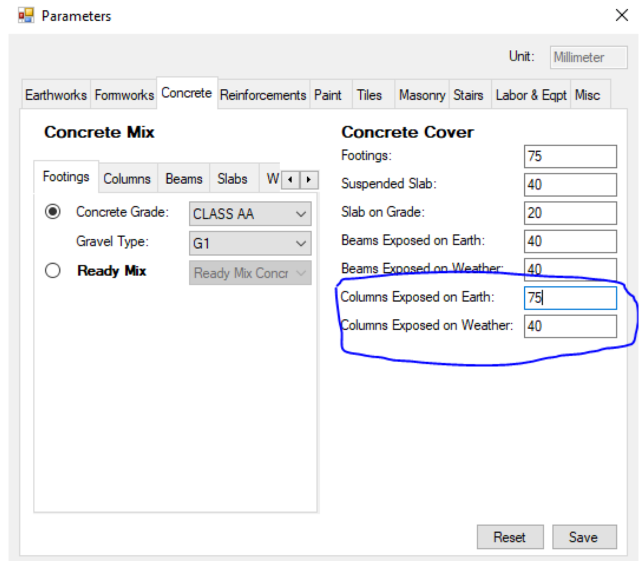


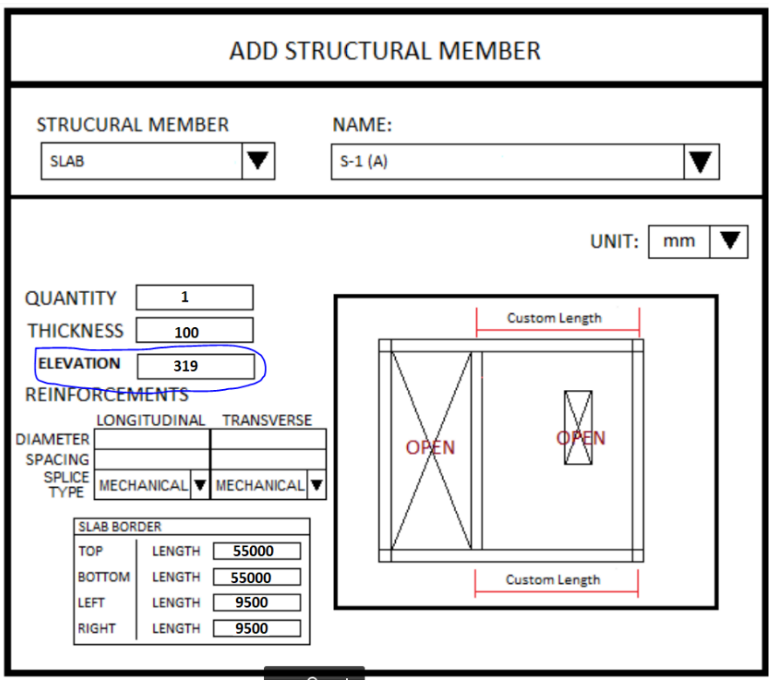

v =3150x 600 x 600 x 13 sets = **14.742 m3**

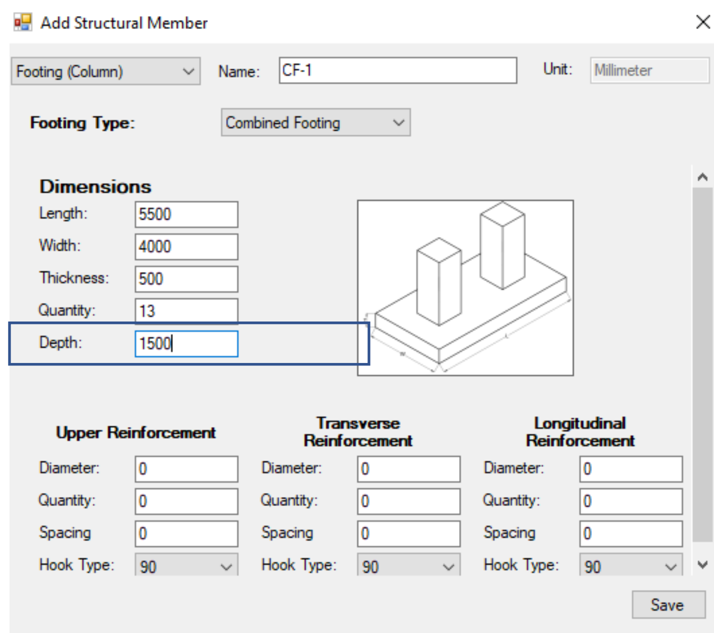
**C-3 @ 13 sets** (GROUND FLR AND FIRST FLOOR)

H1: 3469 mm
B: 600 mm
D: 600 mm




$B+2(CC_{\text{COLUMN EXPOSED TO EARTH}} - CC_{\text{COLUMN EXPOSED TO WEATHER}})$

$$V_T = V_1 + V_2$$

$V_1 = (DEPTH\ OF\ FOOTING + AVERAGE\ SLAB\ ELEVATION - THICKNESS\ OF\ FOOTING)$(B+2(CC$_{\text{COLUMN EXPOSED TO EARTH}}$ – CC$_{\text{COLUMN EXPOSED TO WEATHER}}$) (D+2(CC$_{\text{COLUMN EXPOSED TO EARTH}}$ – CC$_{\text{COLUMN EXPOSED TO WEATHER}}$)

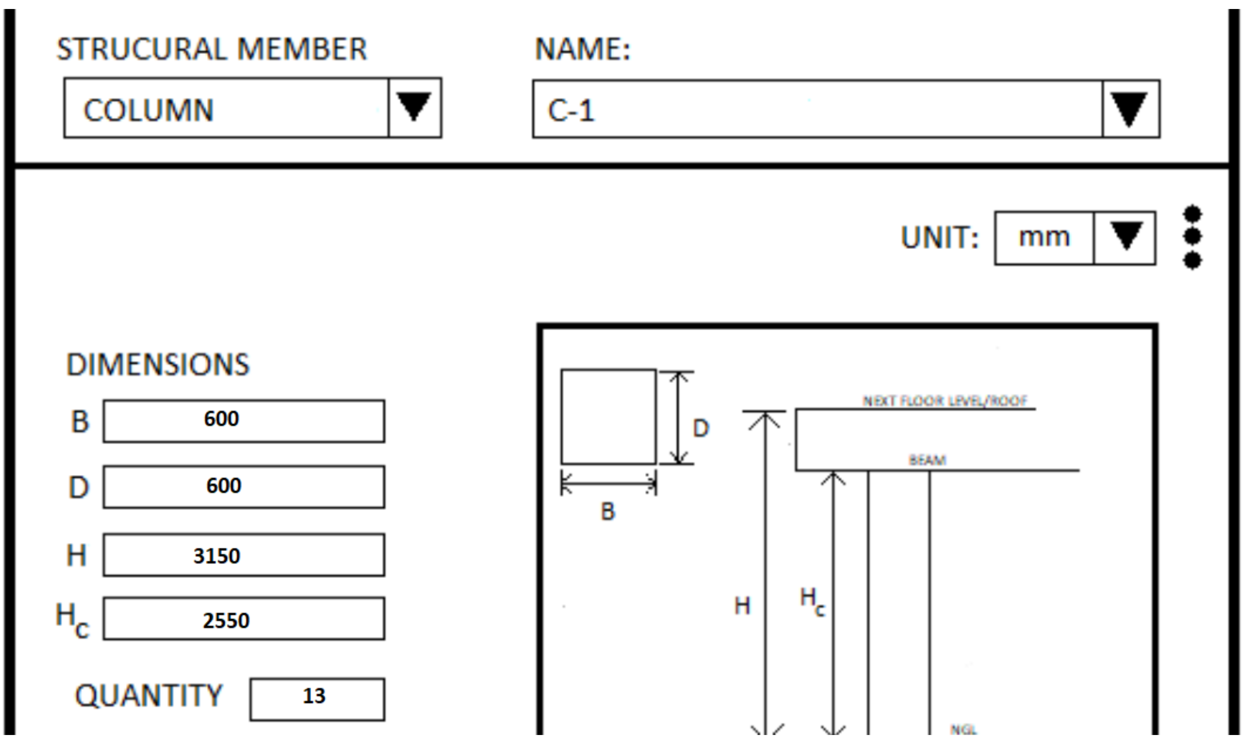
$$V_2 = B * D * (H - AVERAGE\ SLAB\ ELEVATION)$$

$$V_1 = (1500 + 319 - 500)(600 + 2(75 - 40)(600 + 2(75 - 40) = \ 0.5920991\ m3$$

$$V_2 = 600 * 600 * (3469 - 319) = 1.134\ m3$$

$$V_T = 0.592 + 1.134\ \ = 1.726\ m3 * 13\ sets = 22.438\ m3$$

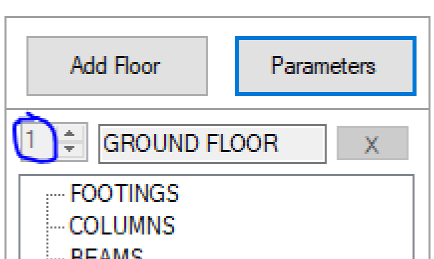
**C-3 @ 13 sets (2$^{ND}$ FLOOR – 4$^{TH}$ FLOOR)**
H: 3150 mm
B:600s
D:600



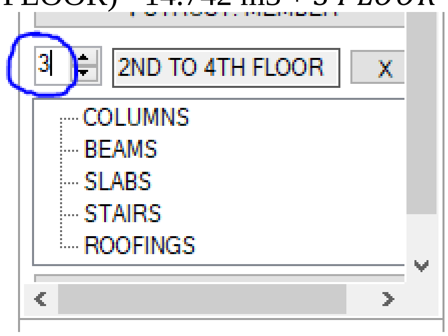

v =3150x 600 x 600 x 13 sets = **14.742 m3**

**COLUMN CONCRETE VOLUME TOTAL**

C-1 @ 13 sets (GROUND FLR AND FIRST FLOOR) = $22.438\ m3 * 1\ FLOOR = 22.438\ m3$
C-2 @ 13 sets (GROUND FLR AND FIRST FLOOR) = $22.438\ m3 * 1\ FLOOR = 22.438\ m3$
C-3 @ 13 sets (GROUND FLR AND FIRST FLOOR) = $22.438\ m3 * 1\ FLOOR = 22.438\ m3$



C-1 @ 13 sets ($2^{ND}$ FLOOR – $4^{TH}$ FLOOR) =14.742 m3 $* 3\ FLOOR = 44.226\ m3$
C-2 @ 13 sets ($2^{ND}$ FLOOR – $4^{TH}$ FLOOR) =14.742 m3 $* 3\ FLOOR = 44.226\ m3$
C-3 @ 13 sets ($2^{ND}$ FLOOR – $4^{TH}$ FLOOR) =14.742 m3 $* 3\ FLOOR = 44.226\ m3$




**TOTAL** $= 22.438 + 22.438 + 22.438 + 44.226 + 44.226 + 44.226 \ = 199.992\ m3$

199.992 m3 @ 4000psi (P 4910.00 / m3) = **P 981,960.72**

F.S. 5%= 198.89 x 5% = 9.996 or 10 m3 x 4910 **= P 49,100.00**

Labor cost = P450.00 /m3 = 199.992 m3 x 450.00 = **P 89,996.40**

## III. BEAMS

RED FONTS ARE INPUTS AND THIS IS HOW THE SYSTEM WILL COMPUTE:
ALL THE DIMENSIONS FOR B AND D IN THIS EXAMPLE FOR ALL FOOTING TIE BEAMS (FTB) ARE THE SAME. B = 400mm or 0.4 m ; D =600mm or 0.6 m

VOLUME = ( B X D X CLEAR LENGTH) X QUANTITY OF BEAM

FTB -1A

V= (0.4 X 0.6 X 4.23) X 1 QTY = 1.0152 m3

FTB-1

V= (0.4 X 0.6 X 3.83) X 10 QTY = 9.192 m3

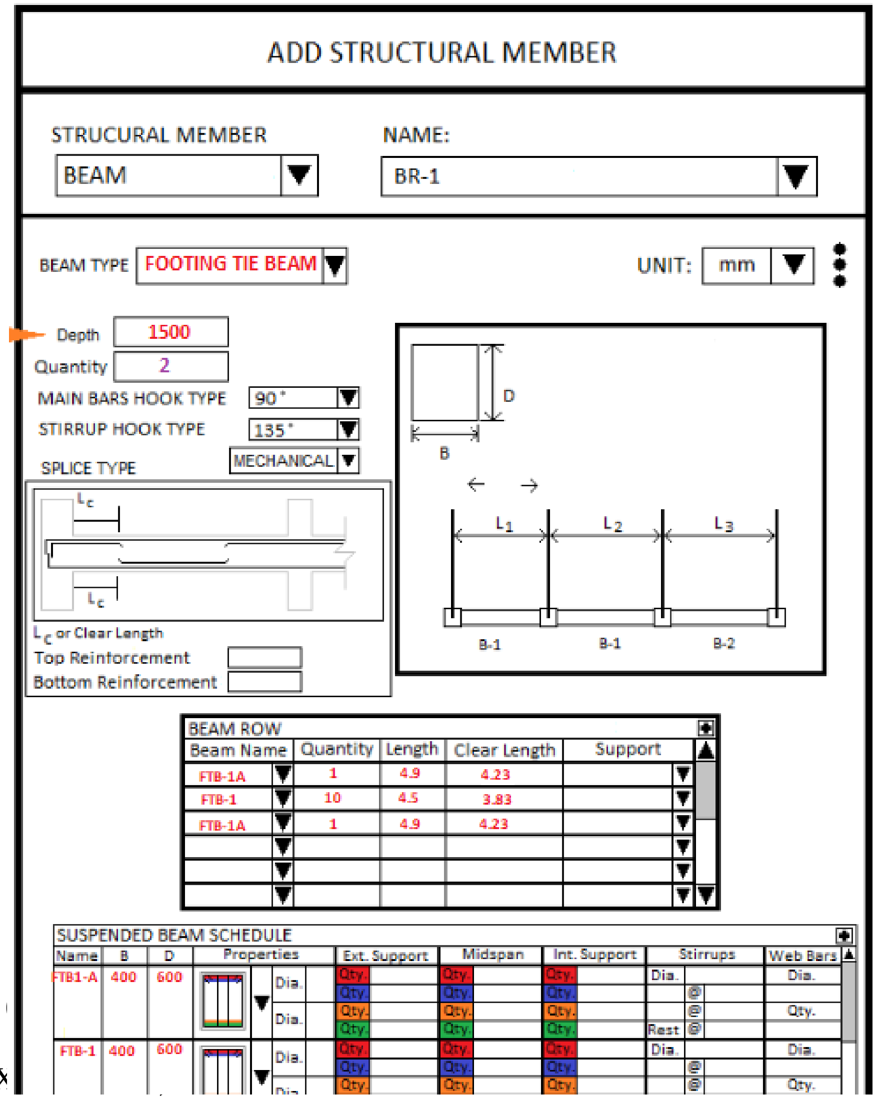
FTB -1A

V= (0.4 X 0.6 X 4.23) X 1 QTY = 1.0152 m3

TOTAL VOLUME FOR BEAM ROW 1

= 1.0152 m3+9.192 m3 +1.0152 m3 = 11.224 m3 x 2 QTY = **22.4448 m3**

Finally, multiply the QTY of the whole beam row (UI under "Depth")




**BEAM ROW 2**

FTB -1

V= (0.4 X

FTB-1

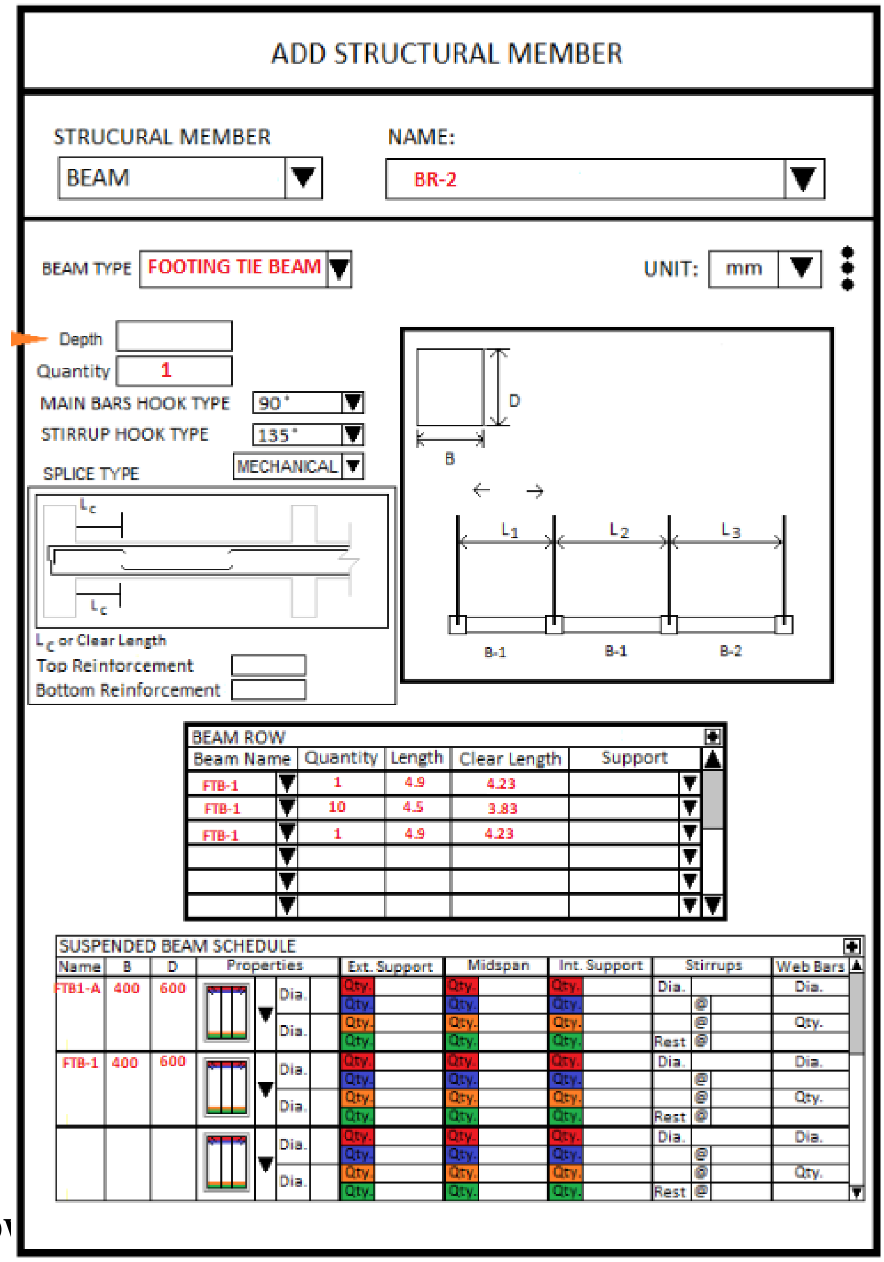
V= (0.4 X 0.6 X 3.83) X 10 QTY = 9.192 m3

FTB -1

V= (0.4 X 0.6 X 4.23) X 1 QTY = 1.0152 m3

TOTAL VOLUME FOR BEAM ROW 2

= 1.0152 m3+9.192 m3 +1.0152 m3 = **11.224 m3**




**BEAM RO**

FTB -2A

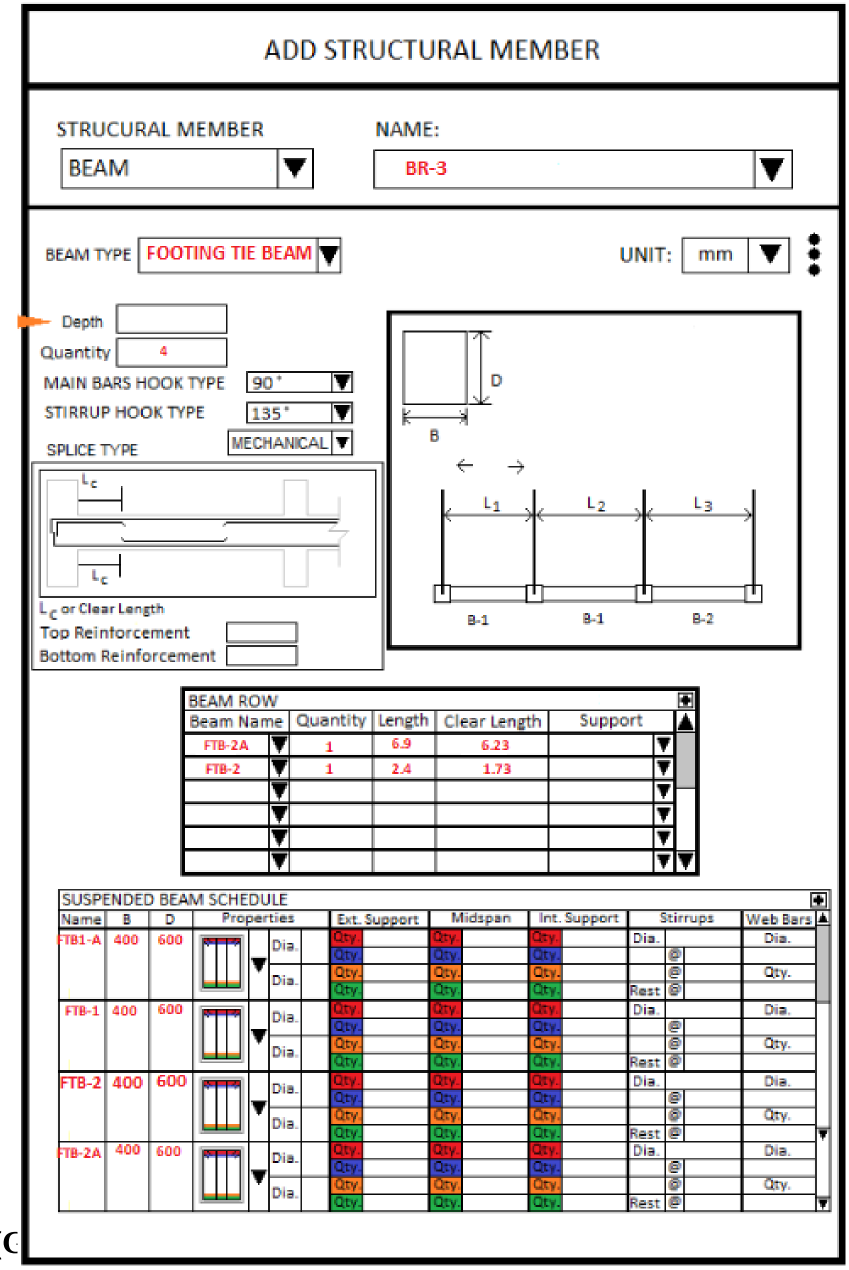
V= (0.4 X 0.6 X 6.23) X 1 QTY = 1.4952 m3

FTB -2

V= (0.4 X 0.6 X 1.73) X 1 QTY = 0.4152 m3

VOLUME TOTAL FOR BEAM ROW 3 = 1.4952 m3 + 0.4152 m3 = 1.9104 m3 x 4 QTY

**= 7.6416 m3**




**BEAM ROW 4 (C**

FTB -2A

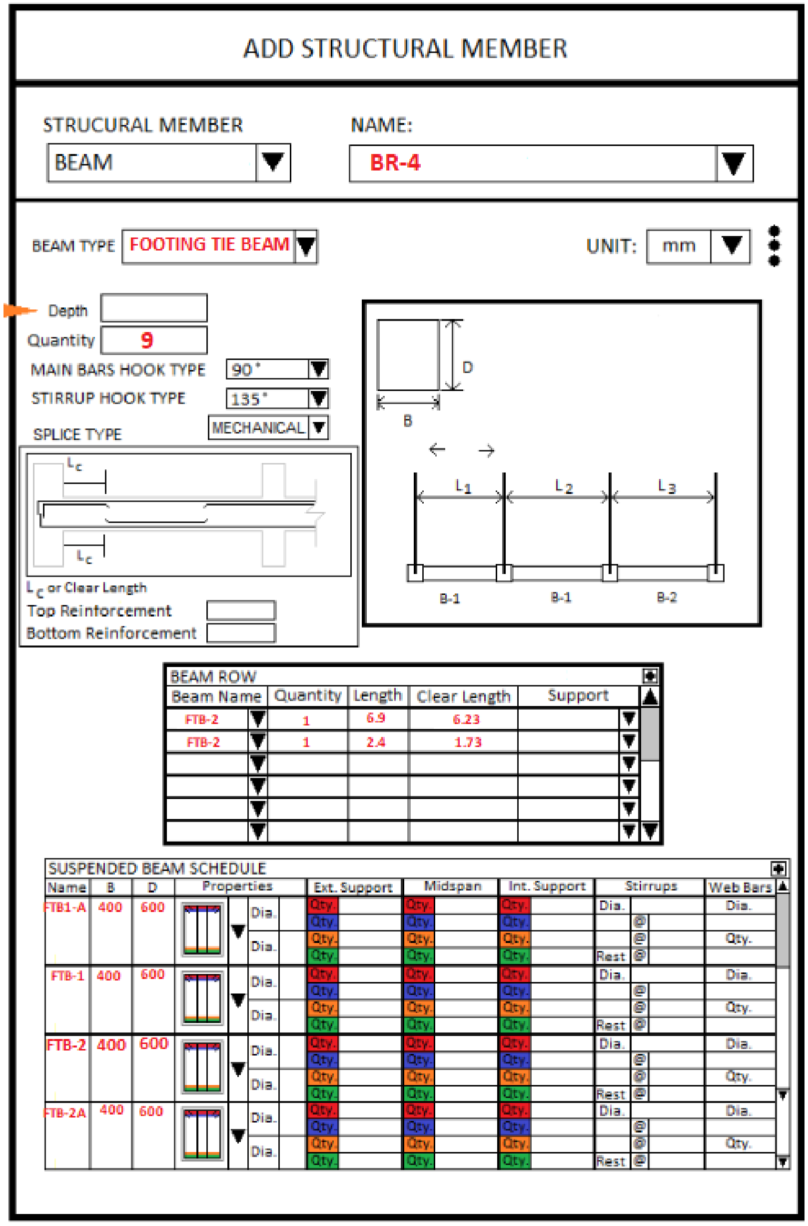
V= (0.4 X 0.6 X 6.23) X 1 QTY = 1.4952 m3

FTB -2

V= (0.4 X 0.6 X 1.73) X 1 QTY = 0.4152 m3

VOLUME TOTAL FOR BEAM ROW 4 = 1.4952 m3 + 0.4152 m3  = 1.9104 m3 x 9 QTY

**= 17.1936 m3**




Total volume of concrete for ground floor = 22.4448 + 11.224+ 7.6416 + 17.936 = **58.504 m3**

**BEAM ROW 5 (2ND TO 4TH FLOOR)**

G-2

V= (0.25 X 0.4 X 4.3) X 1 QTY = 0.43 m3

G-2

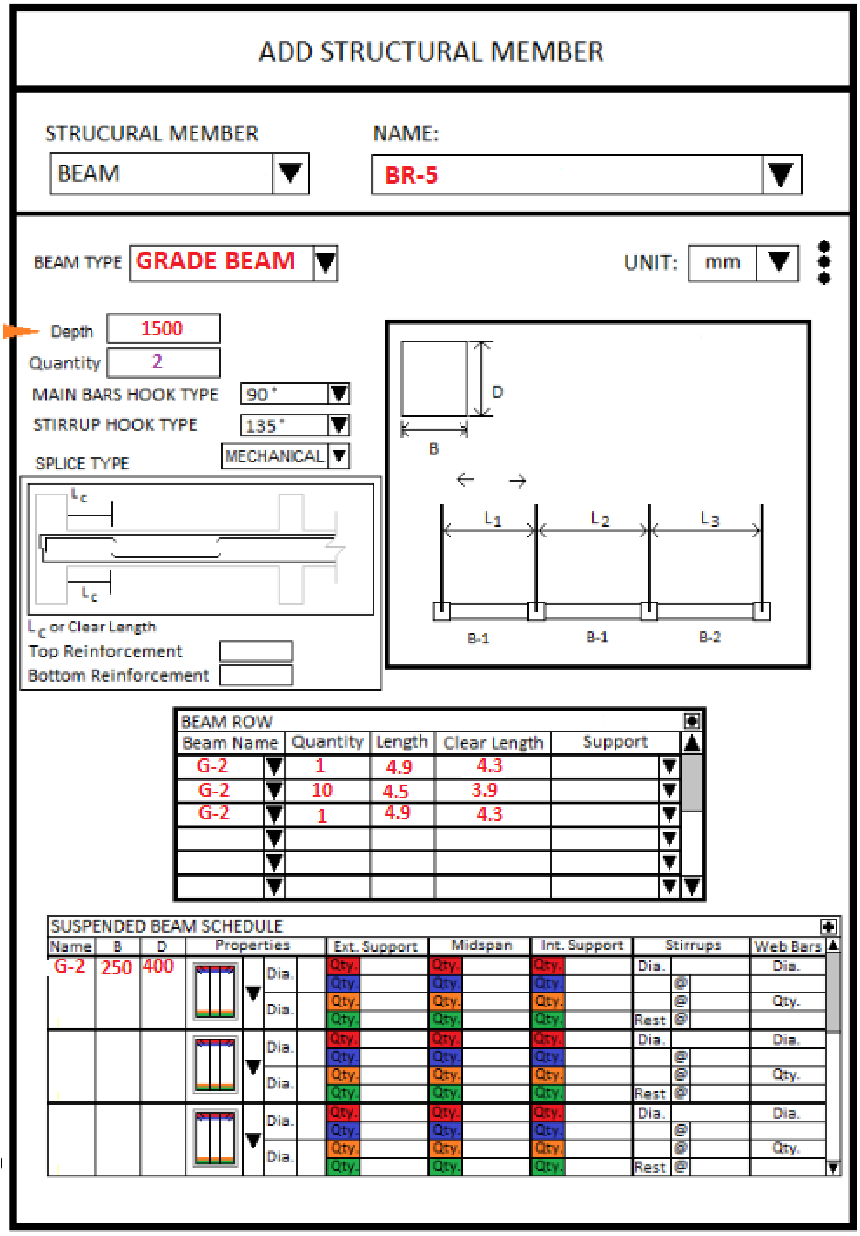
V= (0.25 X 0.4 X 3.9) X 10 QTY = 3.9 m3

G-2

V= (0.25 X 0.4 X 4.3) X 1 QTY = 0.43 m3

VOLUME TOTAL FOR BEAM ROW 5 = 0.43 m3 + 3.9 m3+ 0.43 m3= 4.76m x 2 QTY

**= 9.52 m3**




**BEAM ROW**

G-3

V= (0.4 X 0.5 X 4.3) X 1 QTY = 0.86m3

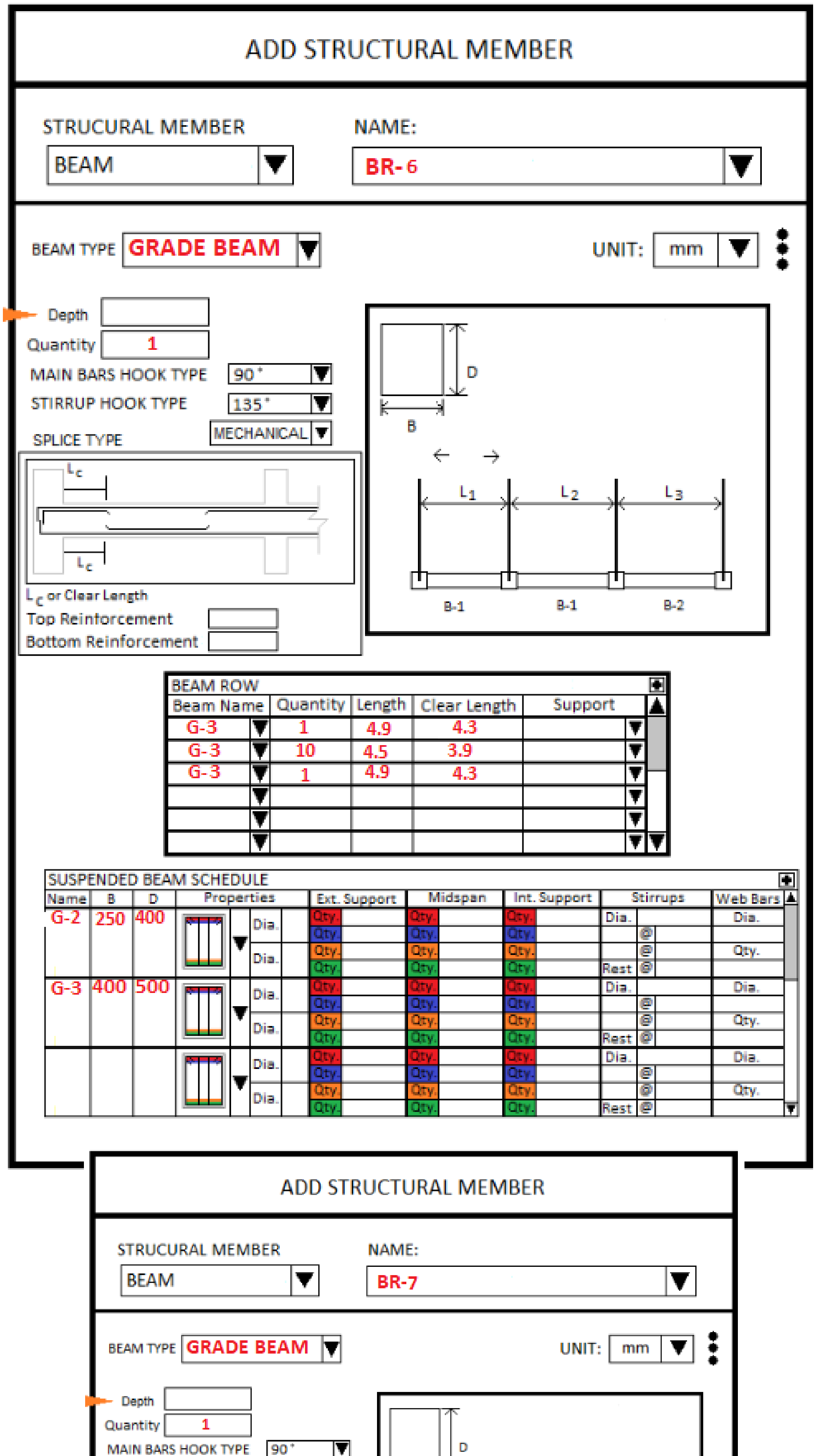
G-3

V= (0.4 X 0.5 X 3.9) X 10 QTY = 7.8 m3

G-3

V= (0.4 X 0.5 X 4.3) X 1 QTY = 0.86 m3

VOLUME TOTAL FOR BEAM ROW 6 = 0.86 m3 + 7.8 m3+ 0.86 m3= **9.52 m**



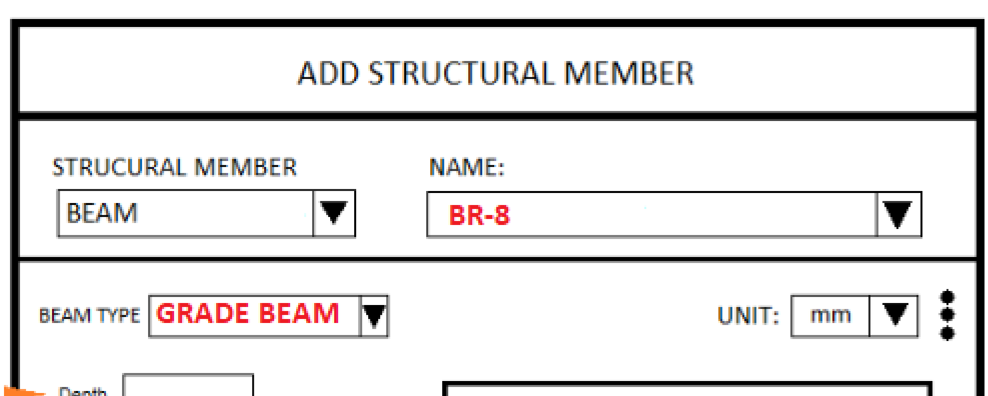

**BEAM**

B-1

**BEAM ROW 8 (2ND TO 4TH FLOOR)**

B-1

V= (0.25 X 0.4 X 3.47) X 2 QTY = **0.694 m3**



**BEAM ROW 9 (2ND TO 4TH FLOOR)**

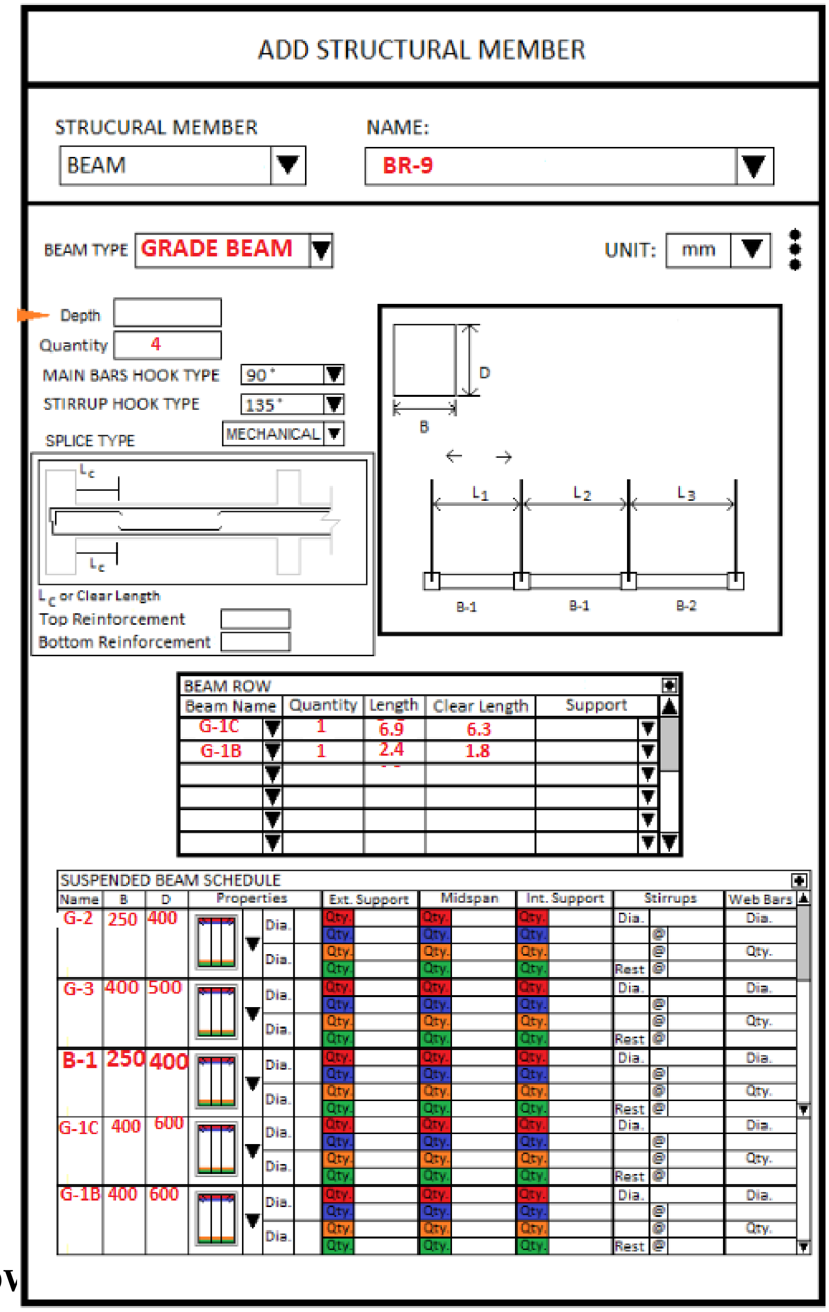
G-1C

V= (0.4 X 0.6 X 6.3) X 1 QTY = 1.512 m3

G-1B

V= (0.4X 0.6 X 1.8) X 1 QTY = 0.432 m3

**VOLUME TOTAL FOR BR-9 =** 1.512 m3 + 0.432 m3 = 1.944 m3 x 4sets = **7.776 m3**




**BEAM ROW**

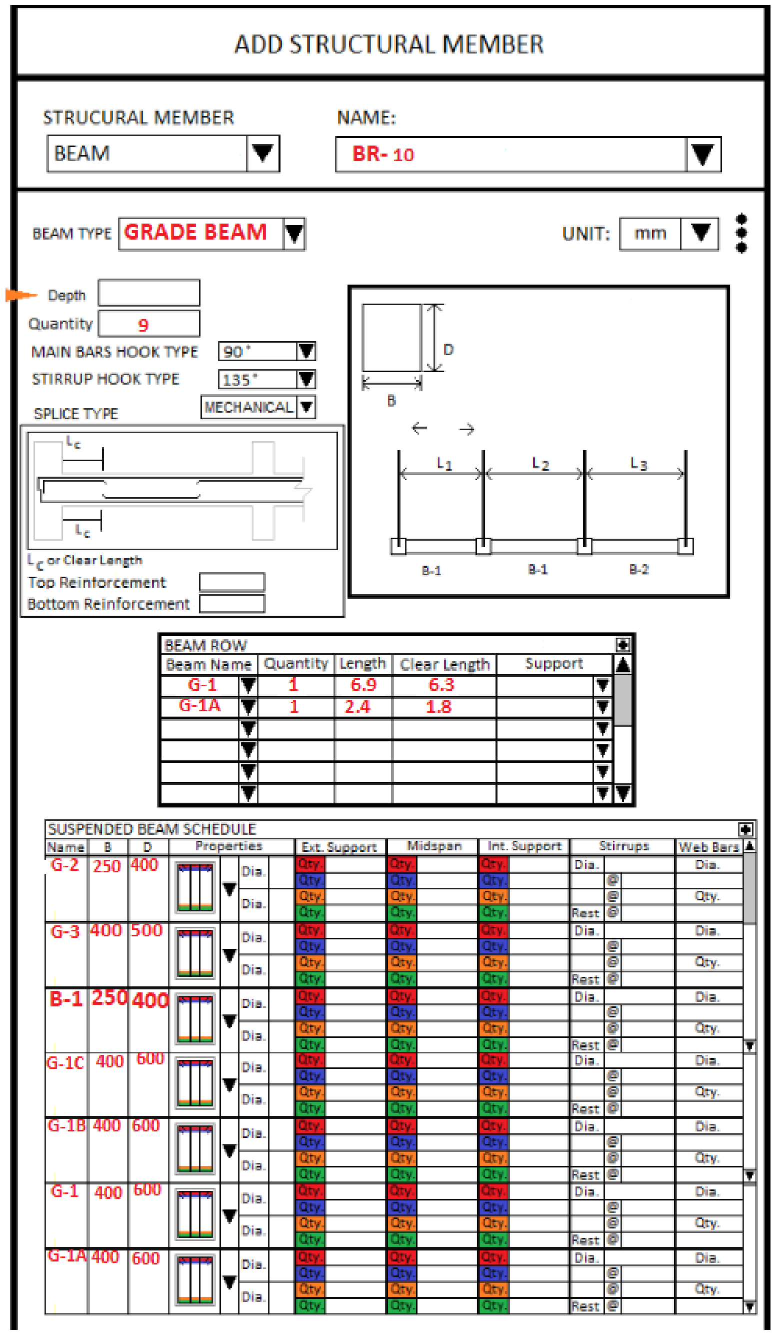
G-1

V= (0.4 X 0.6 X 6.3) X 1 QTY = 1.512 m3

G-1A

V= (0.4X 0.6 X 1.8) X 1 QTY = 0.432 m3

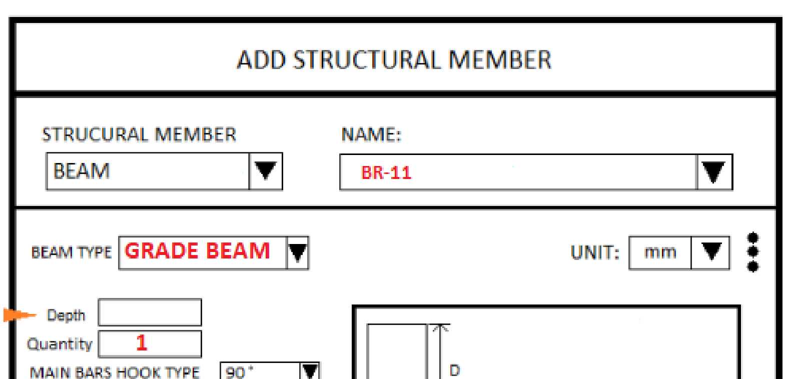
**VOLUME TOTAL FOR BR-9 =** 1.512 m3 + 0.432 m3 = 1.944 m3 x 9 sets = 1**7.496 m3**




**BEAM ROW 11 (**

B-1

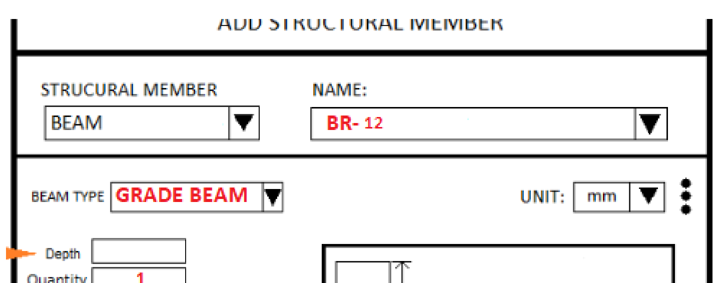
V= (0.25 X 0.4 X 4.1) X 10 QTY = **4.1 m3**



**BEAM ROW 12 (2ND TO 4TH FLOOR)**

CB-1

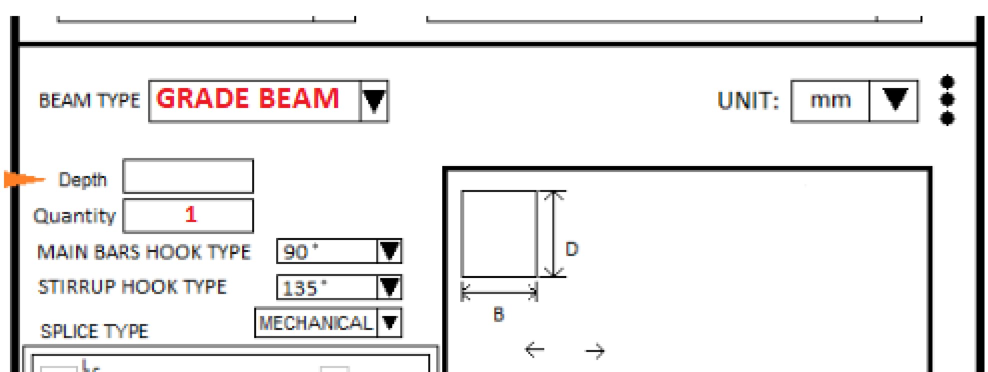
V= (0.25 X 0.4 X1 ) X 1 QTY = **0.1 m3**



**BEAM ROW 13 (2ND TO 4TH FLOOR)**

CB-1

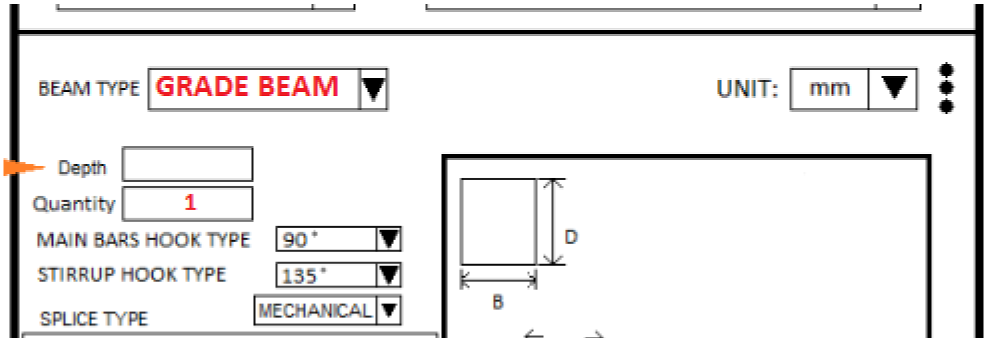
V= (0.25 X 0.4 X1 ) X 1 QTY = **0.1 m3**



**BEAM ROW 14 (2ND TO 4TH FLOOR)**

CB-1

V= (0.25 X 0.4 X1 ) X 1 QTY = **0.1 m3**

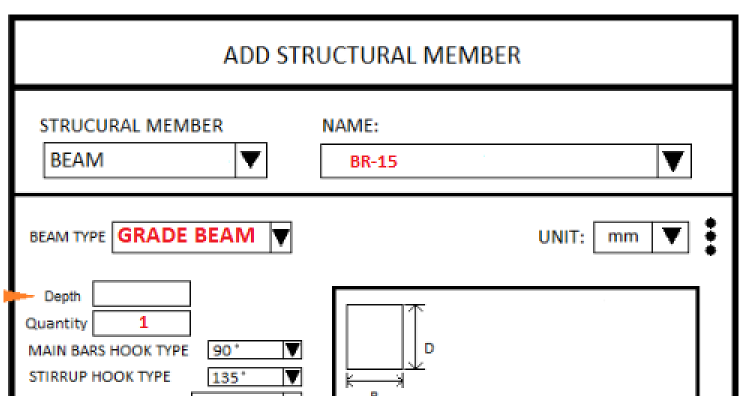


## IV. STAIR

**BEAM ROW 15 (2ND TO 4TH FLOOR)**

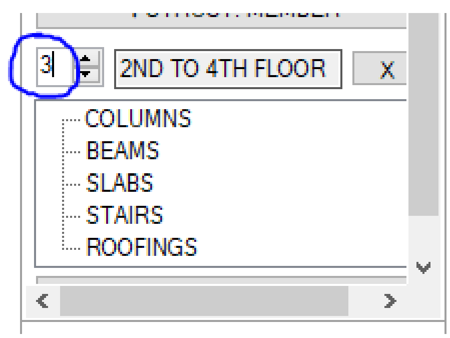
B-2

V= (0.25 X 0.4 X 4.425) X 2 QTY = **0.885 m3**



Total volume of concrete for a single floor:
=9.52+9.52+0.88+0.694+7.776+17.496+4.1+0.1+0.1+0.1+0.885 = 51.171 m3

Total Volume of Concrete for 2nd floor to 4th floor :
51.171 m3 x 3 floors = **153.513 m3**




**ROOF BEAM (note: same illustrations and inputs ar eam 2nd to 4th flr)**

**BEAM ROW 16 (ROOF DECK)**

RG-2

V= (0.25 X 0.4 X 4.3) X 1 QTY = 0.43 m3

RG-2

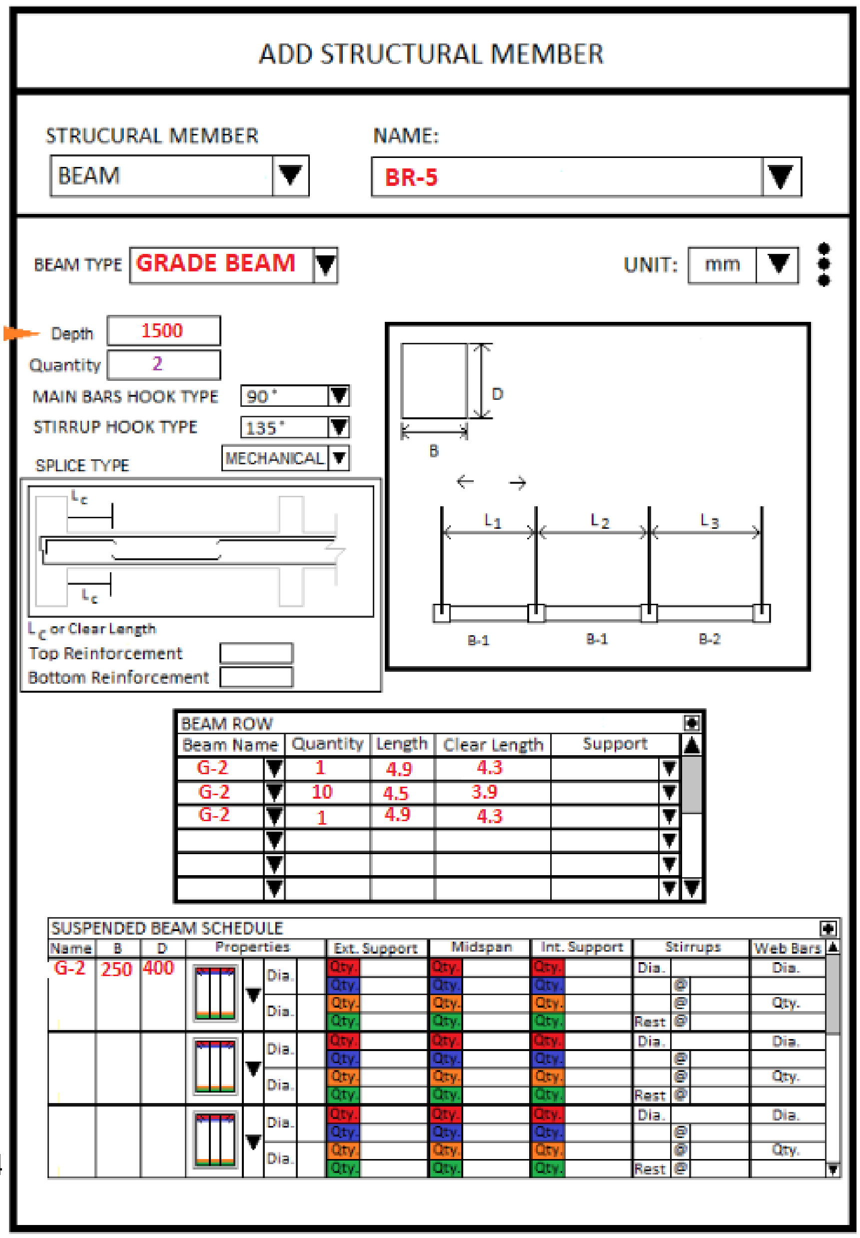
V= (0.25 X 0.4 X 3.9) X 10 QTY = 3.9 m3

RG-2

V= (0.25 X 0.4 X 4.3) X 1 QTY = 0.43 m3

VOLUME TOTAL FOR BEAM ROW 5 = 0.43 m3 + 3.9 m3+ 0.43 m3= 4.76m x 2 QTY

**= 9.52 m3**




**BEAM ROW**

RG-3

V= (0.4

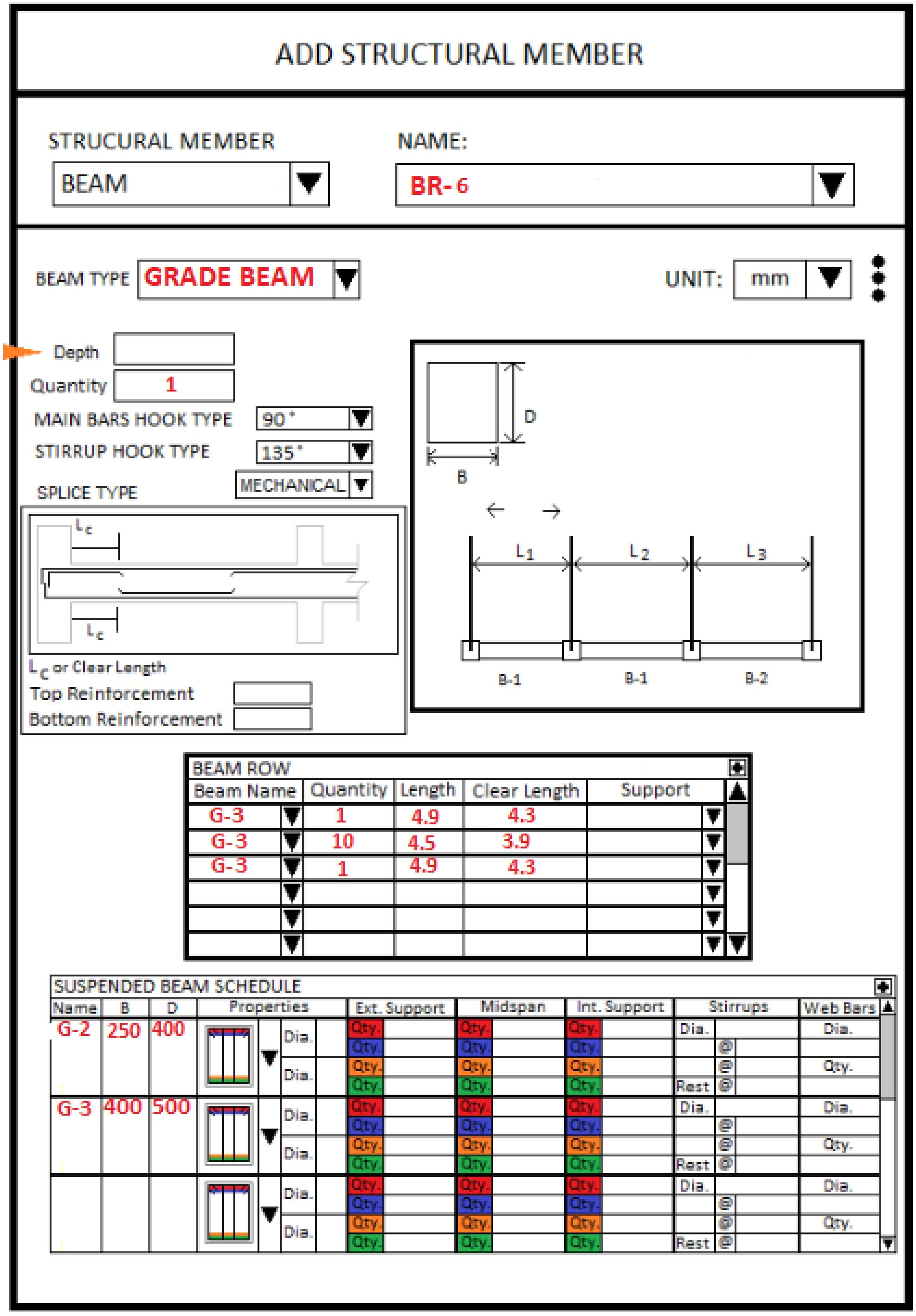
RG-3

V= (0.4 X 0.5 X 3.9) X 10 QTY = 7.8 m3

RG-3

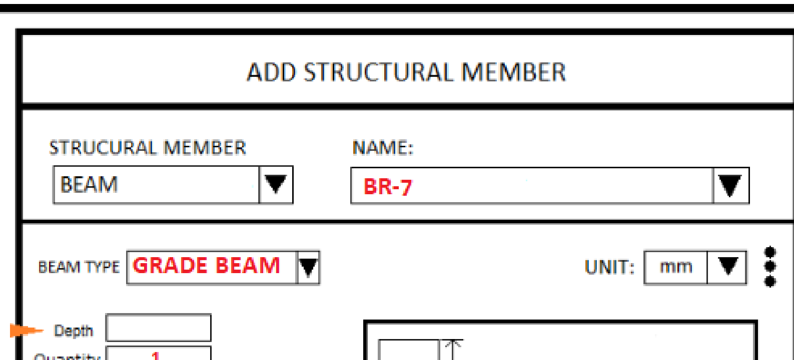
V= (0.4 X 0.5 X 4.3) X 1 QTY = 0.86 m3

VOLUME TOTAL FOR BEAM ROW 6 = 0.86 m3 + 7.8 m3+ 0.86 m3= **9.52 m**




**BEAM**

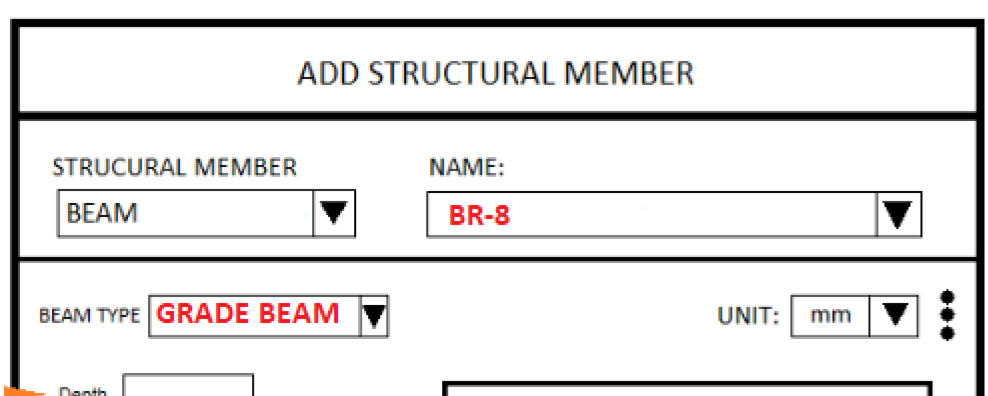
B-1



**BEAM ROW 19 (ROOF DECK)**

B-1

V= (0.25 X 0.4 X 3.47) X 2 QTY = **0.694 m3**



**BEAM ROW 20 (ROOF DECK)**

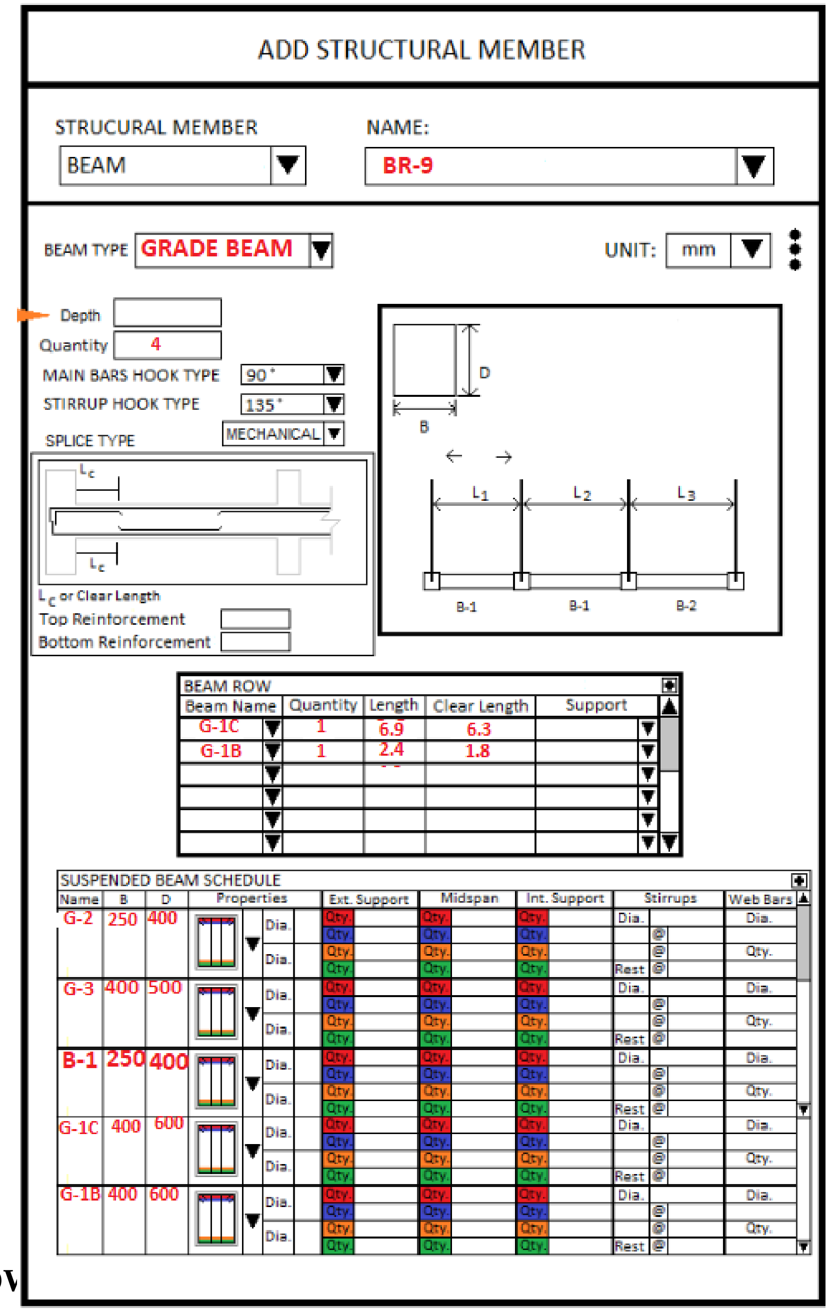
RG-1C

V= (0.4 X 0.6 X 6.3) X 1 QTY = 1.512 m3

RG-1B

V= (0.4X 0.6 X 1.8) X 1 QTY = 0.432 m3

**VOLUME TOTAL FOR BR-20 =** 1.512 m3 + 0.432 m3 = 1.944 m3 x 4sets = **7.776 m3**




**BEAM ROW**

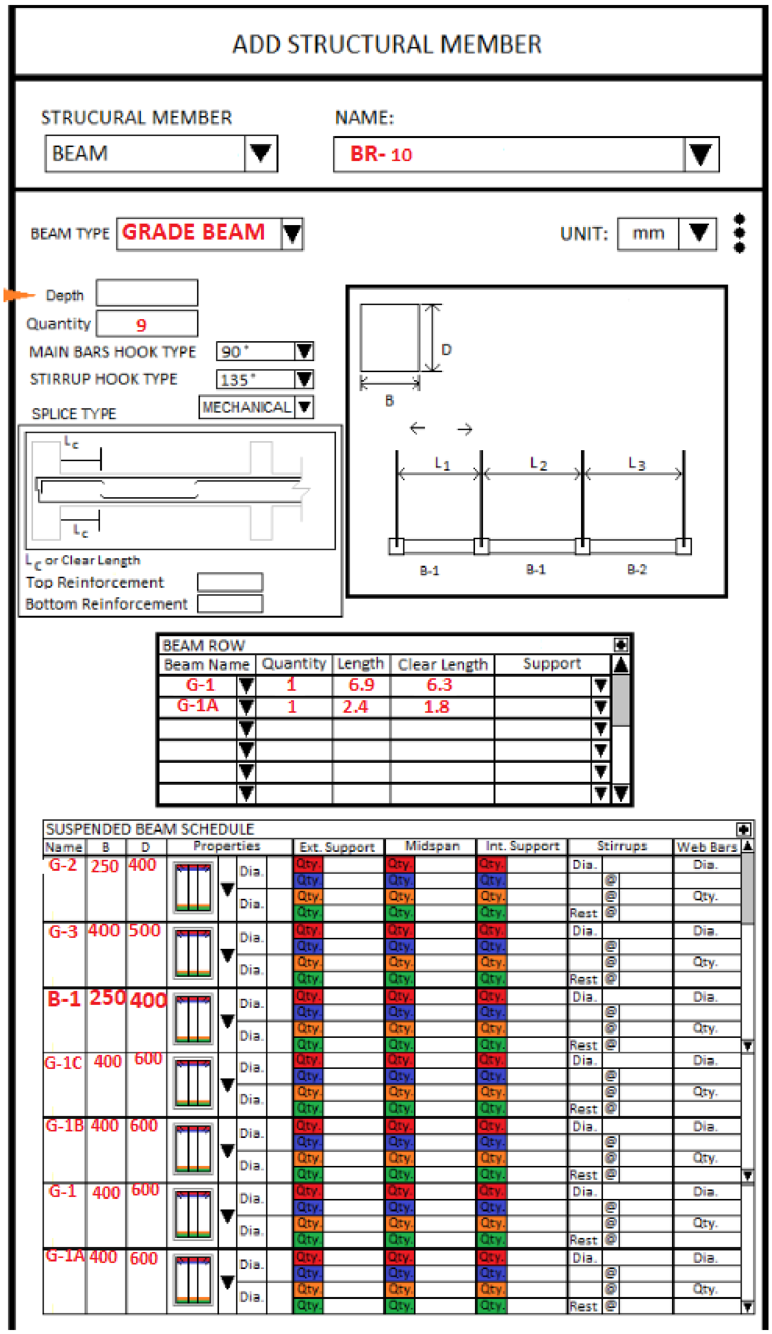
RG-1

V= (0.4 X 0.6 X 6.3) X 1 QTY = 1.512 m3

RG-1A

V= (0.4X 0.6 X 1.8) X 1 QTY = 0.432 m3

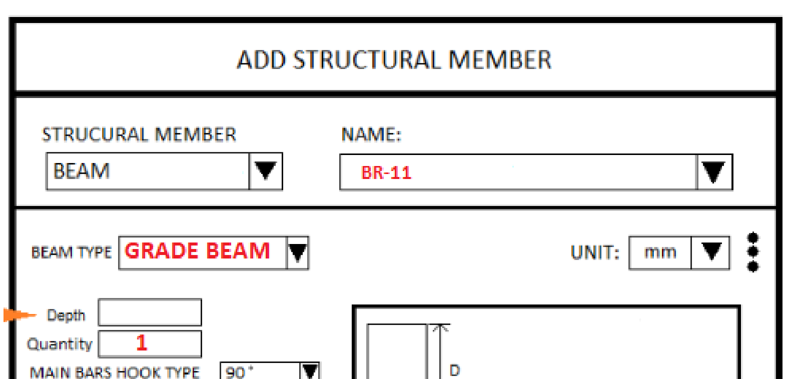
**VOLUME TOTAL FOR BR-21 =** 1.512 m3 + 0.432 m3 = 1.944 m3 x 9 sets = 1**7.496 m3**




**BEAM ROW 22 (**

RB-1

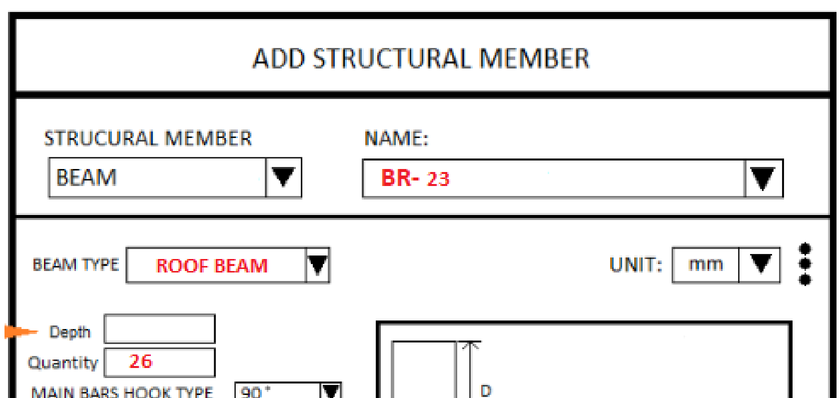
V= (0.25 X 0.4 X 4.1) X 10 QTY = **4.1 m3**



**BEAM ROW 23 (ROOF DECK)**

RCB-1

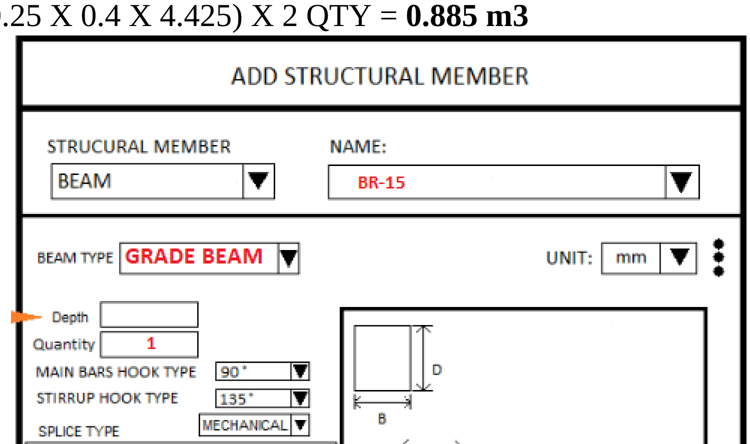
V= (0.25 X 0.4 X 1) X 1 QTY = 0.1 m3 x 26 QTY = **2.6 m3**



**BEAM ROW 24  (ROOF DECK)**

B-2

V= (0.25 X 0.4 X 4.425) X 2 QTY = **0.885 m3**



Total volume of concrete for a single roof deck floor:
=9.52+9.52+0.88+0.694+7.776+17.496+4.1+2.6+0.885 = **53.471** m3

Total volume for all beams =  58.504 + 153. 513+ 53.471 = **265.488 m3**
Total cost: 265.488 x 4910 = **P 1,303,546.08**

**V. STAIRS CONCRETE**
**STAIRS (U-STAIRS) @ 6 SETS (2 PER FLOOR, 1st to 3rd Flr.)**
TREAD WIDTH: 300mm
Riser: 175mm
STEPS FLIGHT 1: 9
STEPS FLIGHT 2: 9
Waist slab thickness:  150 mm
Landing slab thickness: 150 mm

Stair Width: 1.6m
Gap: 100mm
Landing width: 1.2m

@ 4000 psi (27.6 mpa)

WAIST SLAB:
Length = $(0.3*9)^2+(0.175*9)^2$ = 3125.799 mm or **3150mm**

= 0.150 x 1.6 x 3.15
= 0.756 m3 x 2 (1st and 2nd flight) = **1.52 m3**

STEPS:
= [(0.3*0.1752)/2] (1.6) (18) = **0.756 m3**

LANDING:
= 0.15 x 1.2 x (1.6 + 0.1 + 1.6) = **0.594 m3**

Total volume for a U-Stair = 1.52+ 0.756 + 0.594 = **2.87 m3**

Total volume for all U Stairs = 2.87 x 6 = **17.22 m3**

**STAIRS (L-STAIRS) @ 2 SETS (FOURTH FLOOR,)**
TREAD WIDTH: 250 mm
Riser: 175 mm
STEPS FLIGHT 1: 9
STEPS FLIGHT 2: 9
Waist slab thickness: 150 mm
Landing slab thickness: 150 mm
Stair Width: 1m
Landing width: 1m

**Concrete:**

@ 4000 psi (27.6 mpa)

WAIST SLAB:
Length = (0.25*9)2+(0.175*9)2 = 2.75 m or 2750mm

= 0.150 x 1 x 2.75
= 0.4125 m3 x 2 (1st and 2nd flight) = **0.825 m3**

STEPS:
= (0.25*0.1752) (1)(18) = **0.39375 m3**

LANDING:
= 0.15 x 1 x 1 = **0.15 m3**

Total Volume for an L-stair = 0.825 + 0.39375 + 0.15 = **1.37 m3**
Total Volume for all L-stair = 1.37 x 2 = **2.74 m3**

Total Volume of Concrete for Stairs = 17.22 +2.74 = 19.96 or **20 m3**
CONCRETE: 20 m3 @ 4000psi (P 4910.00 / m3) **= P 98,200.00**

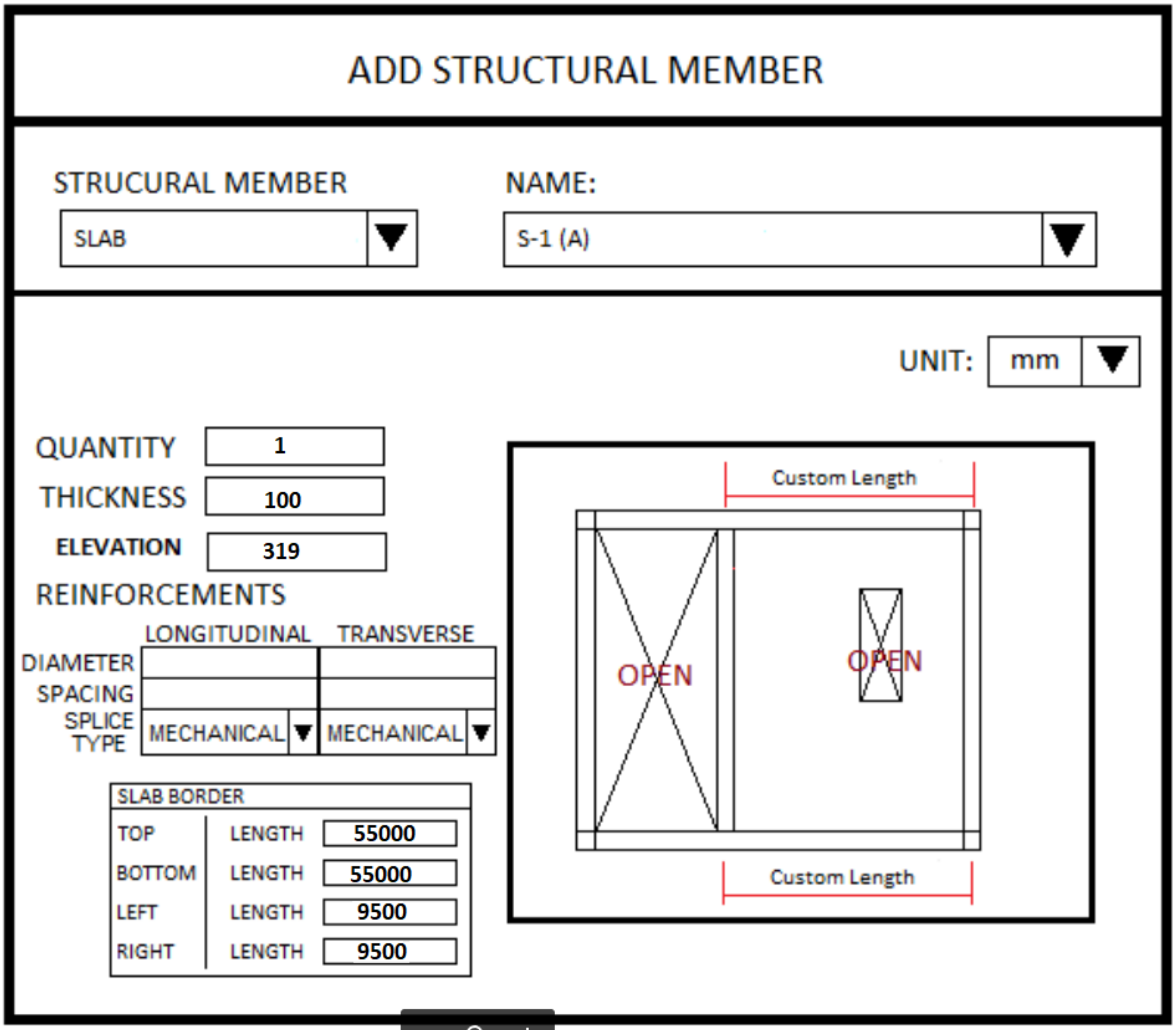
**F.S. 5%= 20m3 x 5% = 1 m3 x 4910 = P 4,910.00**

Labor cost = P450.00 /m3 = 20 m3 x 450.00 = **P 9,000.00**

## V. SLAB

**Slab on grade**
L TOP: 55000mm
W LEFT: 9500mm
T: 100mm

V= 55000 x 9500 x 100 = **52.25 m3**




CONCRETE: 52.25 m3 @ 4000psi (P 4910.00 / m3) **= P 256,547.50**

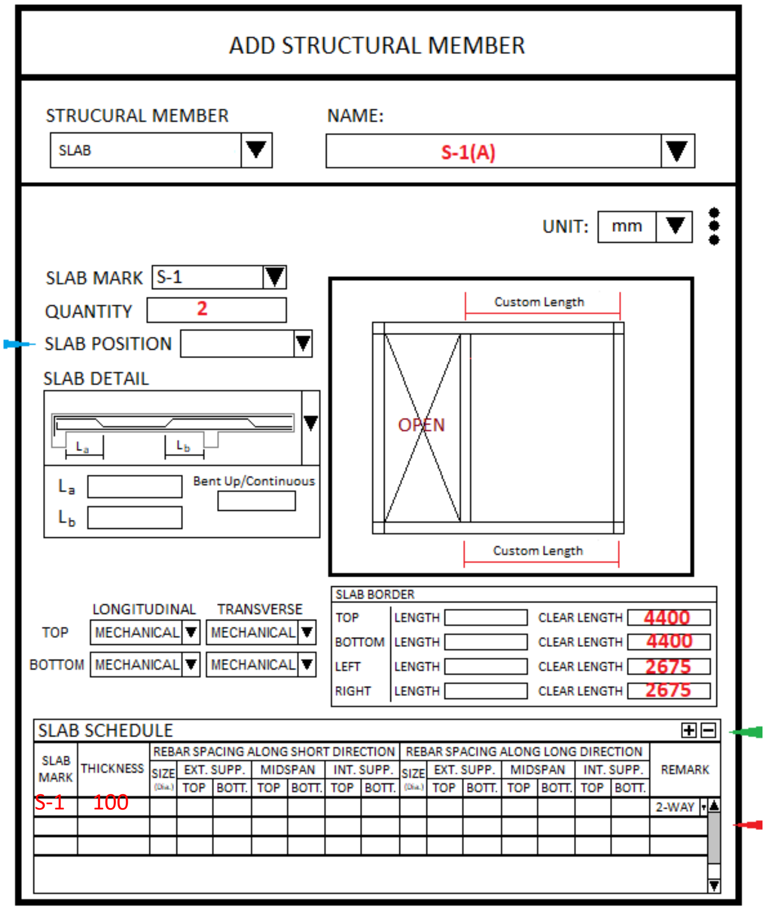
**F.S. 5%=** 52.25 **m3 x 5% = 2.6125 m3 x 4910 = P 12,827.38**

Labor cost = P450.00 /m3 = 52.25m3 x 450.00 = **P 23,512.50**

**Hanging or Suspended Slab (2nd floor to 4th floor)**

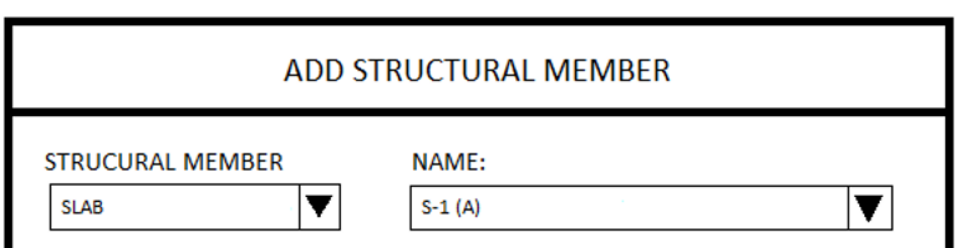
**S-1 (A) @ 2 sets**
L TOP: 4400mm
W LEFT: 2675mm
T: 100mm

V = 4.4 x 2.675 x .100 =1.177 m3 x 2 = **2.354 m3**



**S-1 (B) @ 10 sets**
L TOP: 4100mm
W LEFT: 2800mm
T: 100mm

V = 4.1 x 2.800 x .100 =1.148 m3 x 10 = 11.48 m3



S-1(B)

10

4100

4100

2800

2800

S-1 100

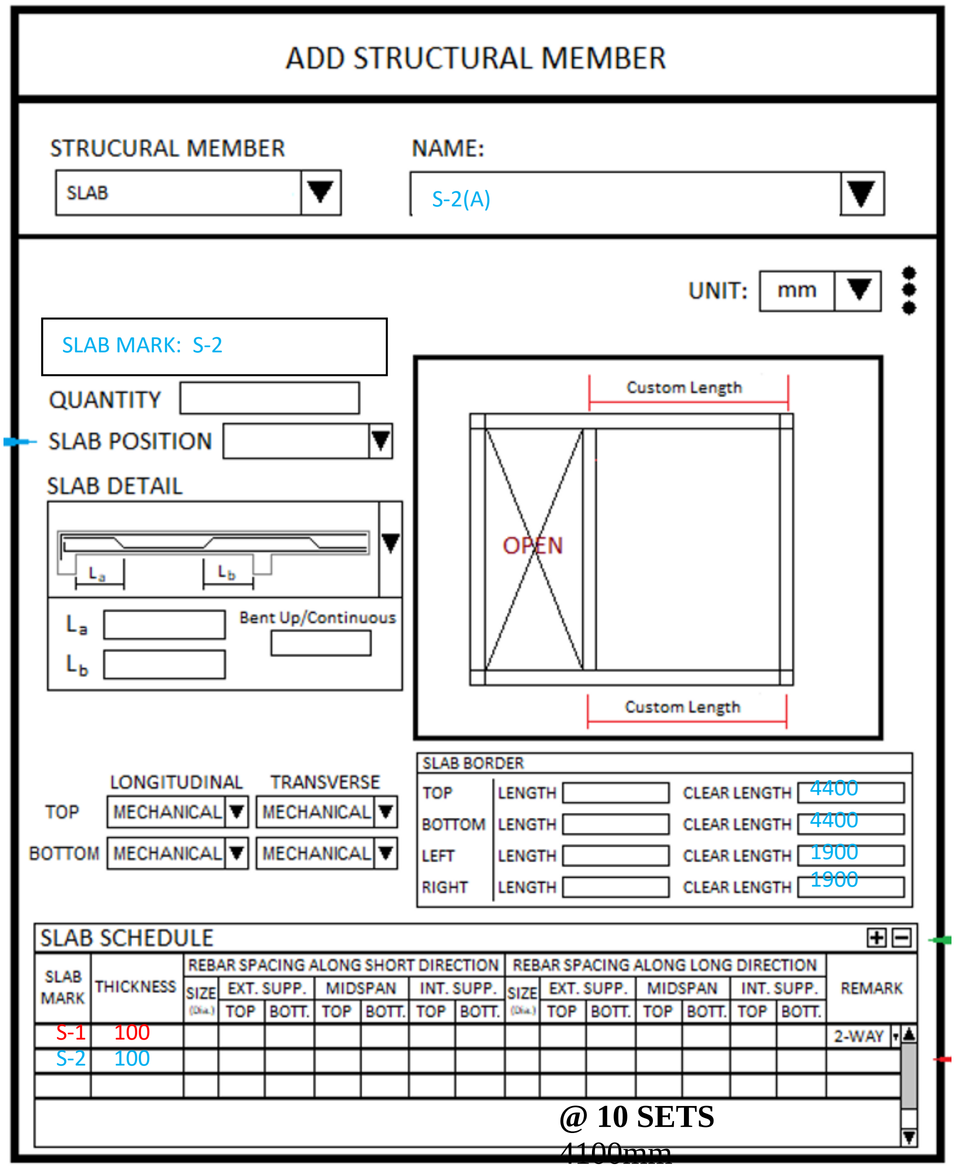
**S-1 (C) @ 10 sets**
L TOP: 4100mm
W LEFT: 3350mm
T: 100mm

V = 4.1 x 3.35 x .100 = 1.3735 m3 x 10 = 13.735 m3

volume = 2.354 + 11.48 + 13.735 = **27.569** m3

**S-2 (A) @ 2 SETS**
L TOP: 4400mm
W LEFT: 1900 mm
T: 100mm

Volume = 4.4 x 1.9 x 0.1 x 2 = **1.672 m3**



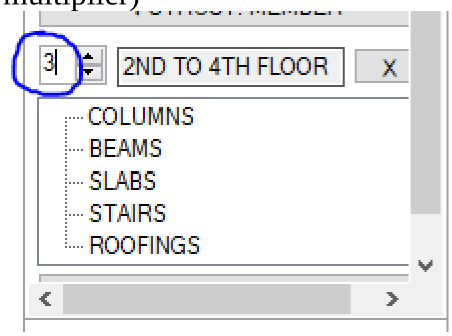

**S-2 (A) @ 10 SETS**
L TOP: 4100mm
W LEFT: 1900 mm
T: 100mm
V= 4.1 x 1.9 x .1 x 10 = **7.79 m3**

**S-3 (A) @ 2 SETS**

L TOP: 1250mm
W LEFT: 3475mm
T: 100mm

V = 1.25 x 3.475 x .100 = 0.434375 m3 x 2 = **0.86875 m3**

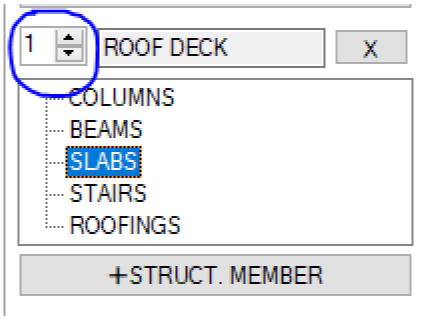
V= 37.899 m3 (single floor, 2$^{nd}$ floor. Since 2$^{nd}$ floor to 4$^{th}$ floor is the same, use multiplier)




**VOLUME SUSPENDED SLAB (FLOOR 2-4) =** 37.899 x 3 =**113.7 m3**

**ROOF DECK**
**S-1 (A) @ 2 SETS**
L: 4400 mm
W: 2675 mm
T: 100mm

V= 4.4 x 2.675 x 0.1 x2 = **2.354 m3**




**VOLUME TOTAL = 116.054 m3**

CONCRETE: 116.054 m3 @ 4000psi (P 4910.00 / m3) **= P 569,825.14**

F.S. 5%=116.054 m3 x 5% = 5.8027 m3 x 4910 **= P28,491.257**

Labor cost = P450.00 /m3 = 116.054 m3 x 450.00 = **P52,224.30**