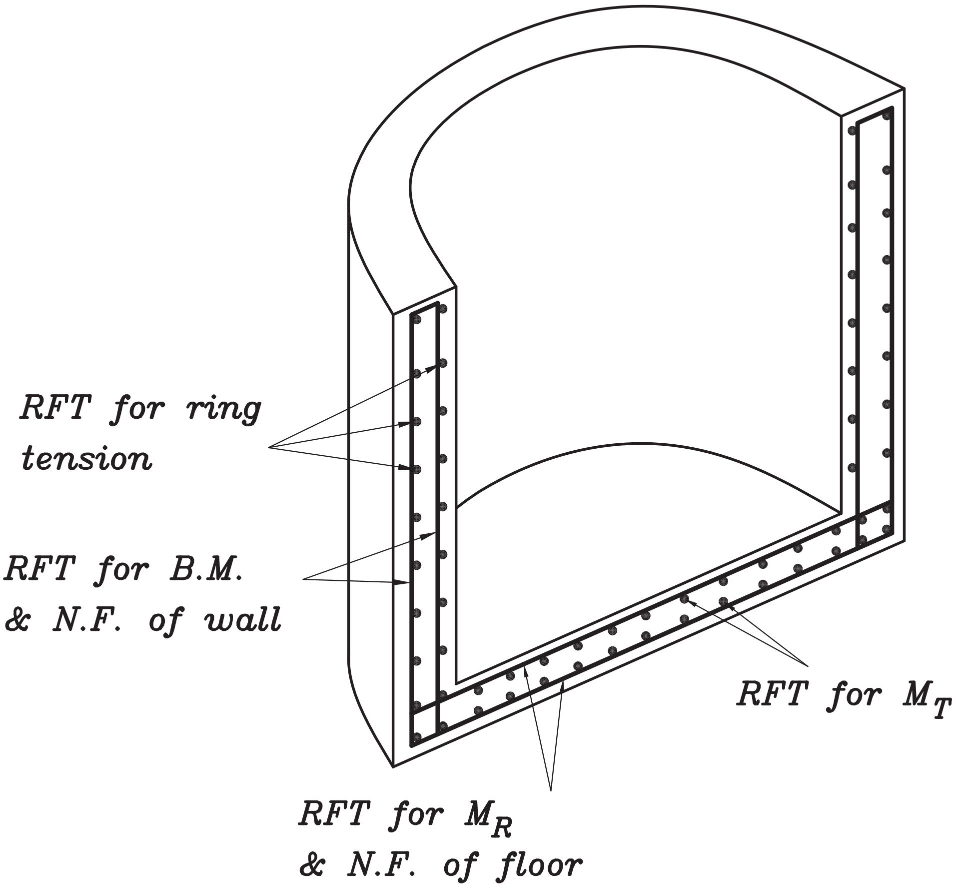
– Design of sections



VL. RFT. of wall designed for B.M. & N.F.

HZ. RFT. of wall designed for ring tension

Radial direction of floor designed for M_R & N.F.

Tangential direction of floor designed for M_T

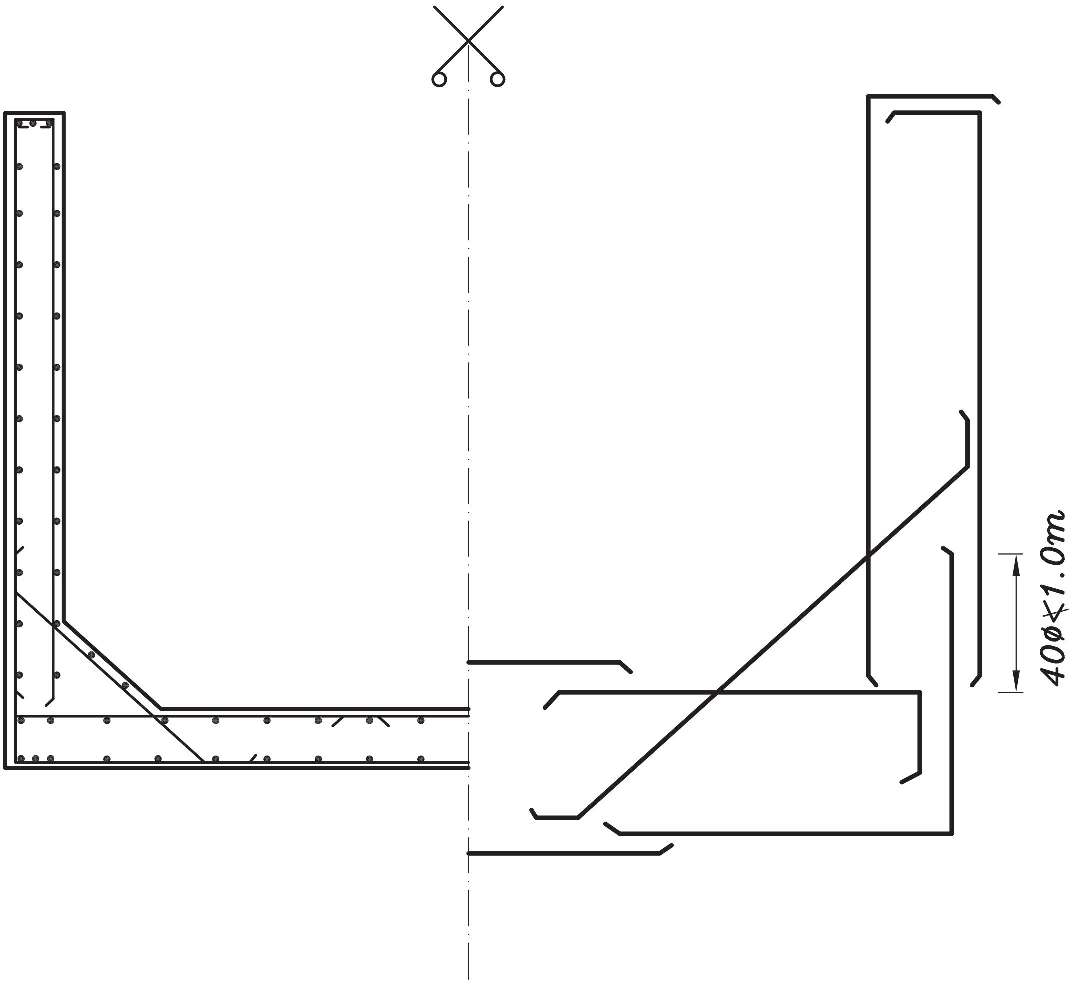
عدد الاسياخ يتراوح من (٥-١٠) اسياخ فى المتر .

$$A_{s_{min}} = \begin{cases} 5\phi 12/m \text{ for main steel (at tension side)} \\ 5\phi 10/m \text{ for secondary steel (at compression side)} \end{cases}$$

– *Details of RFT.*

VL. strips

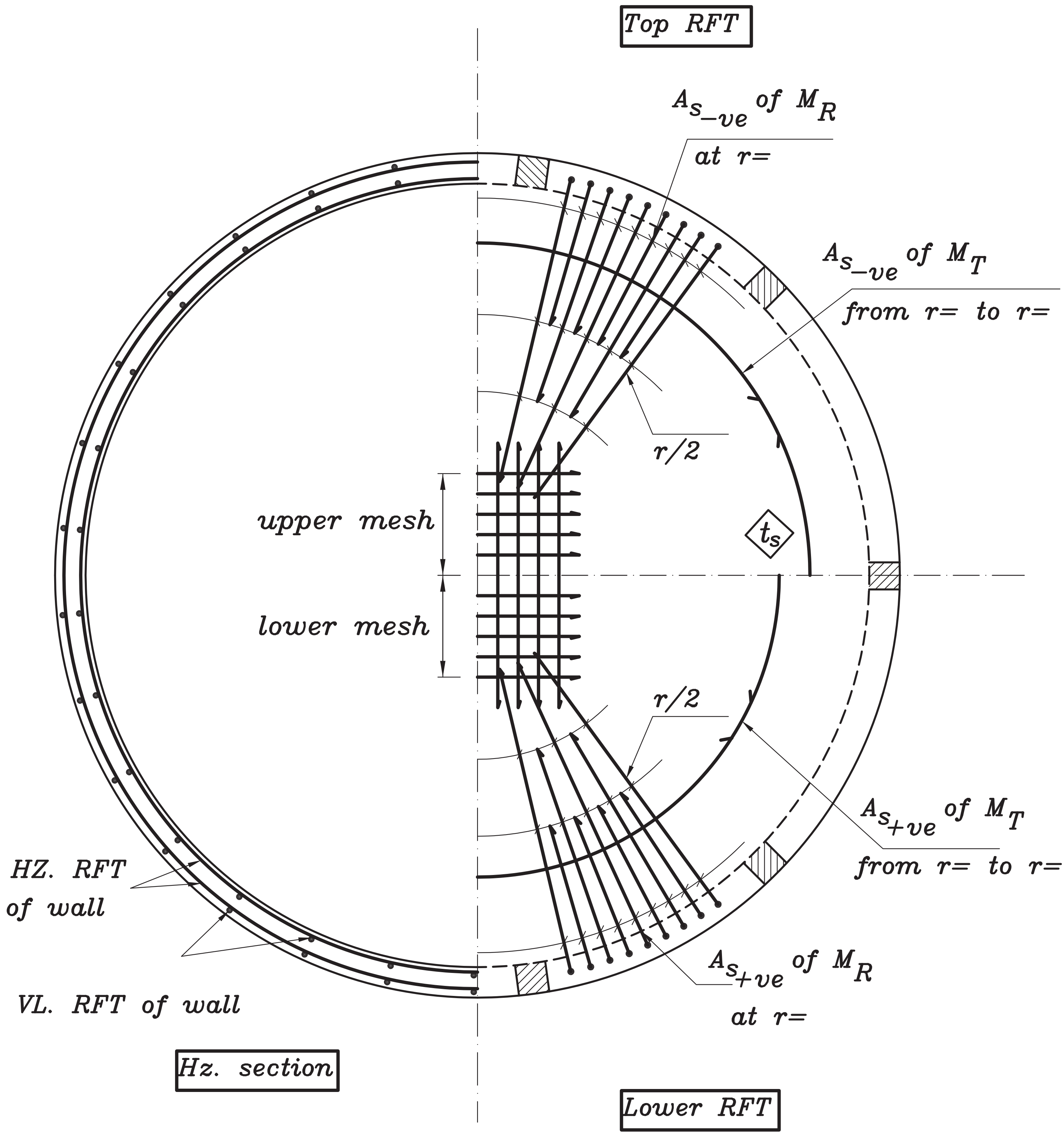
نفس تفاصيل تسليح الشرائح الراسية فى الخزانات الـ *(elevated & rested)*



HZ. plan

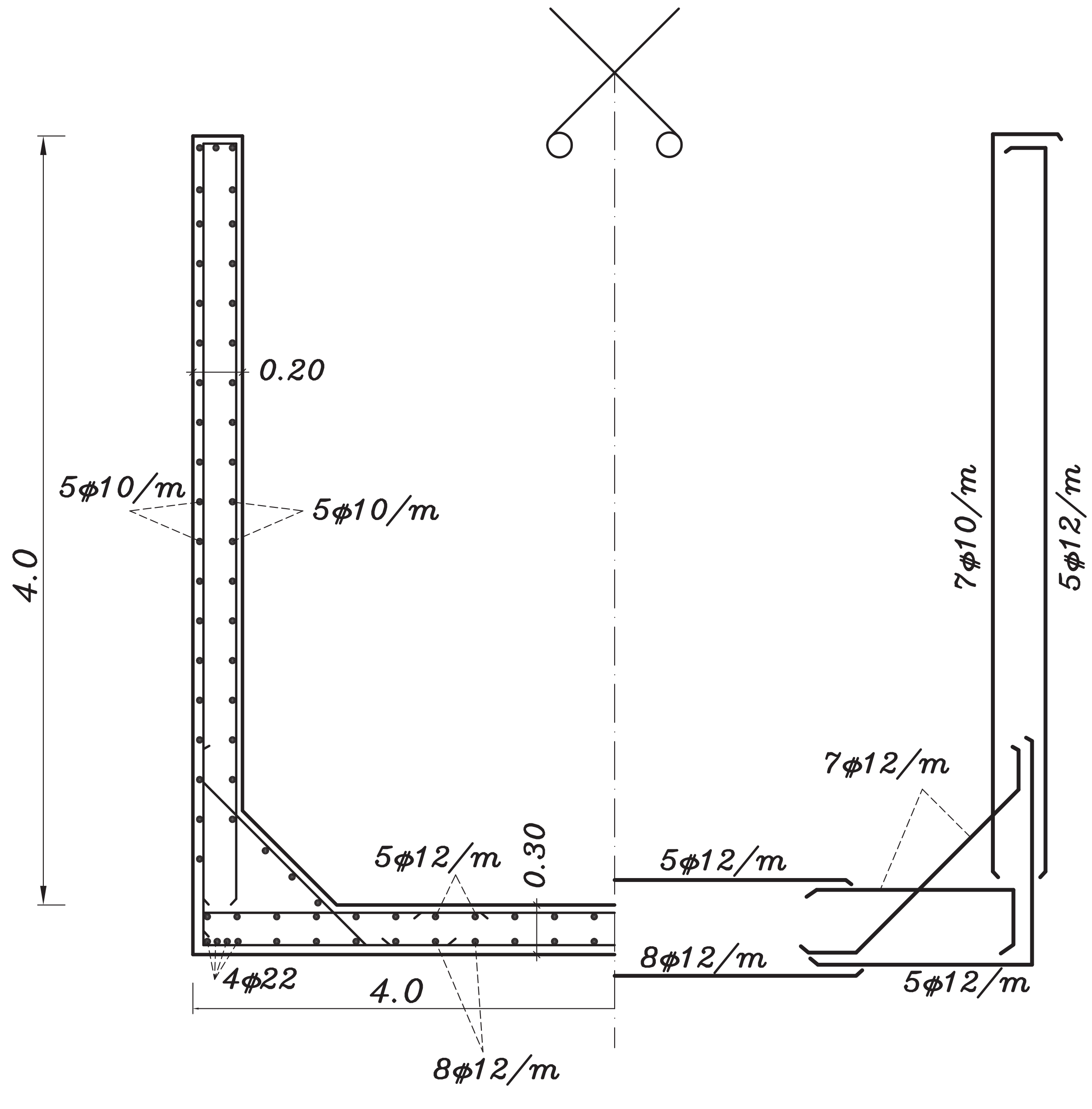
نرسم $(\frac{1}{4}\ plan)$ ونبين عليه الحديد السفلى و $(\frac{1}{4}\ plan)$ ونبين عليه الحديد العلوى

و نرسم $(\frac{1}{2}\ hz.\ section)$ ونبين عليه التسليح الراسى و الافقى للحائط.

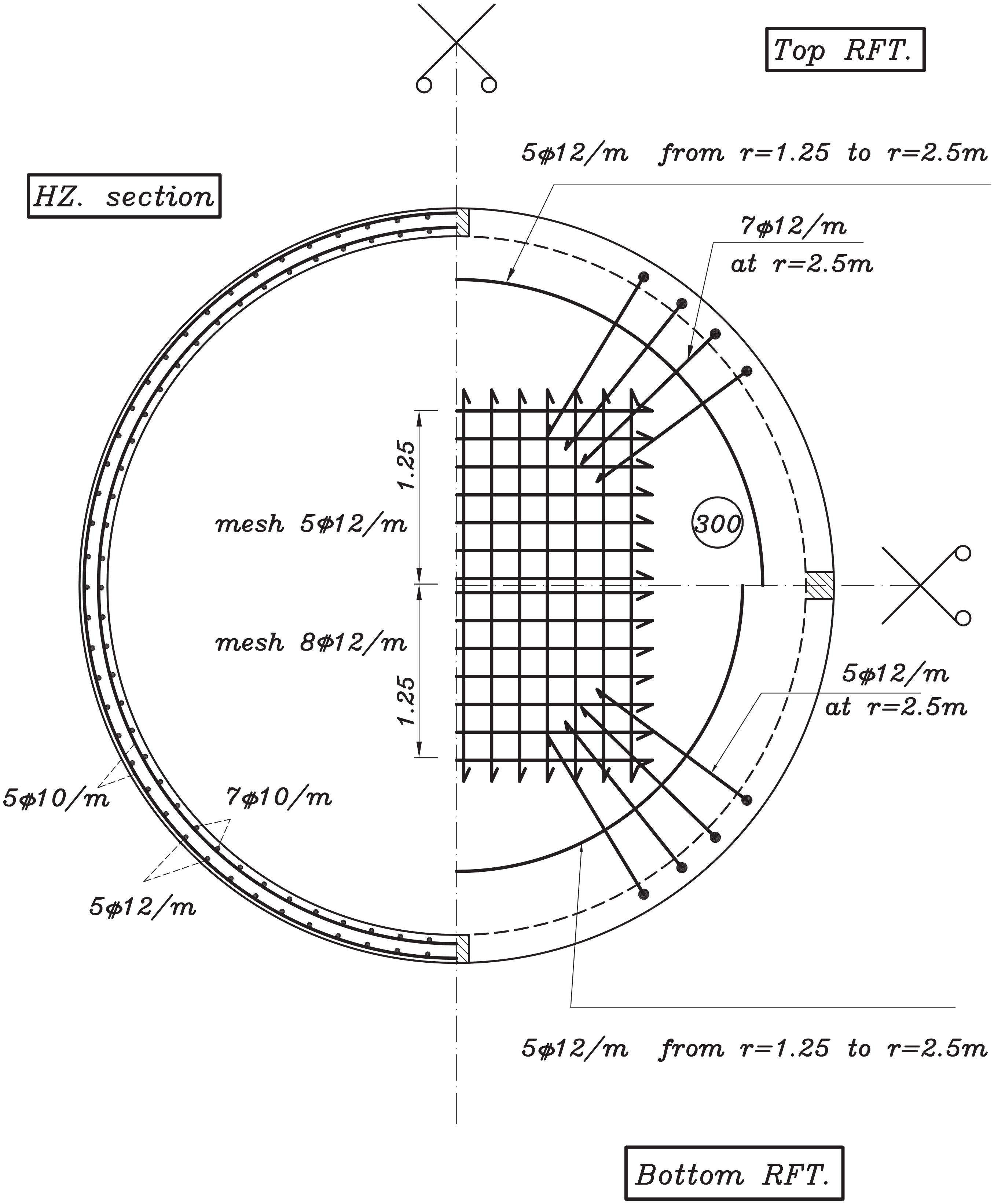


Top RFT
$A_{s_{-ve}}$ of M_R
at r=
$A_{s_{-ve}}$ of M_T
from r= to r=
r/2
upper mesh
t_s
lower mesh
r/2
$A_{s_{+ve}}$ of M_T
from r= to r=
HZ. RFT
of wall
$A_{s_{+ve}}$ of M_R
at r=
VL. RFT of wall
Hz. section
Lower RFT

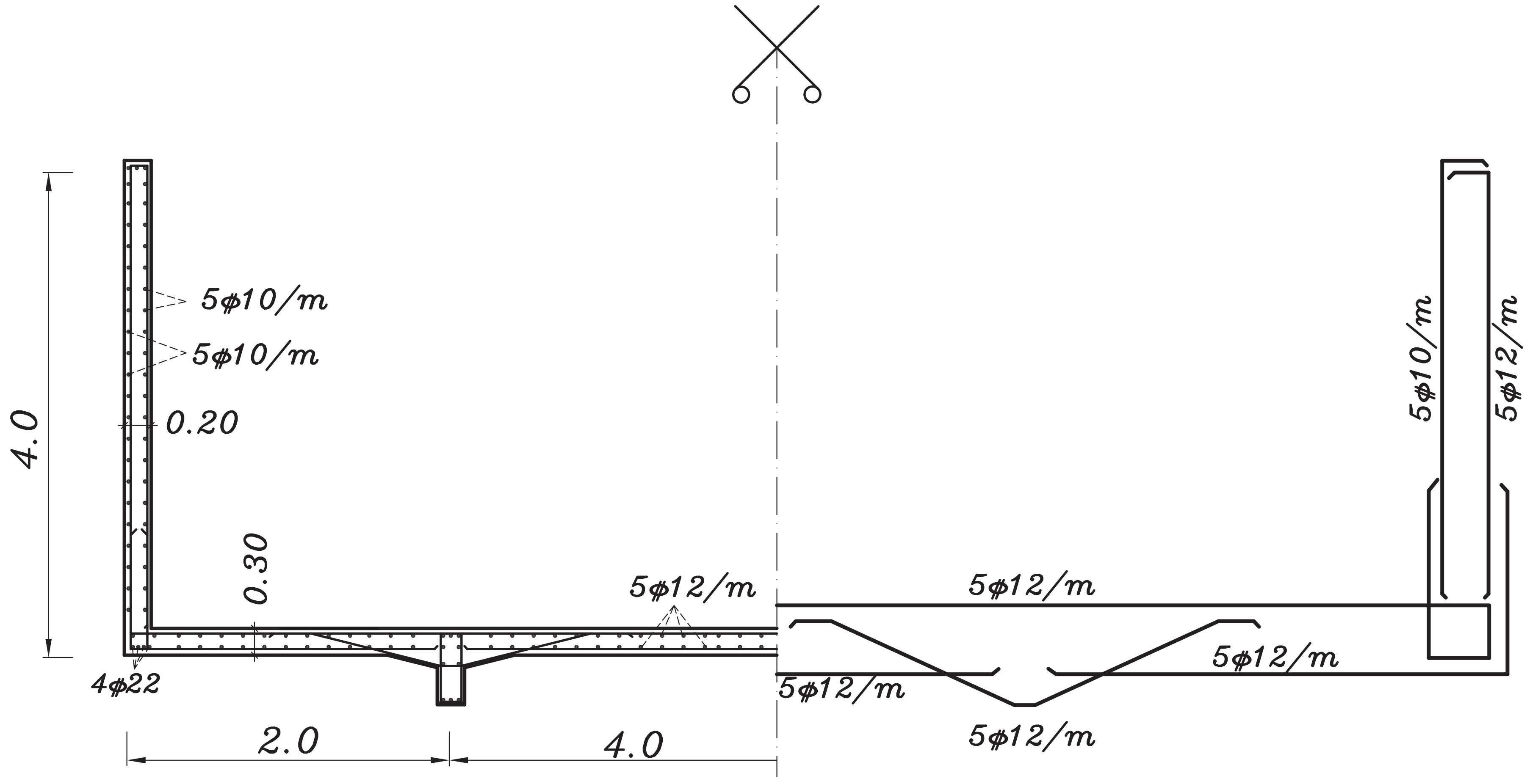
Details of RFT.



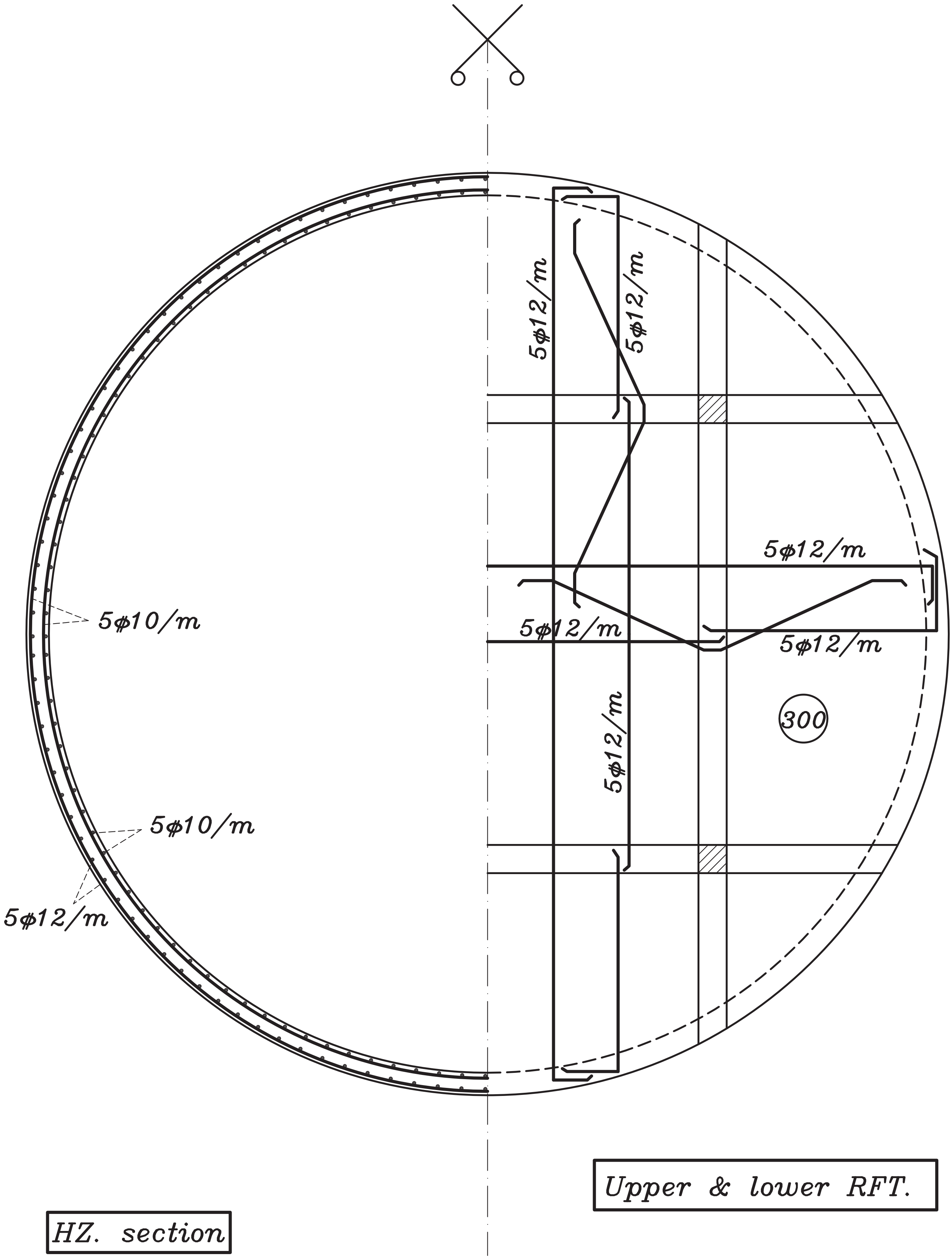
VL. strip


Top RFT.
5φ12/m from r=1.25 to r=2.5m
HZ. section
7φ12/m
at r=2.5m
1.25
mesh 5φ12/m
300
mesh 8φ12/m
1.25
5φ12/m
at r=2.5m
5φ10/m
7φ10/m
5φ12/m
5φ12/m from r=1.25 to r=2.5m
Bottom RFT.

Details of RFT.

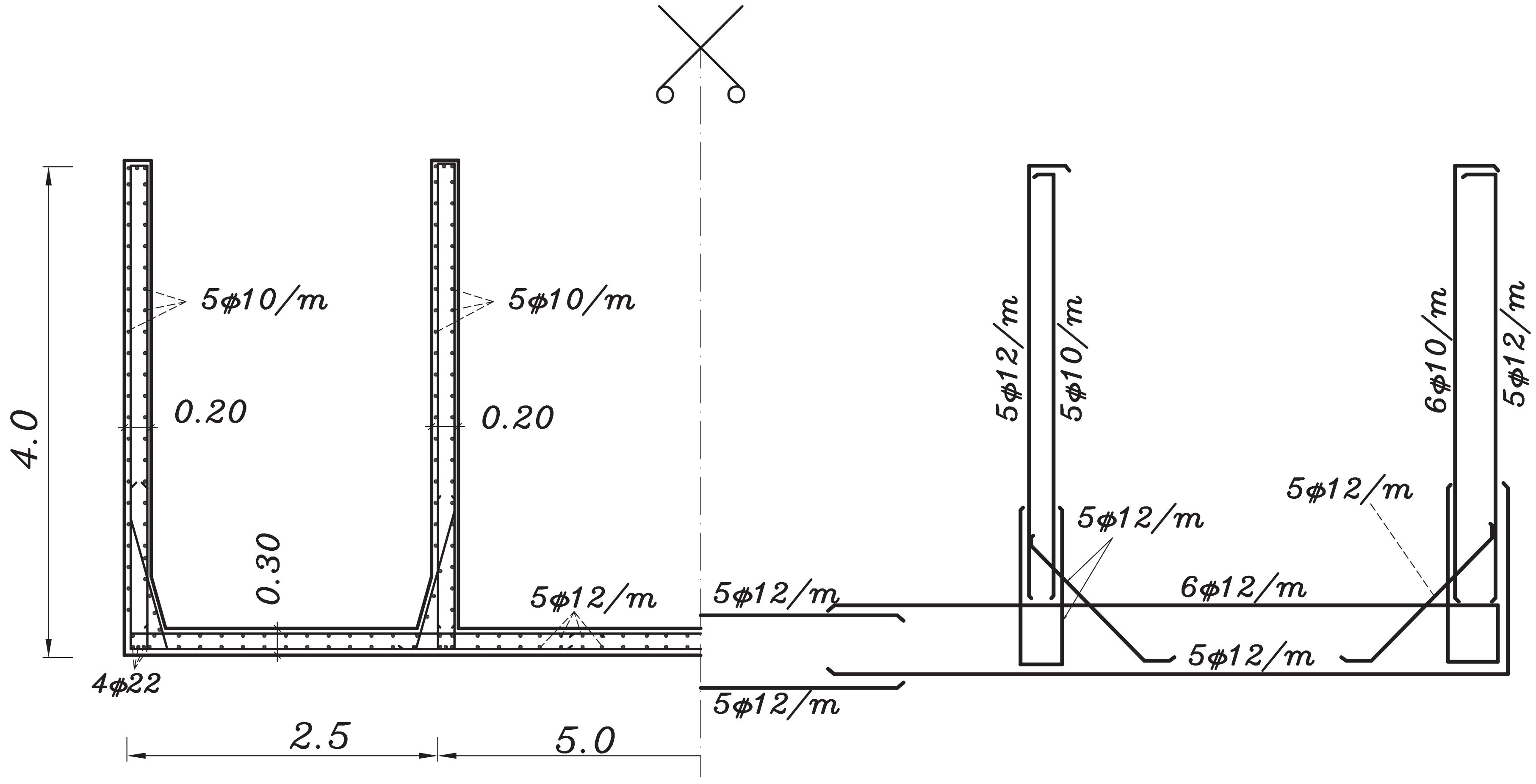


VL. strip



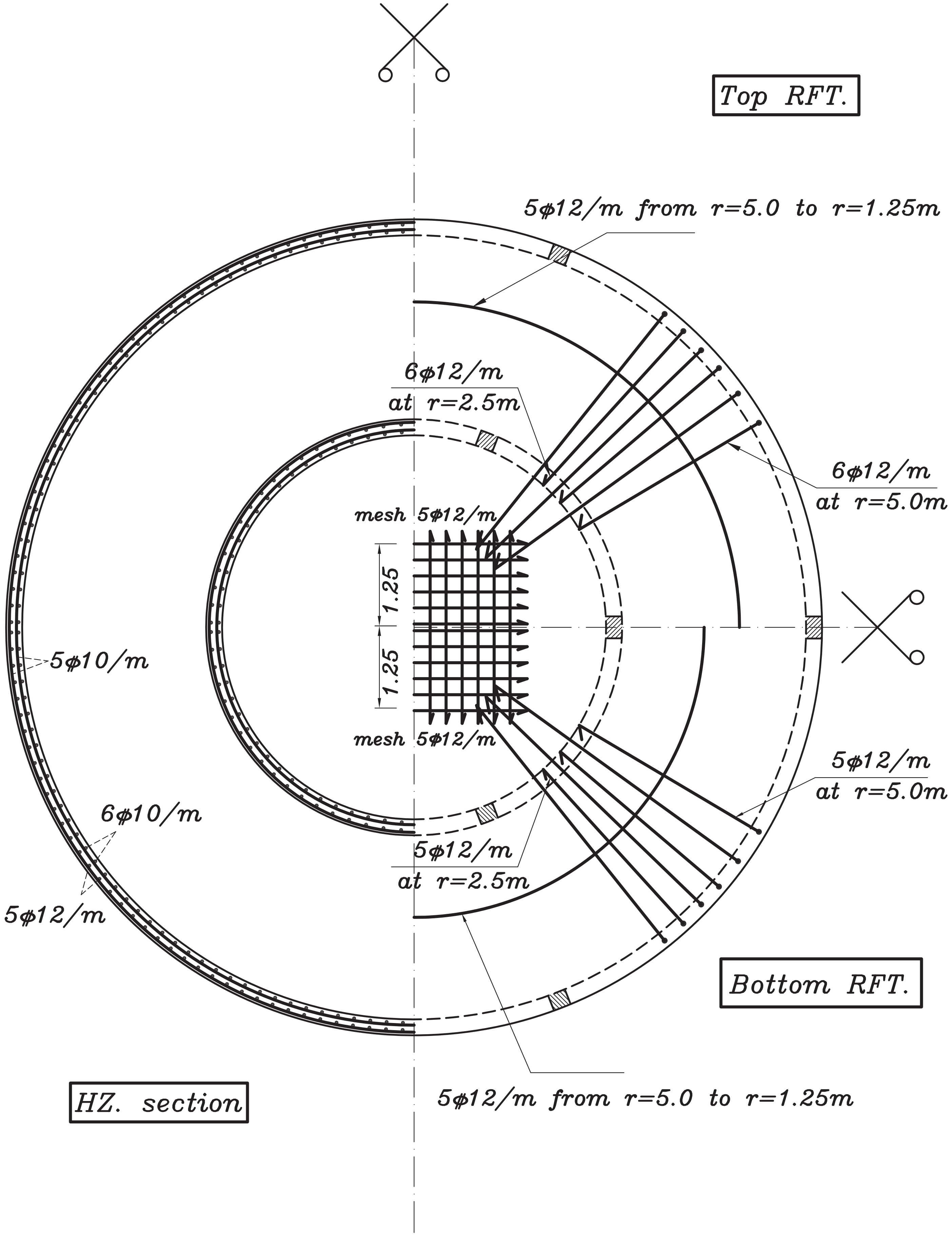
By Eng. Ezz El-Din Mostafa ٢٠٠٨

Details of RFT.



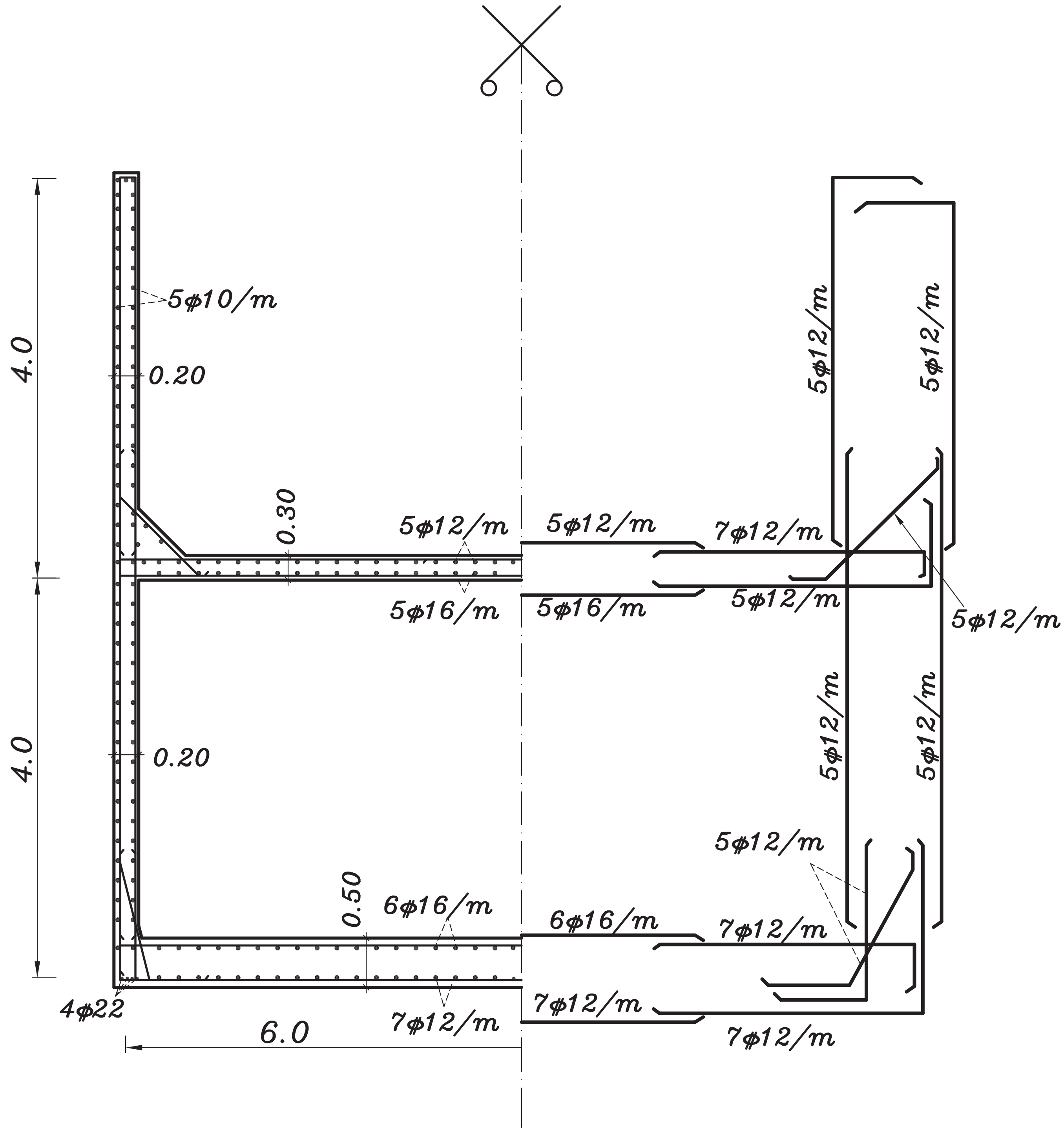
VL. strip

By Eng. Ezz El-Din Mostafa ٢٠٠٨

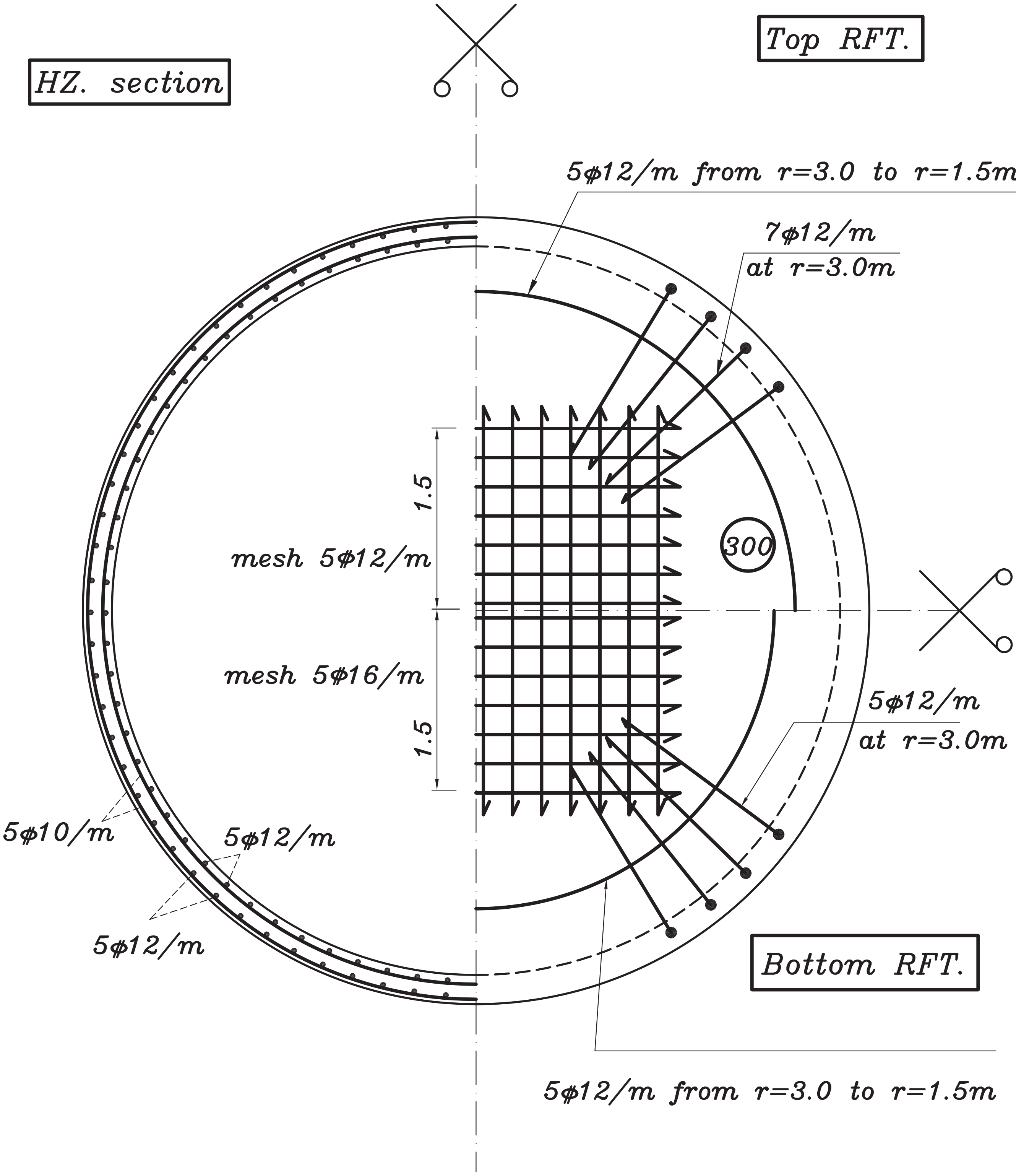


Top RFT.
5φ12/m from r=5.0 to r=1.25m
6φ12/m
at r=2.5m
6φ12/m
at r=5.0m
mesh 5φ12/m
1.25
1.25
5φ10/m
mesh 5φ12/m
5φ12/m
at r=5.0m
6φ10/m
5φ12/m
at r=2.5m
5φ12/m
Bottom RFT.
HZ. section
5φ12/m from r=5.0 to r=1.25m

Details of RFT.

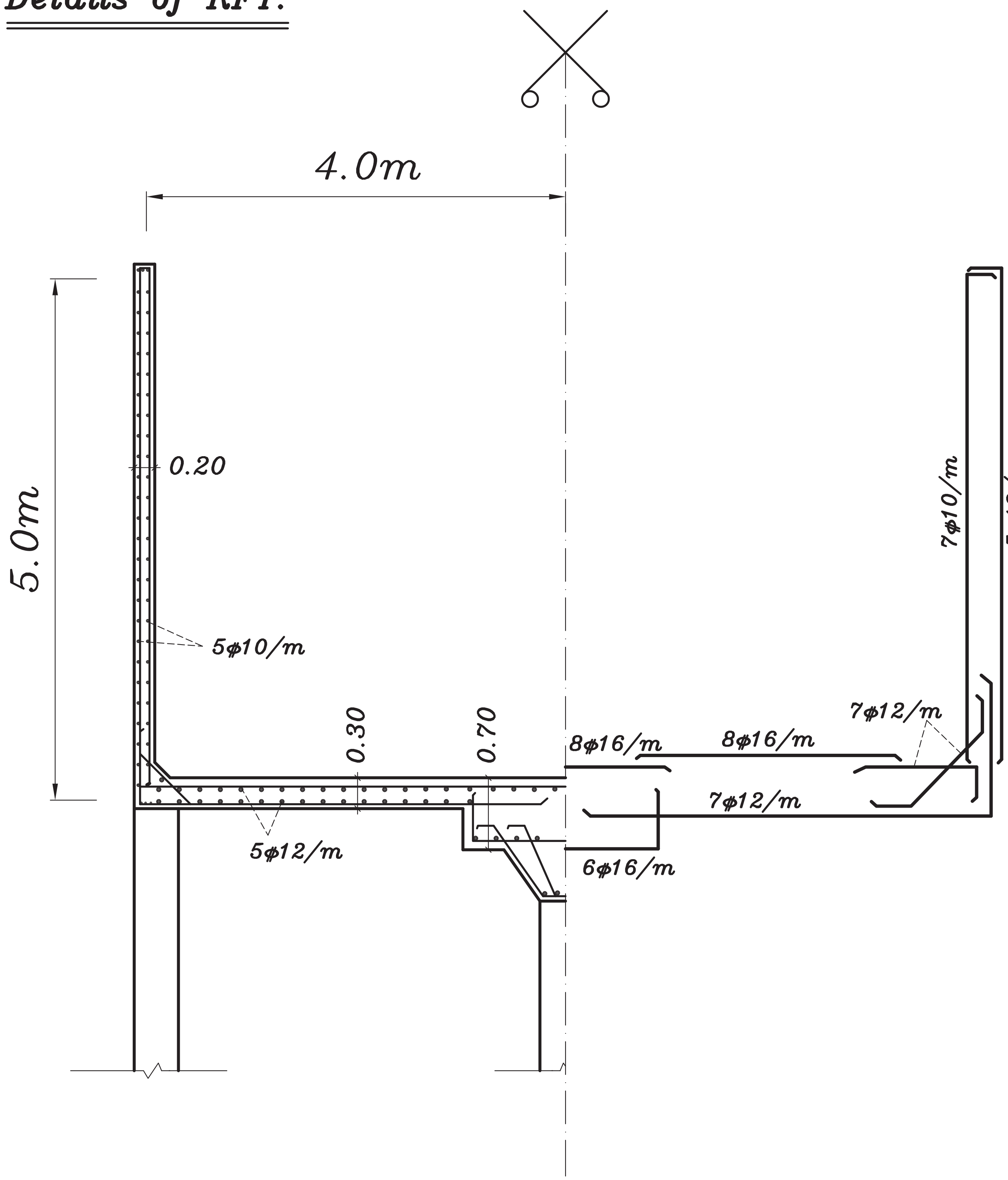


VL. strip

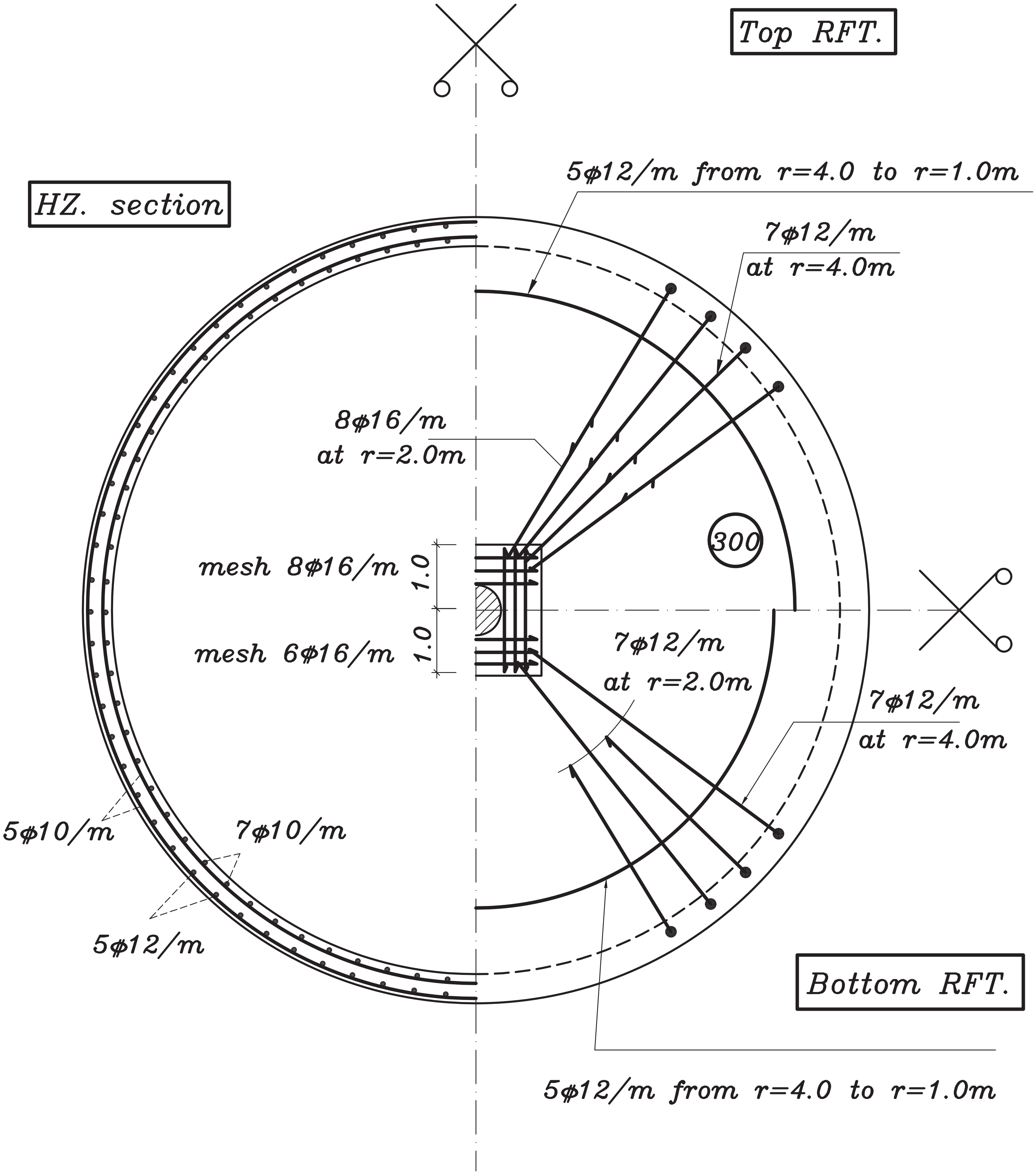


Plan of upper slab

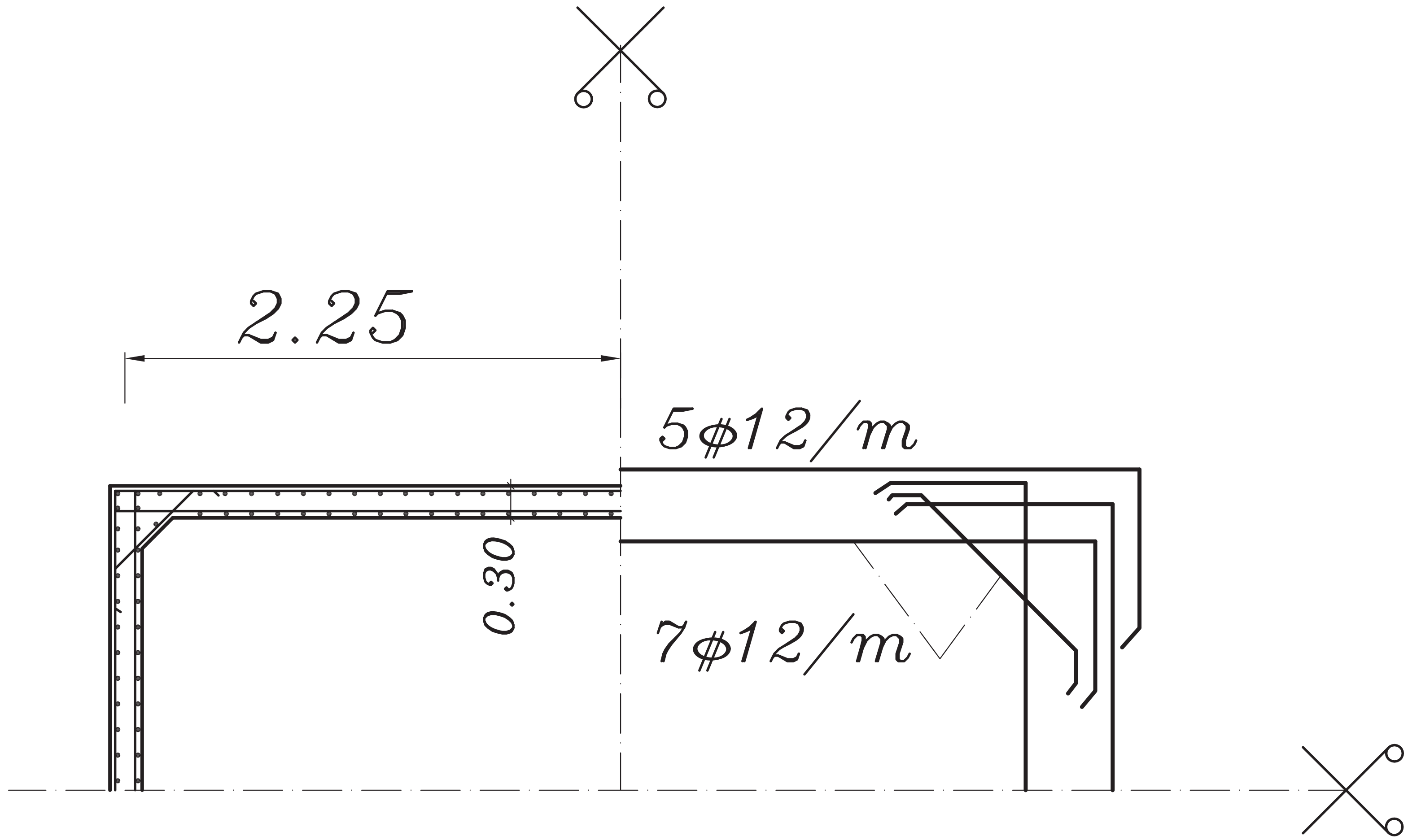
Details of RFT.



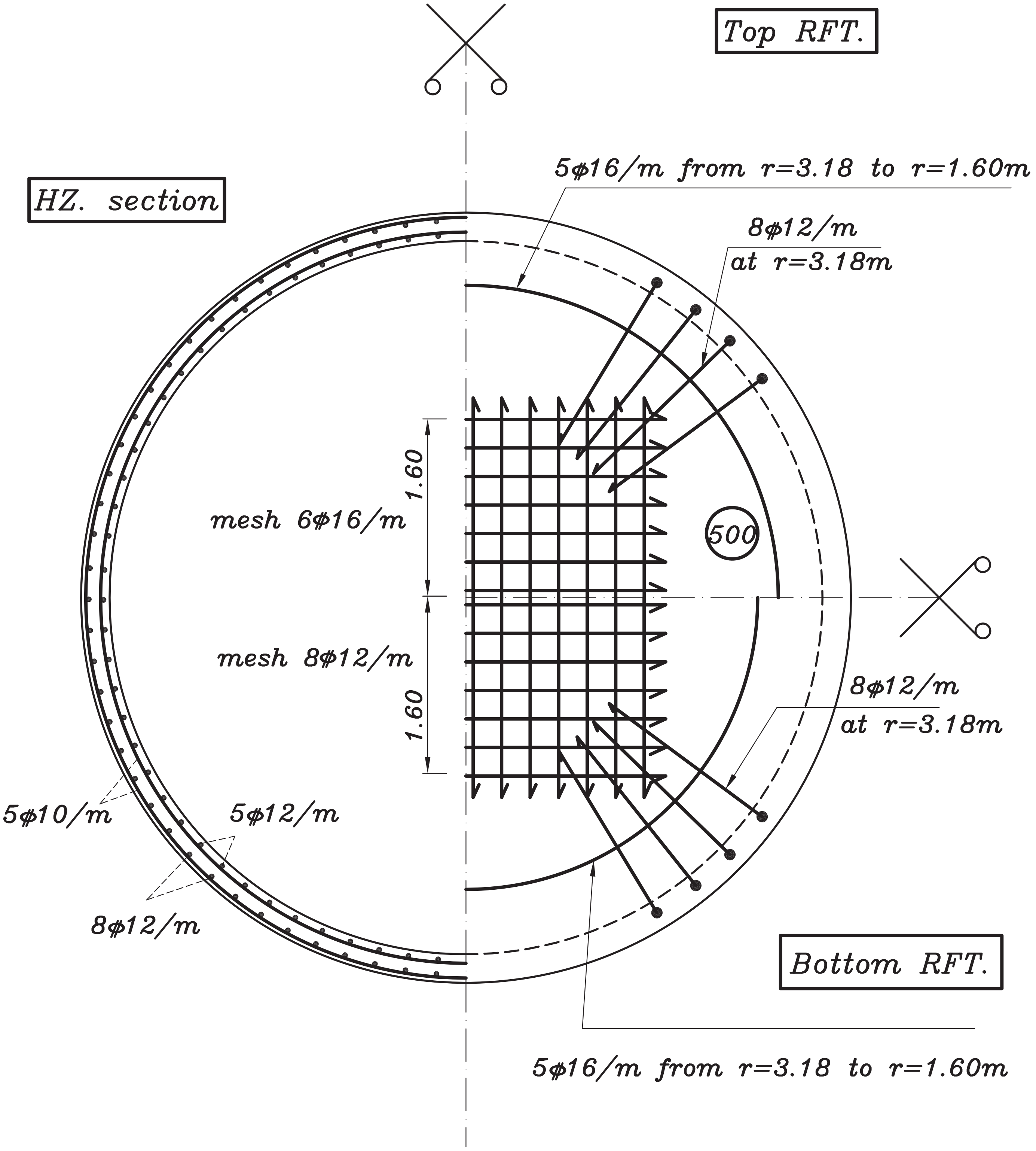
VL. strip


Top RFT.
HZ. section
5ϕ12/m from r=4.0 to r=1.0m
7ϕ12/m
at r=4.0m
8ϕ16/m
at r=2.0m
300
mesh 8ϕ16/m
1.0
mesh 6ϕ16/m
1.0
7ϕ12/m
at r=2.0m
7ϕ12/m
at r=4.0m
5ϕ10/m
7ϕ10/m
5ϕ12/m
Bottom RFT.
5ϕ12/m from r=4.0 to r=1.0m

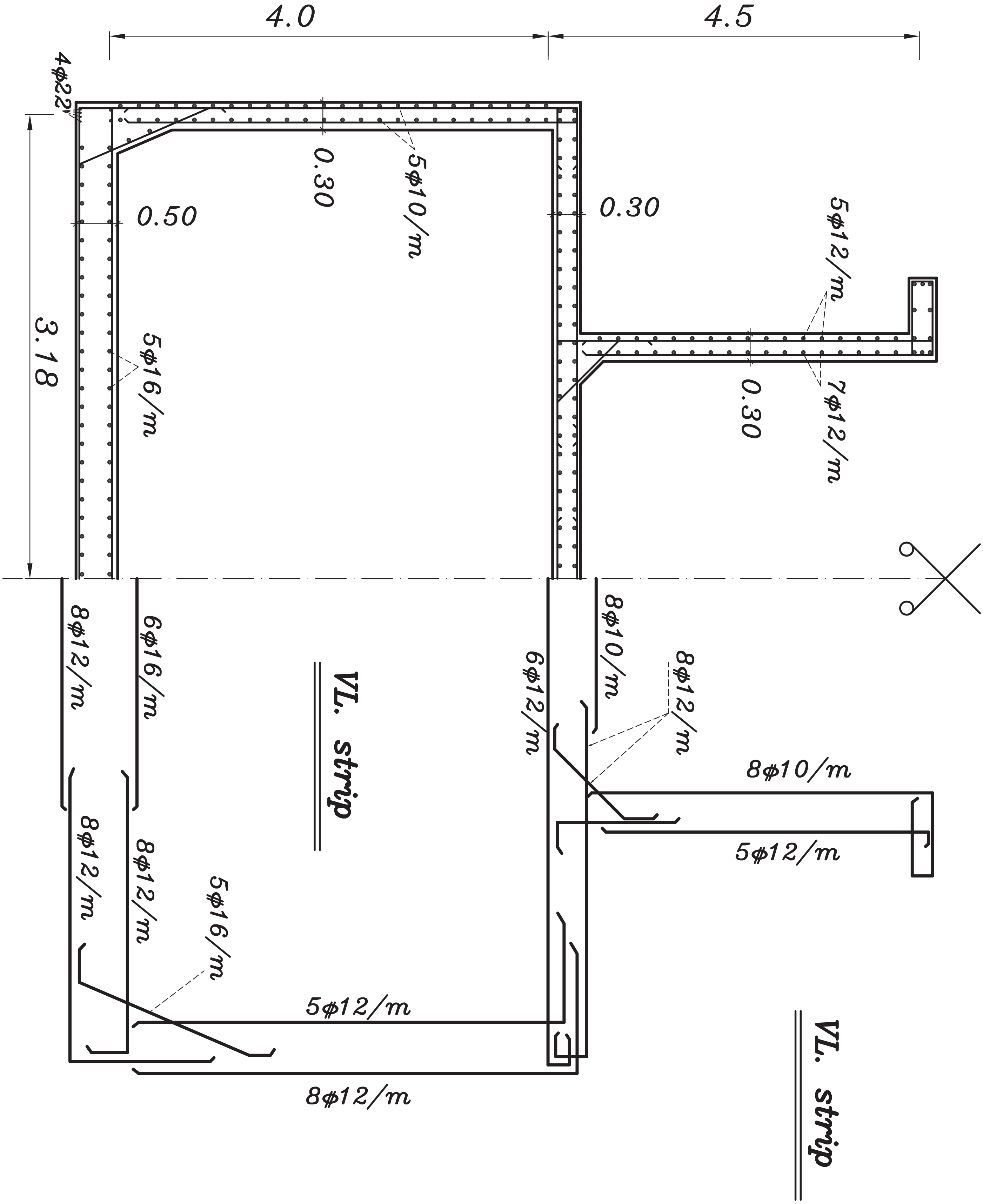
Details of RFT.



Hz. sec. at rectangular tank



Hz. sec. at circular tank


4.0
4.5
4φ22
0.30
5φ10/m
0.50
0.30
5φ12/m
3.18
5φ16/m
0.30
7φ12/m
8φ12/m
6φ16/m
VL. strip
8φ10/m
6φ12/m
8φ12/m
8φ10/m
5φ12/m
8φ12/m
8φ12/m
5φ16/m
5φ12/m
8φ12/m
VL. strip

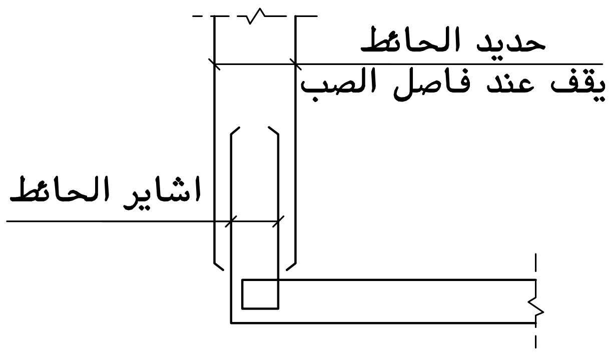
− Details of RFT.

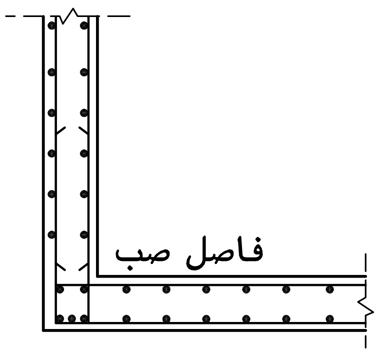
١-عدد الاسياخ يتراوح من (٥-١٠) اسياخ فى المتر .

٢-اقل كمية من الحديد توضع فى بلاطات الخزانات هى

$$A_{s_{min}} = \begin{cases} 5\phi 12/m \text{ for main steel (at tension side)} \\ 5\phi 10/m \text{ for secondary steel (at compression side)} \end{cases}$$

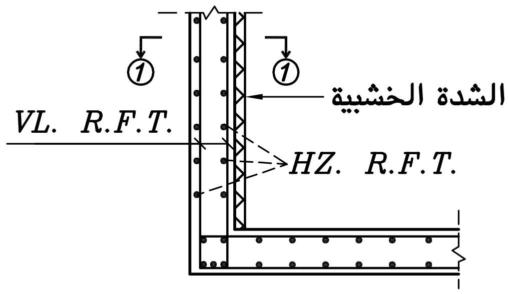
٣-يجب مراعاة مراحل صب الخزان بمعنى انه نتيجة صب ارضية الخزان اولا ثم صب الحائط بعد ذلك فان اشاير الحائط تخرج من ارضية الخزان و لا يدخل تسليح الحائط فى ارضية الخزان



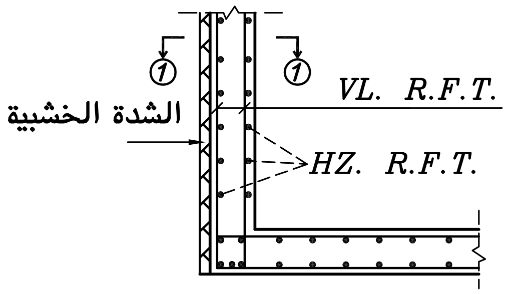


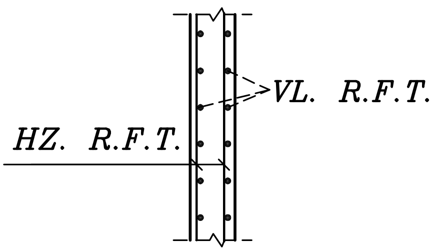
٤-يتم رص الحديد الافقى للحائط كما يلى لسهولة التنفيذ

يتم وضع الشدة ثم وضع الحديد الراسى للحائط يليه الحديد الافقى ثم يوضع الحديد الراسى فى الجهة المقابلة يليه الحديد الافقى كما يتضح من الرسم

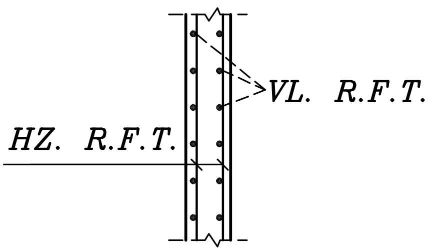


OR





HZ. sec. (1−1)



HZ. sec. (1−1)

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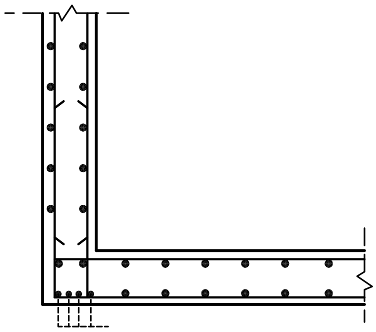
٤-يتم تركيز حديد اسفل و اعلى الحائط لان الحائط يعمل ككمرة بالنسبة للارضية .



كيفية رسم (concrete dimensions) للخزان

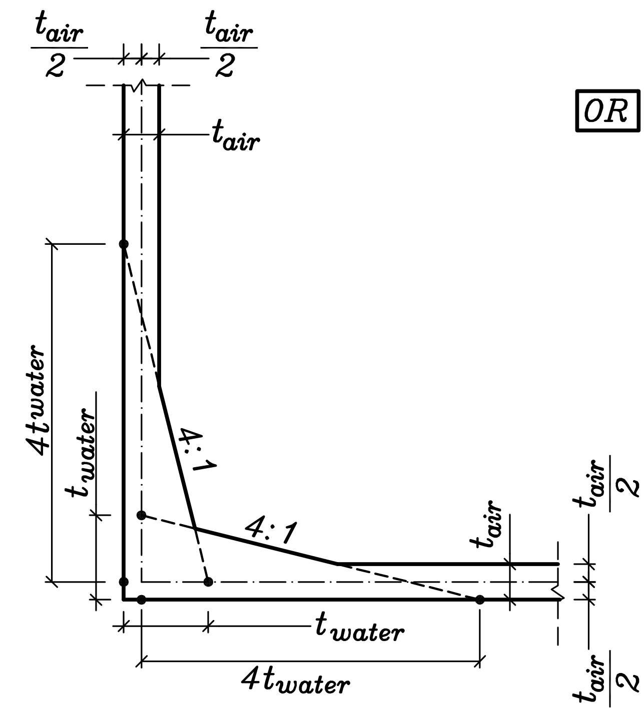
١ - نرسم (C.L.) للخزان و نوقع عليه تخانة (air sections) بحيث تكون التخانة فى منتصف ال (C.L.)

ـ ملحوظة

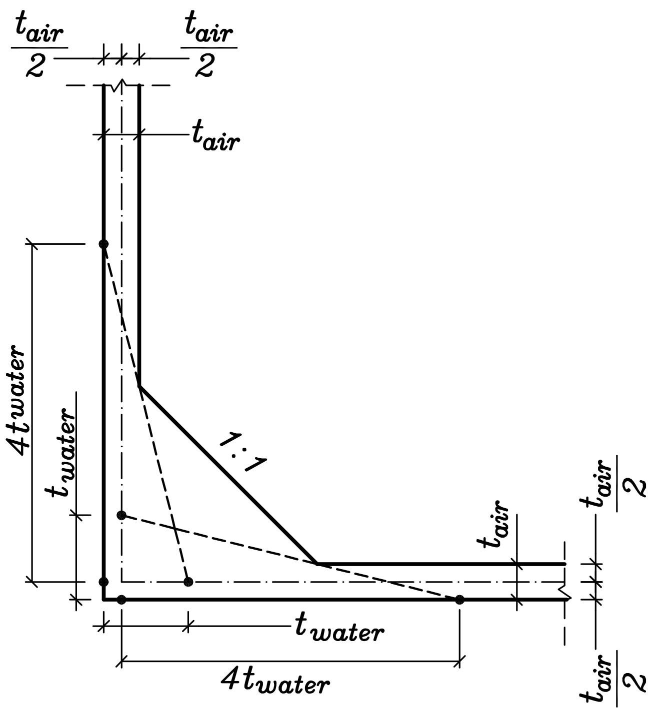
يقصد بتخانة (air sections) هى ($\frac{L_s}{16}$ or $\frac{H}{10}$ $\nless 250mm$)

٢ - نوقع تخانة (water sections) كما بالرسم و منها نرسم الخزان .

How to draw the haunch



اصعب فى التنفيذ و لكن تاخذ حجم اقل من الخزان



اسهل فى التنفيذ و لكن تاخذ حجم اكبر من الخزان

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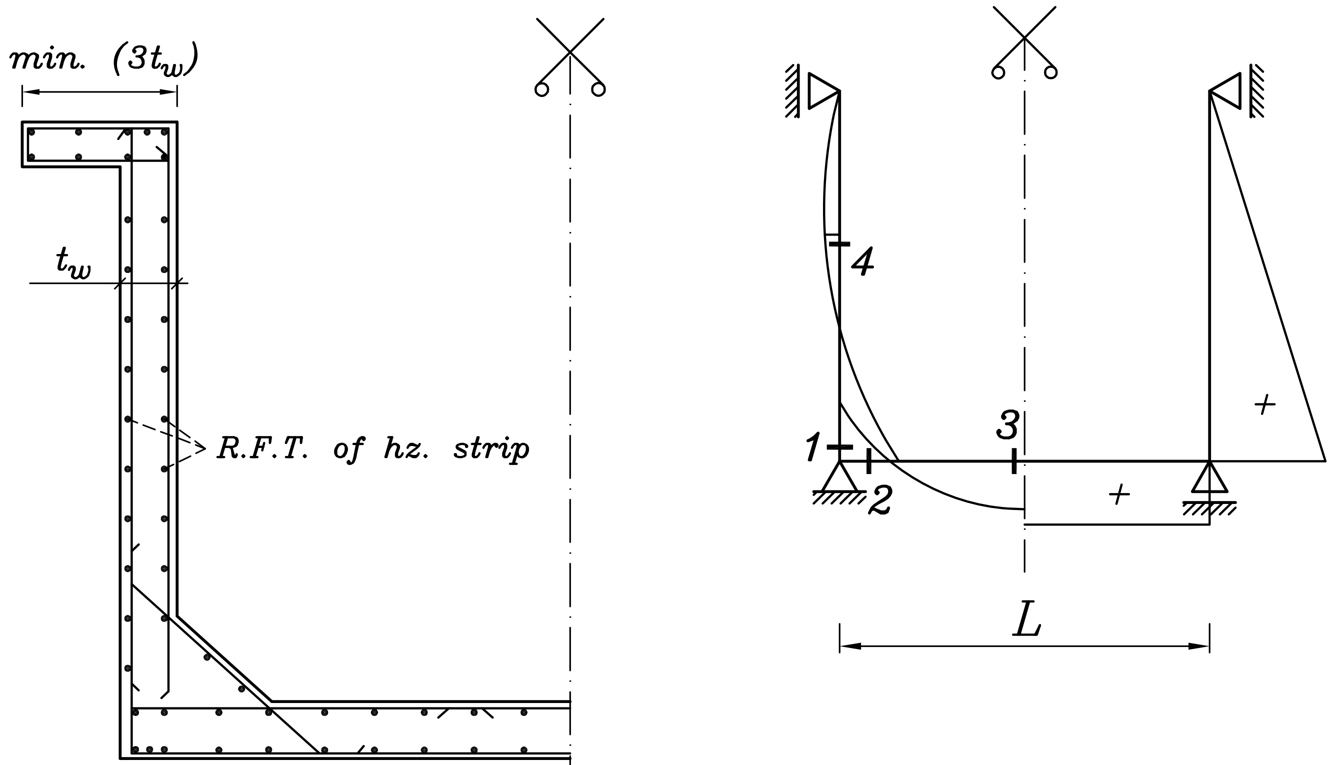
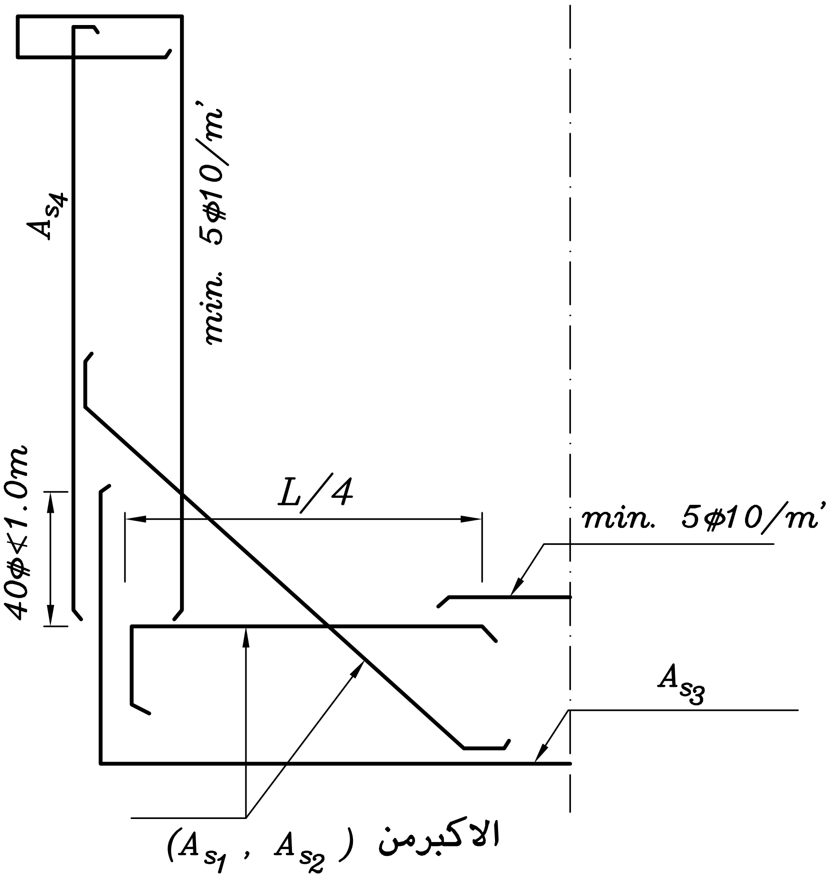
RFT. of elements of the tank

1– Walls

a– external walls





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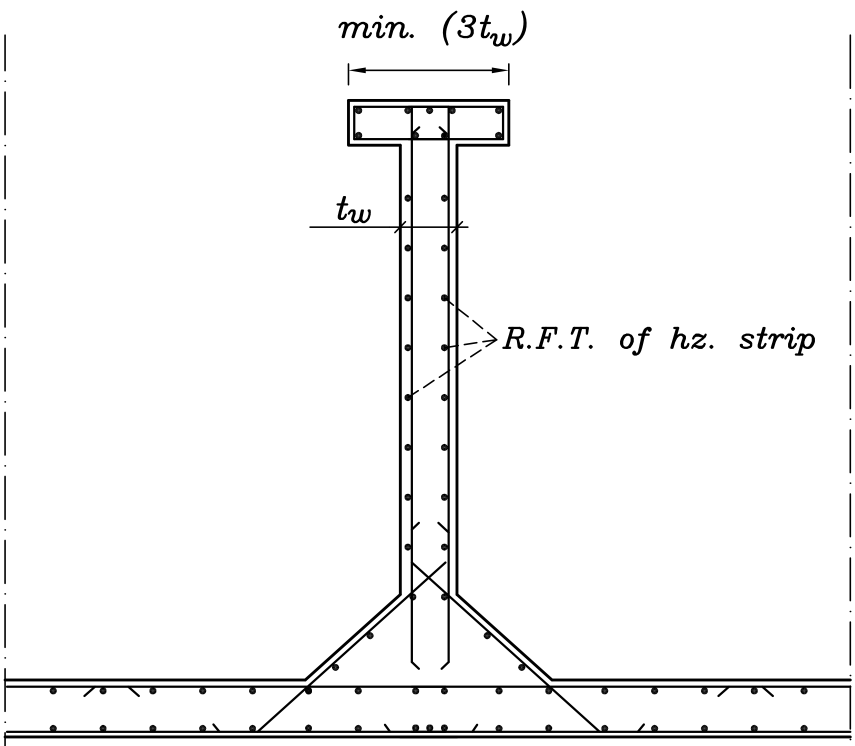
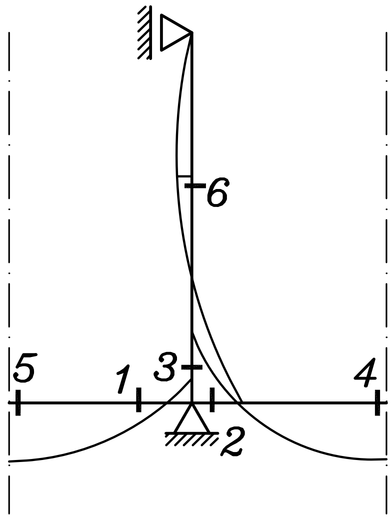
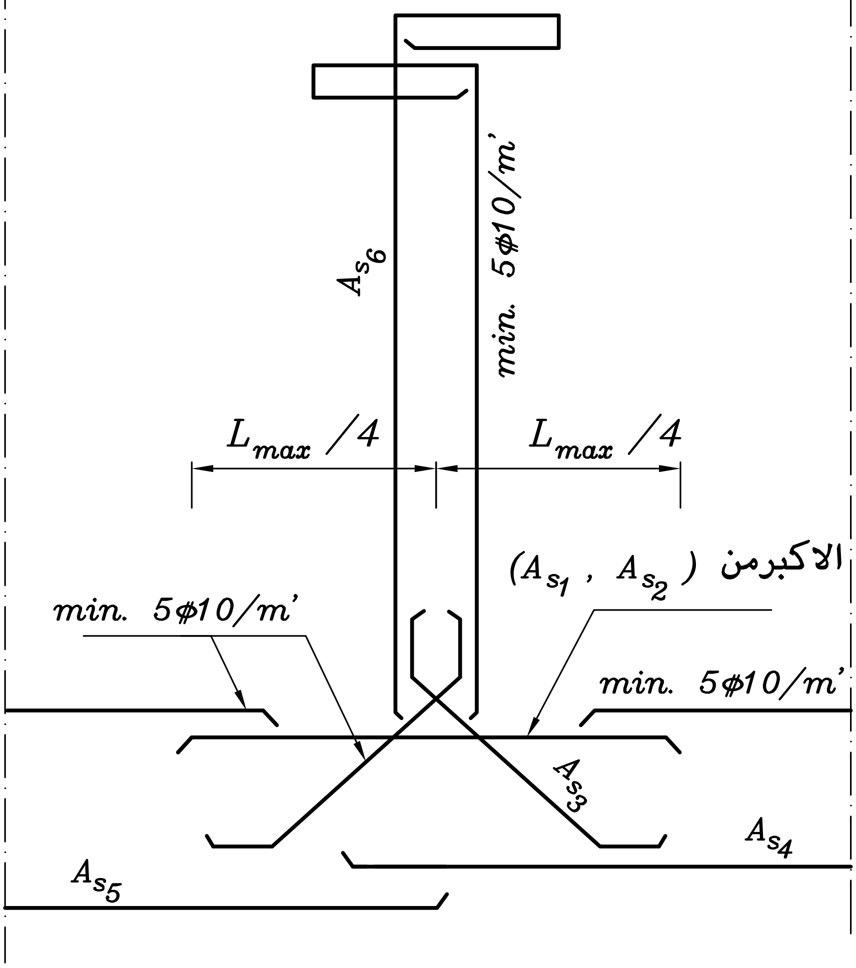
b− internal walls







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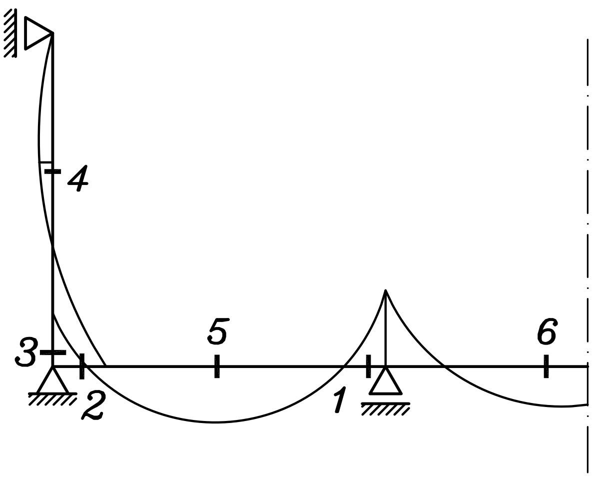
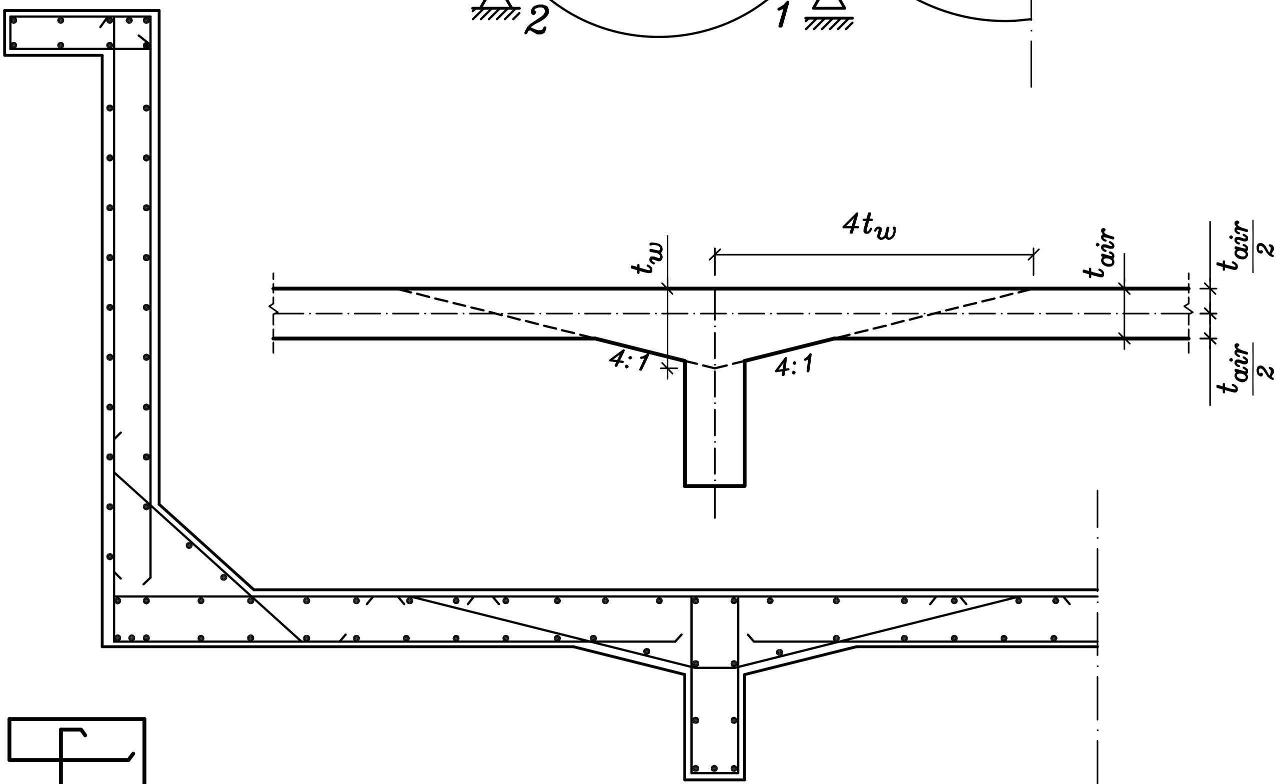
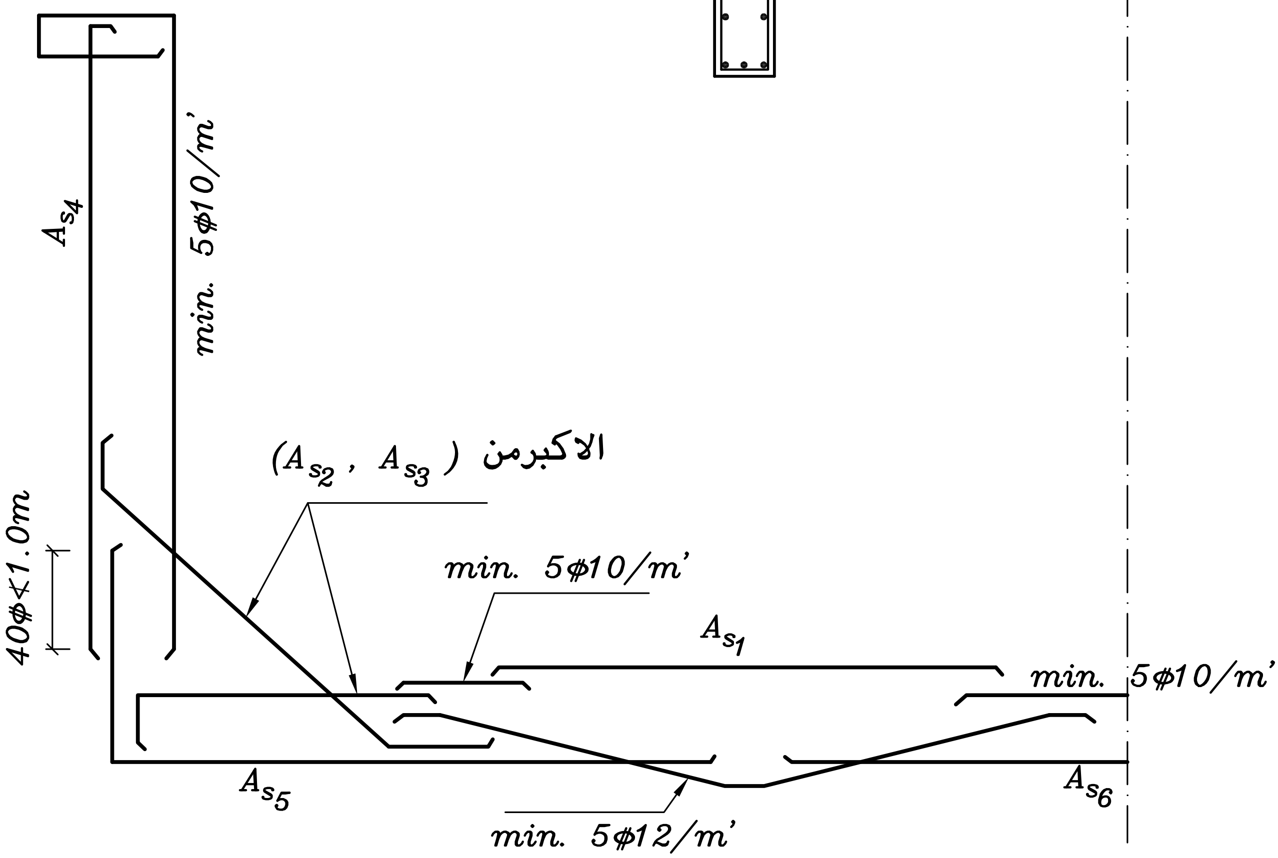
2- Floors

- Case (a)







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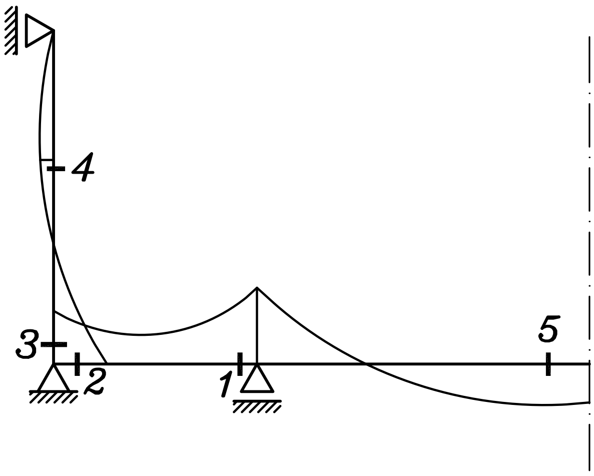
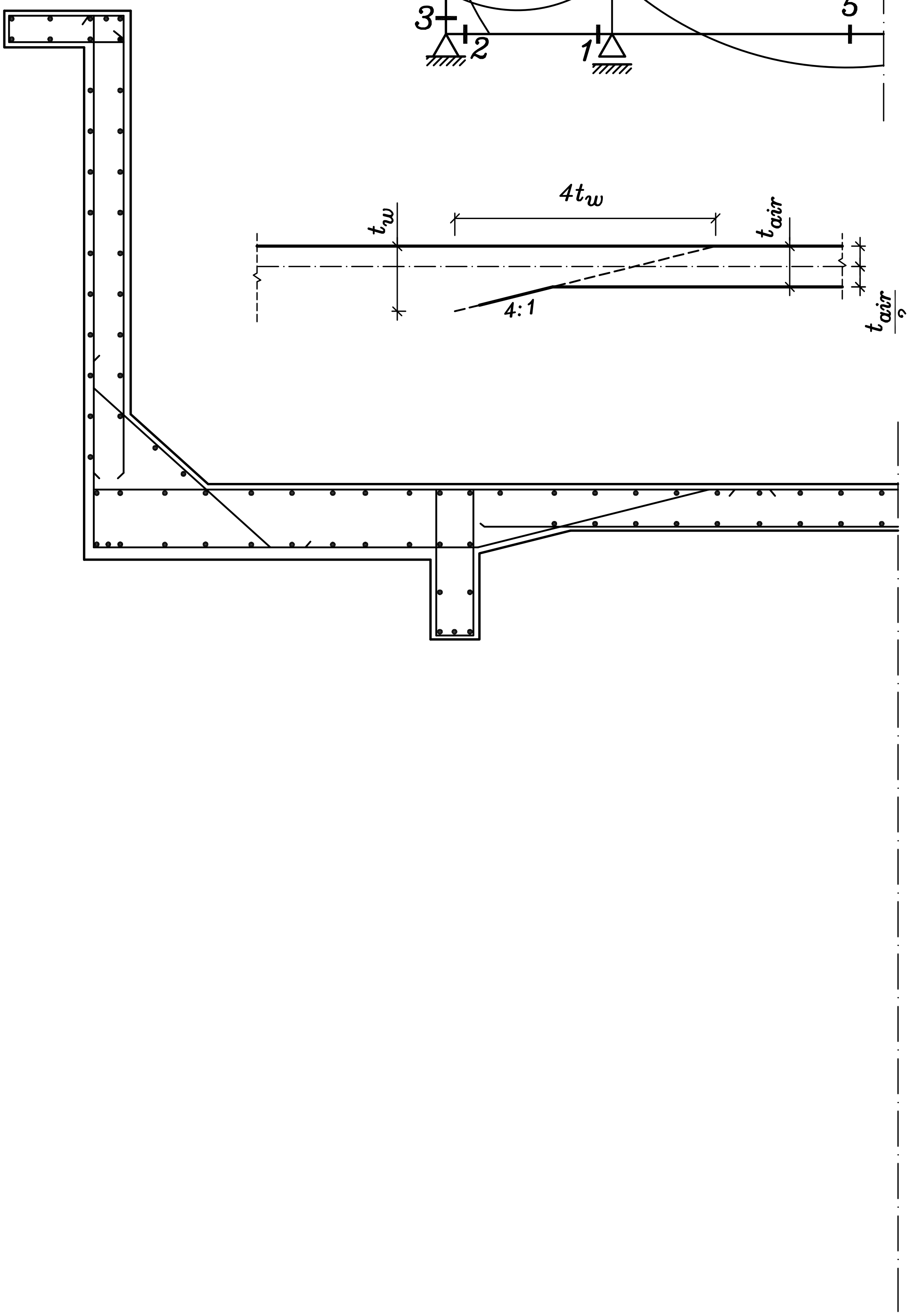
– Case (b)





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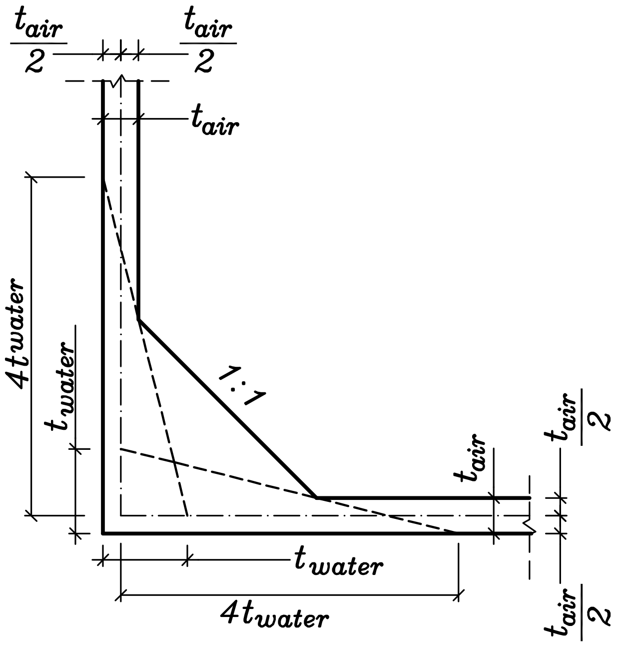
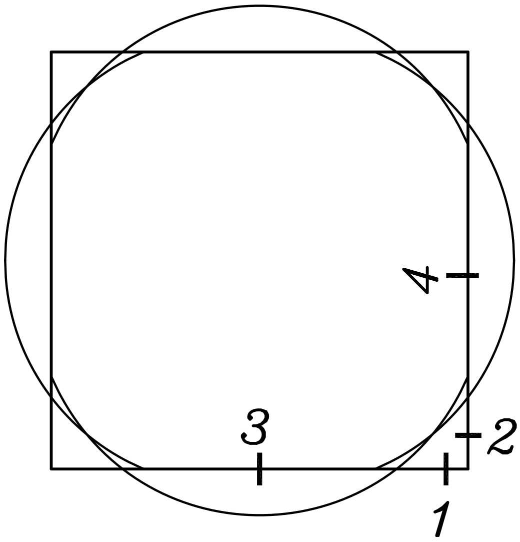
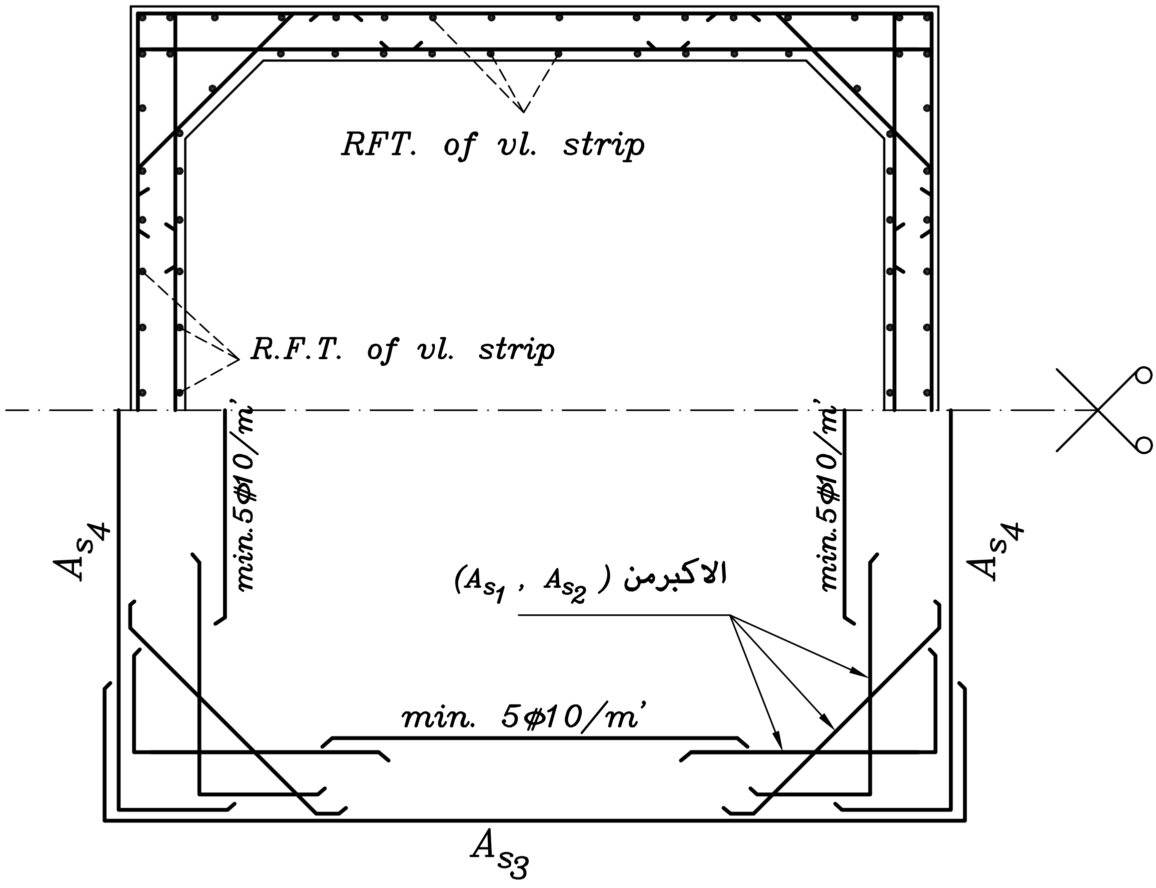
3- Hz. strip

Case (a): haunch at hz. strip







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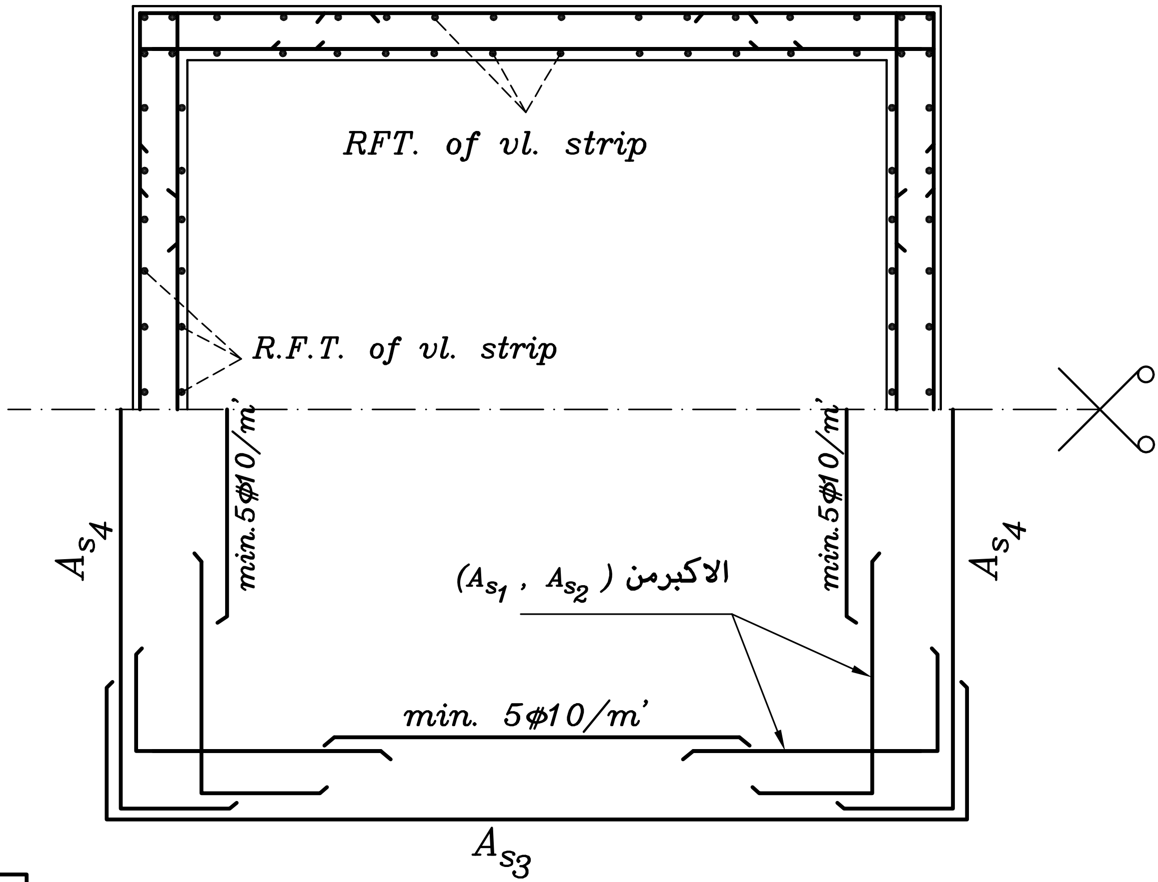
Case (b): no haunch at hz. strip



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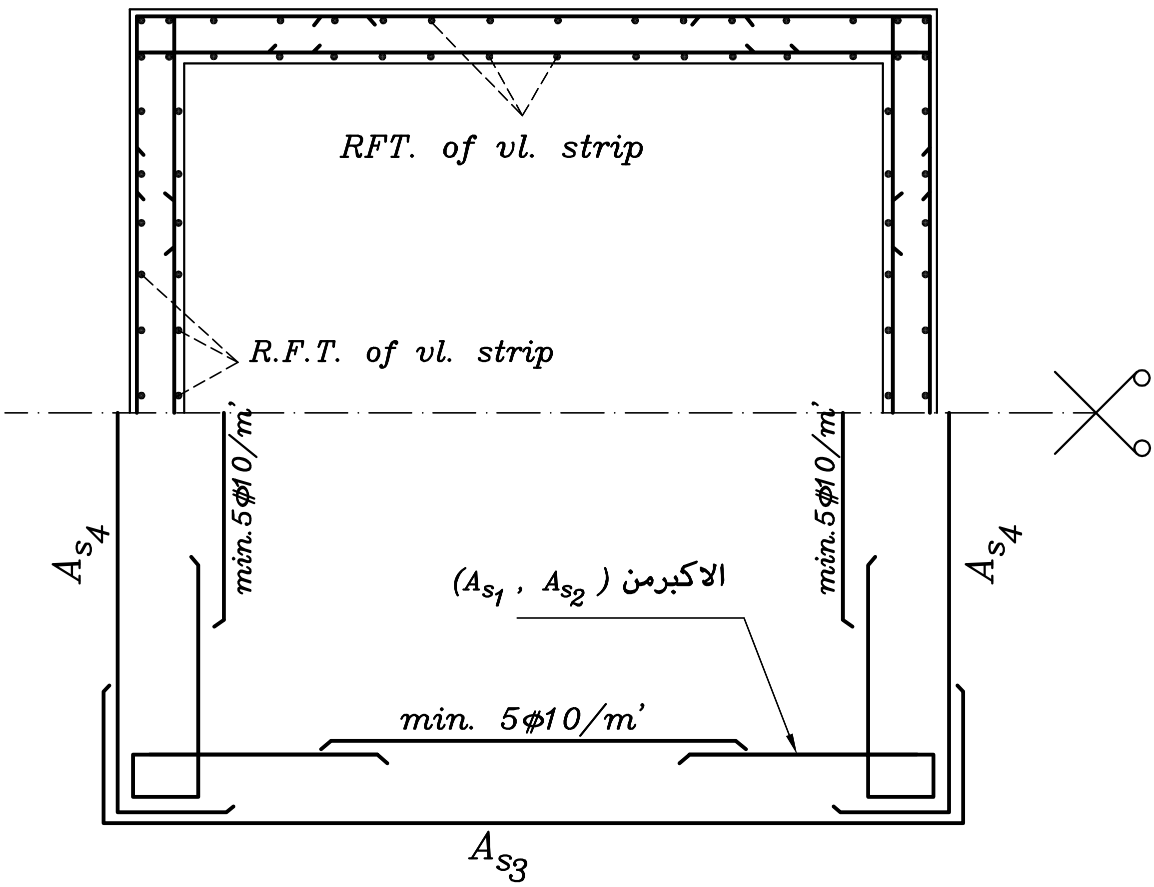

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$$M_{us}=67.50*0.53=35.78 kN.m$$

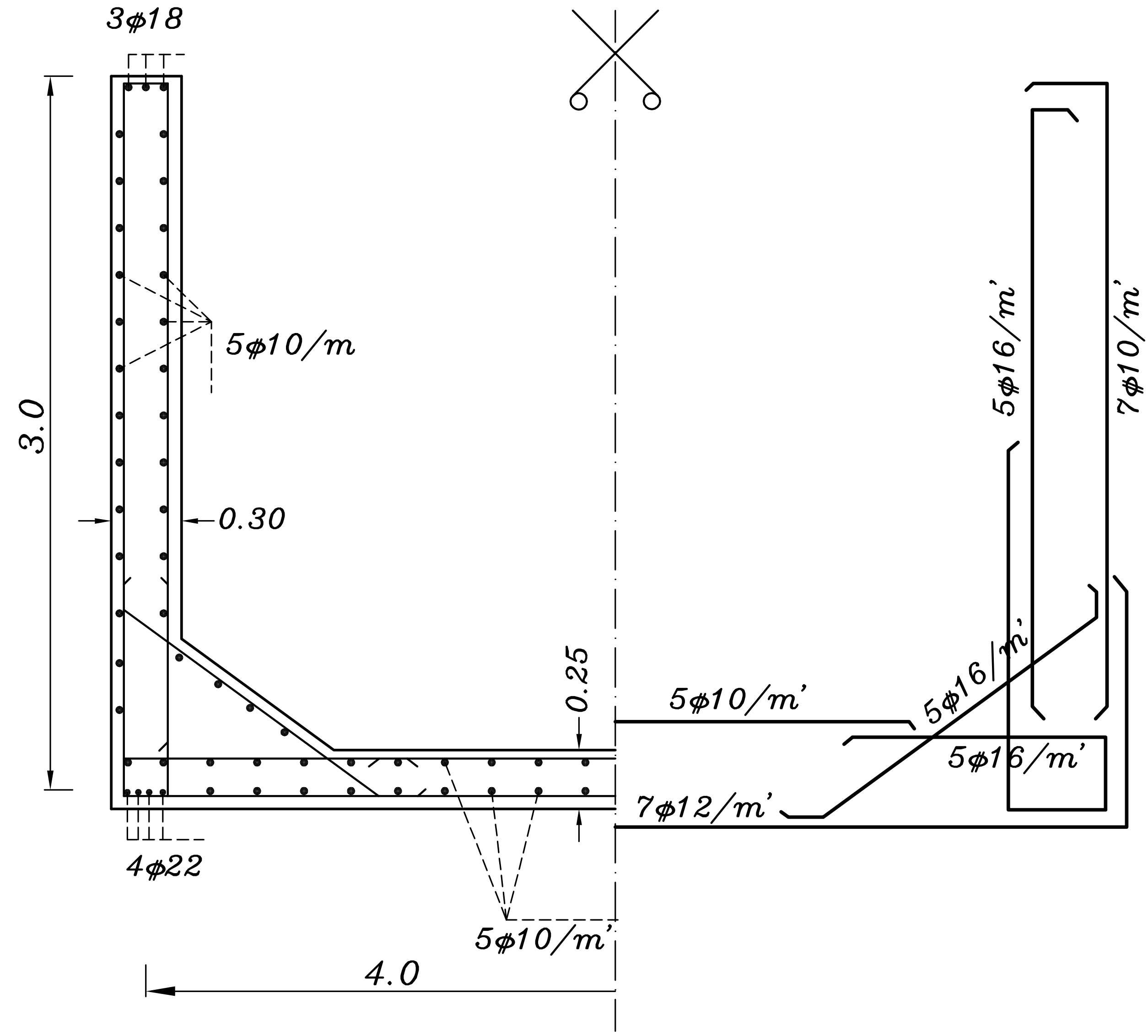
$$210=C_1\sqrt{\frac{35.78*10^6}{1000*25}} \qquad C_1=5.55 \quad \& \quad J=0.826$$

$$A_s=\frac{1}{\beta_{cr}}*\left[\frac{M_{us}}{J*d*f_y}+\frac{T_{u.l.}}{f_y/\gamma_s}\right] \text{ assume } \phi 12 \text{ used} \Longrightarrow \quad \beta_{cr}=1.00$$

$$A_s=\frac{1}{1.00}\left[\frac{35.78*10^6}{0.826*210*360}+\frac{67.50*10^3}{360/1.15}\right]$$

$$A_s=788.60 mm^2/m' \Longrightarrow 7\phi 12/m'$$

Details of RFT.



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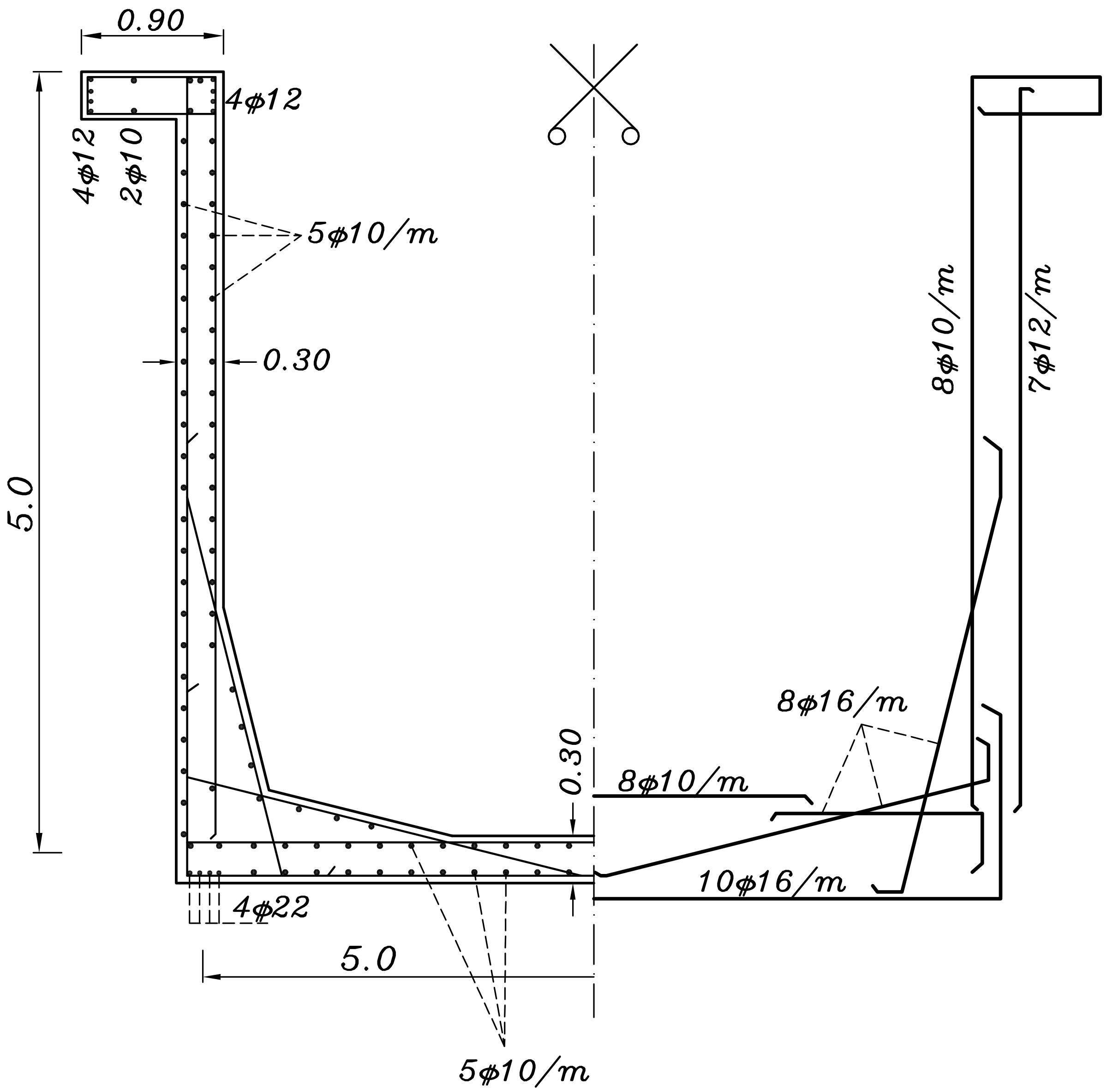
Details of RFT.



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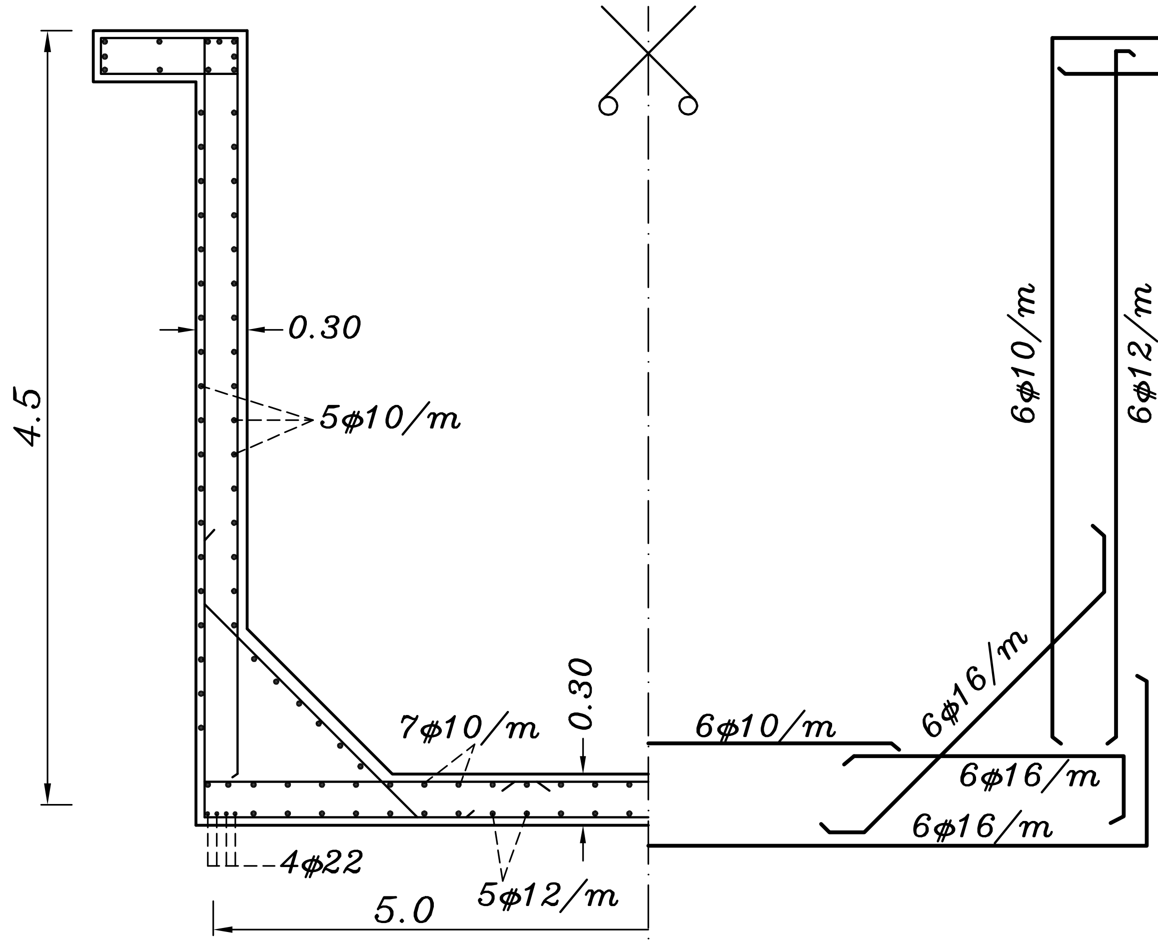
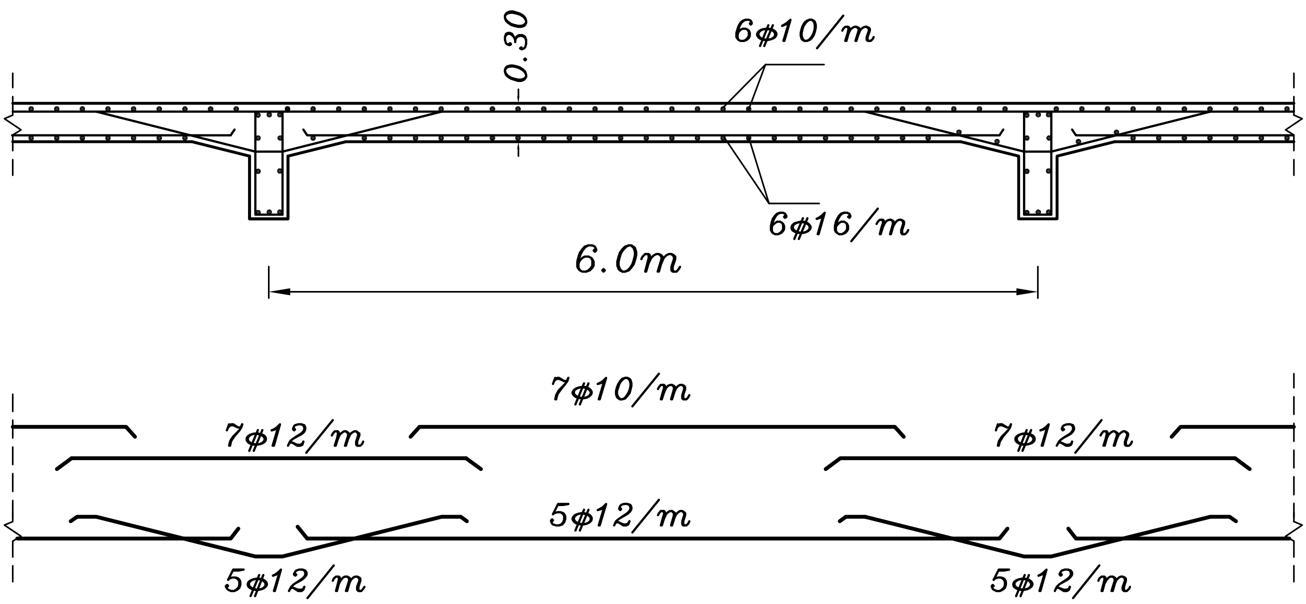
Details of RFT.



VL. strip



Hz. strip

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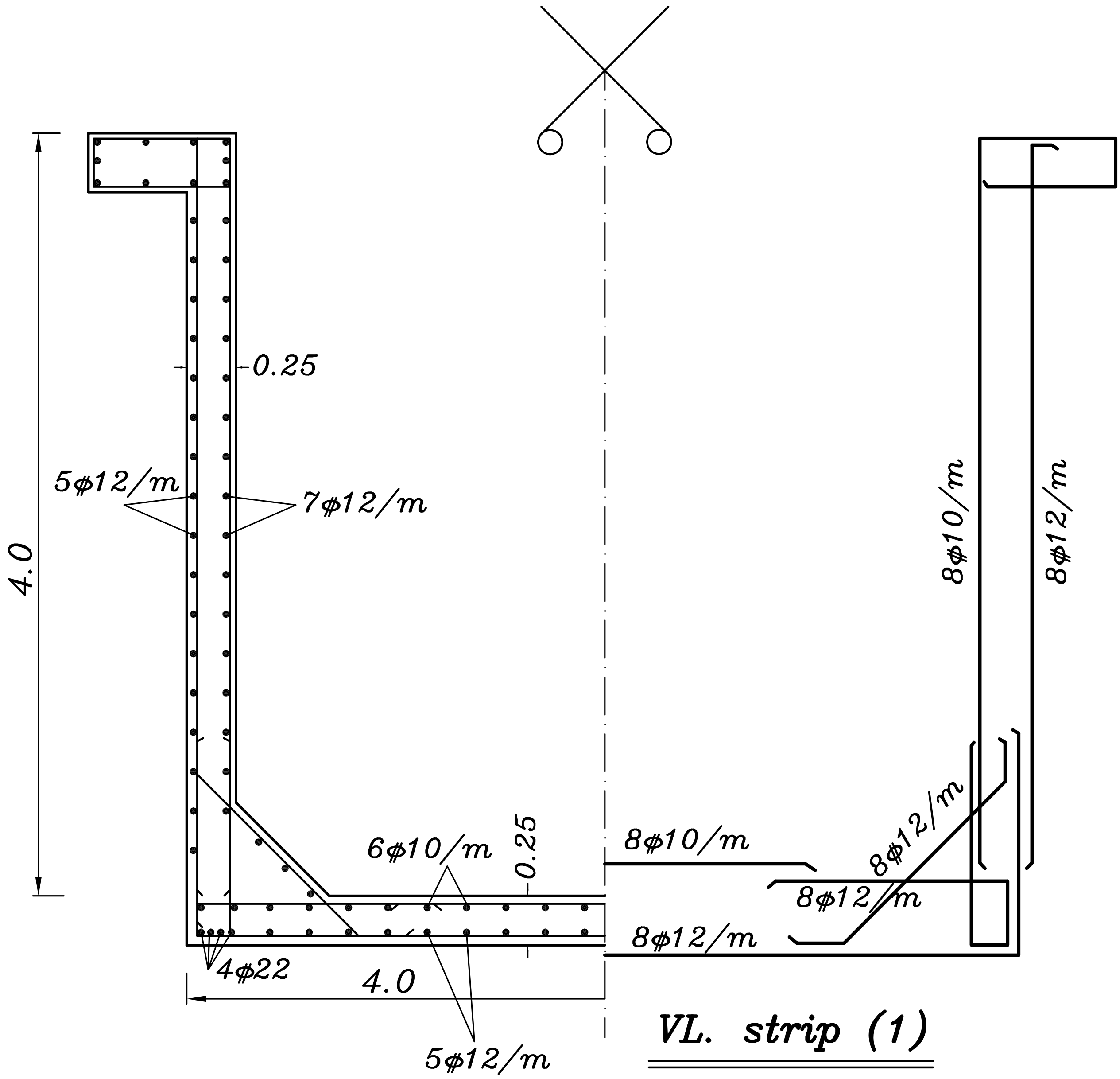
Details of RFT.



VL. strip (1)

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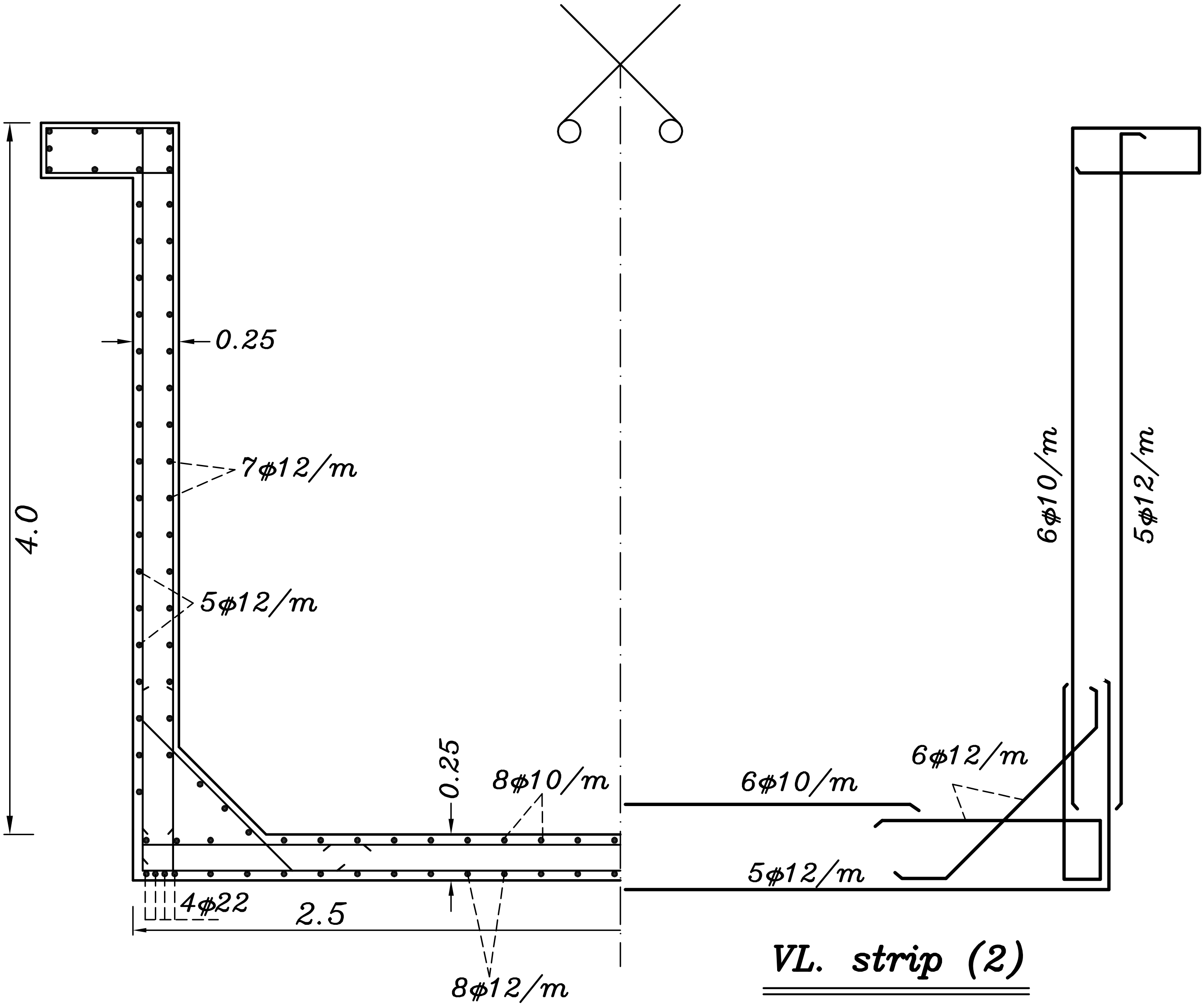

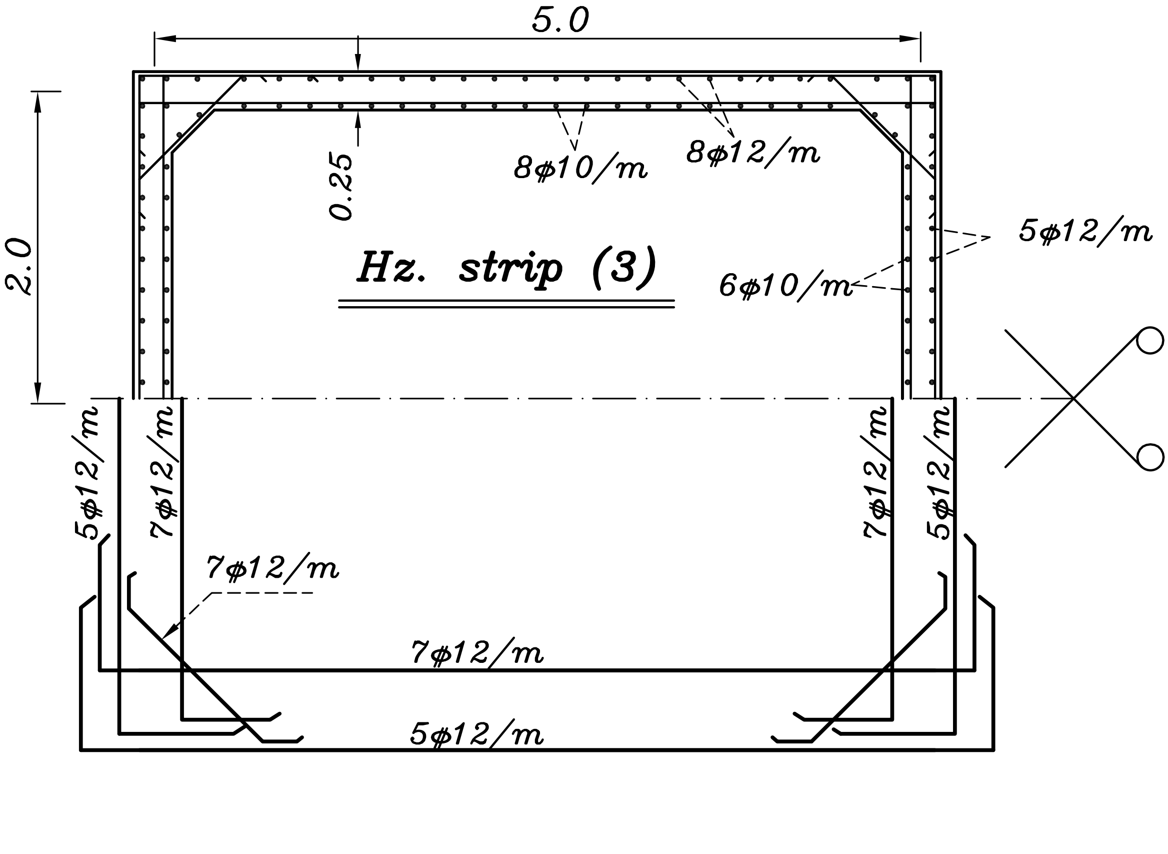

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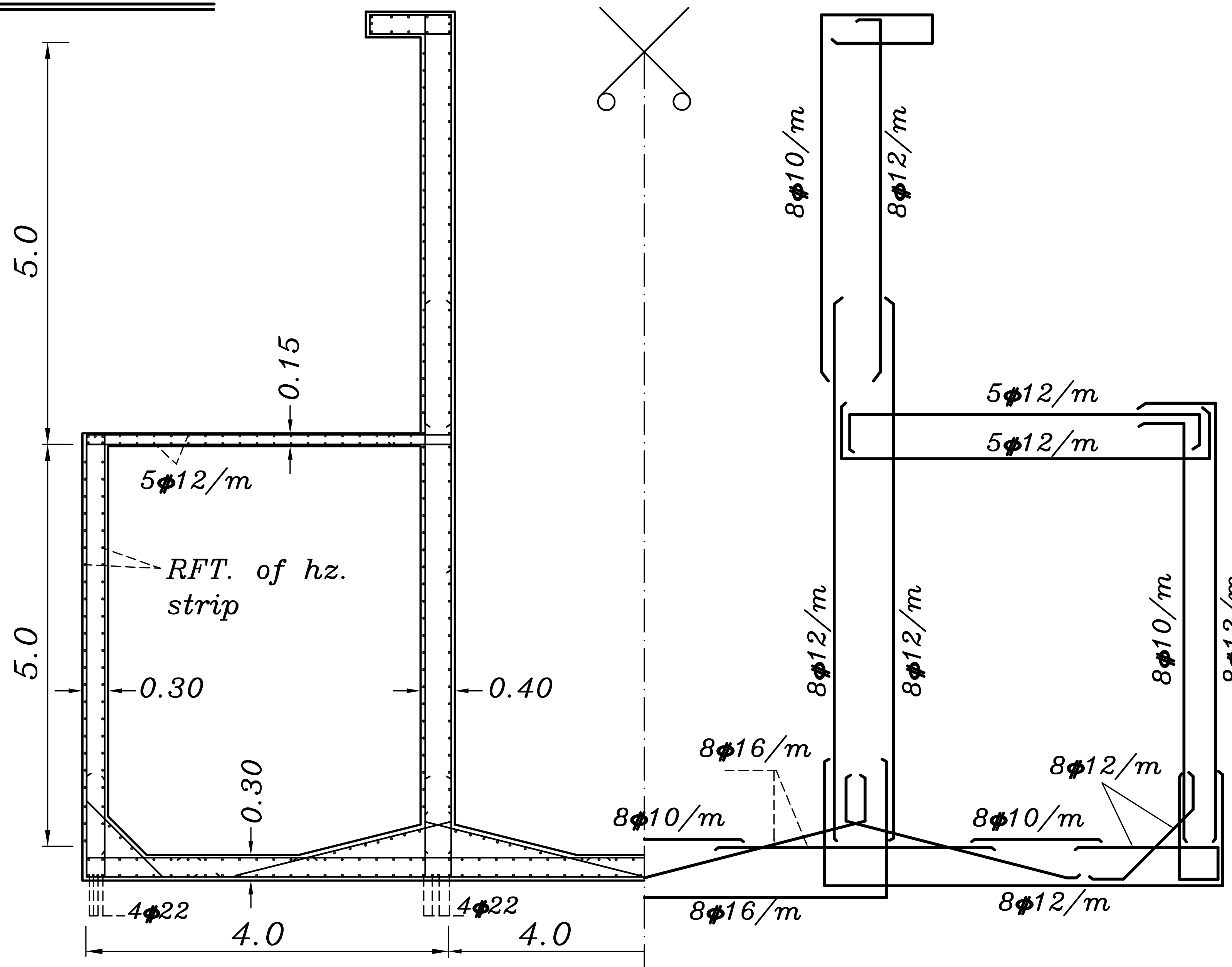
Details of RFT.



VL. strip (1)

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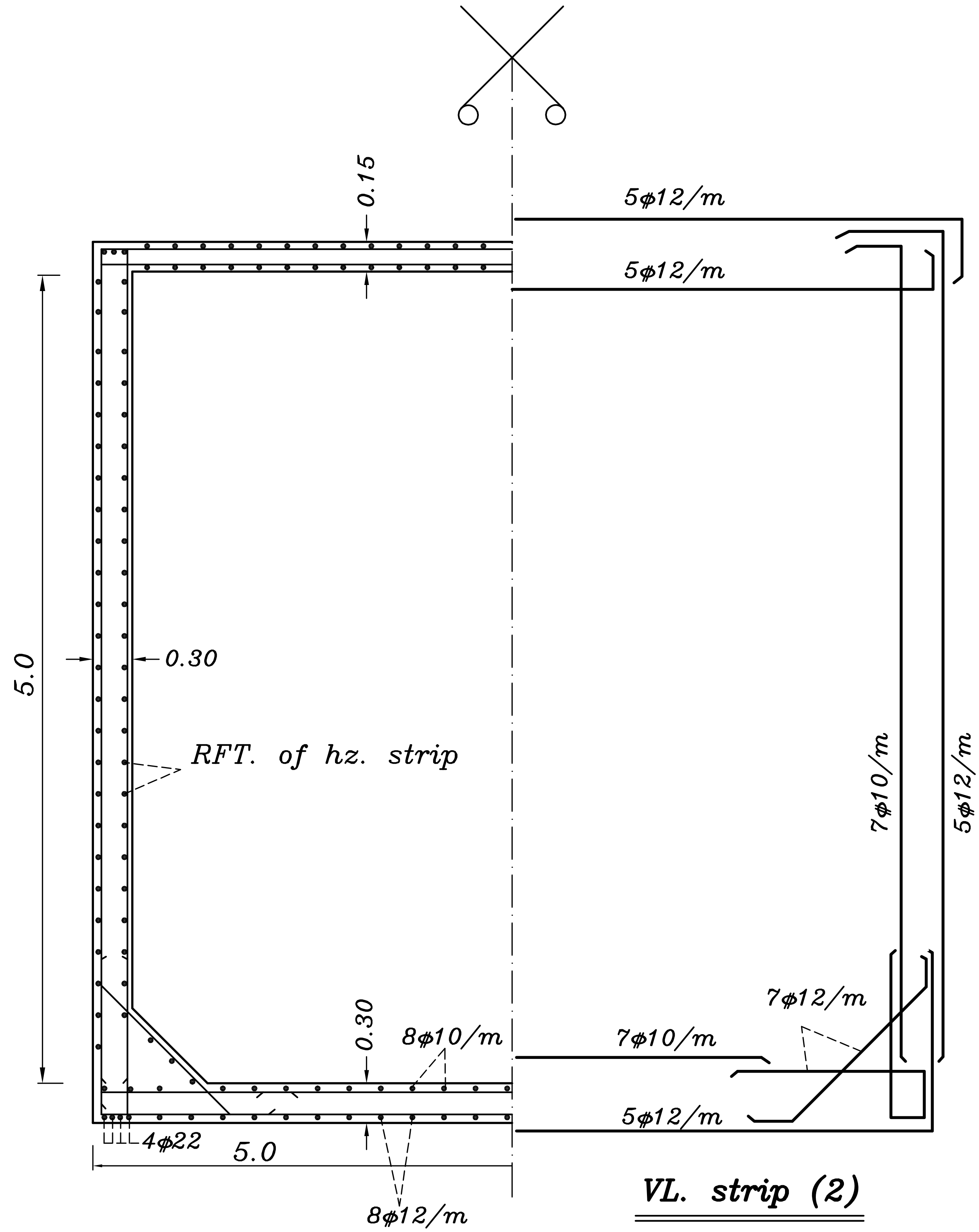

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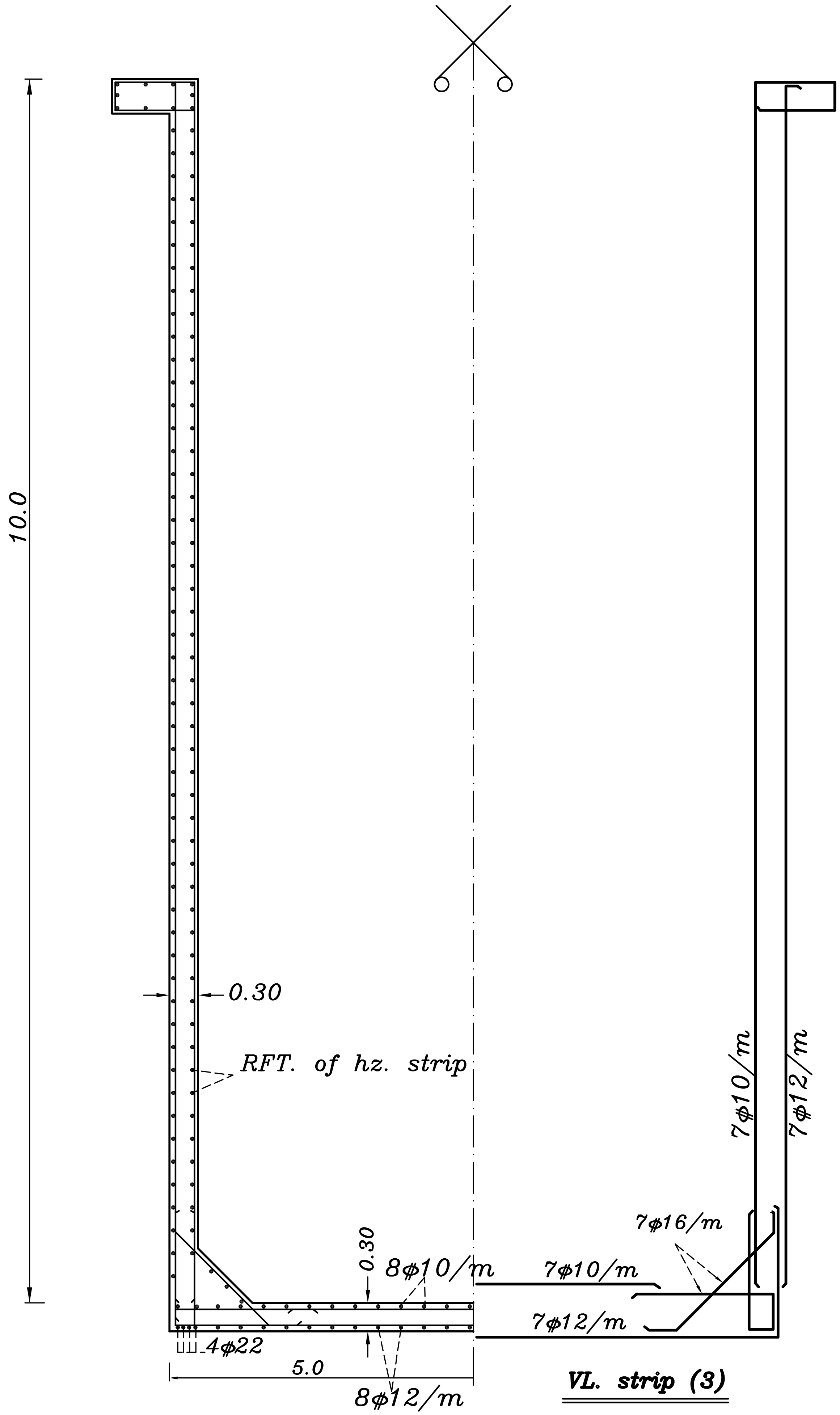

VL. strip (3)

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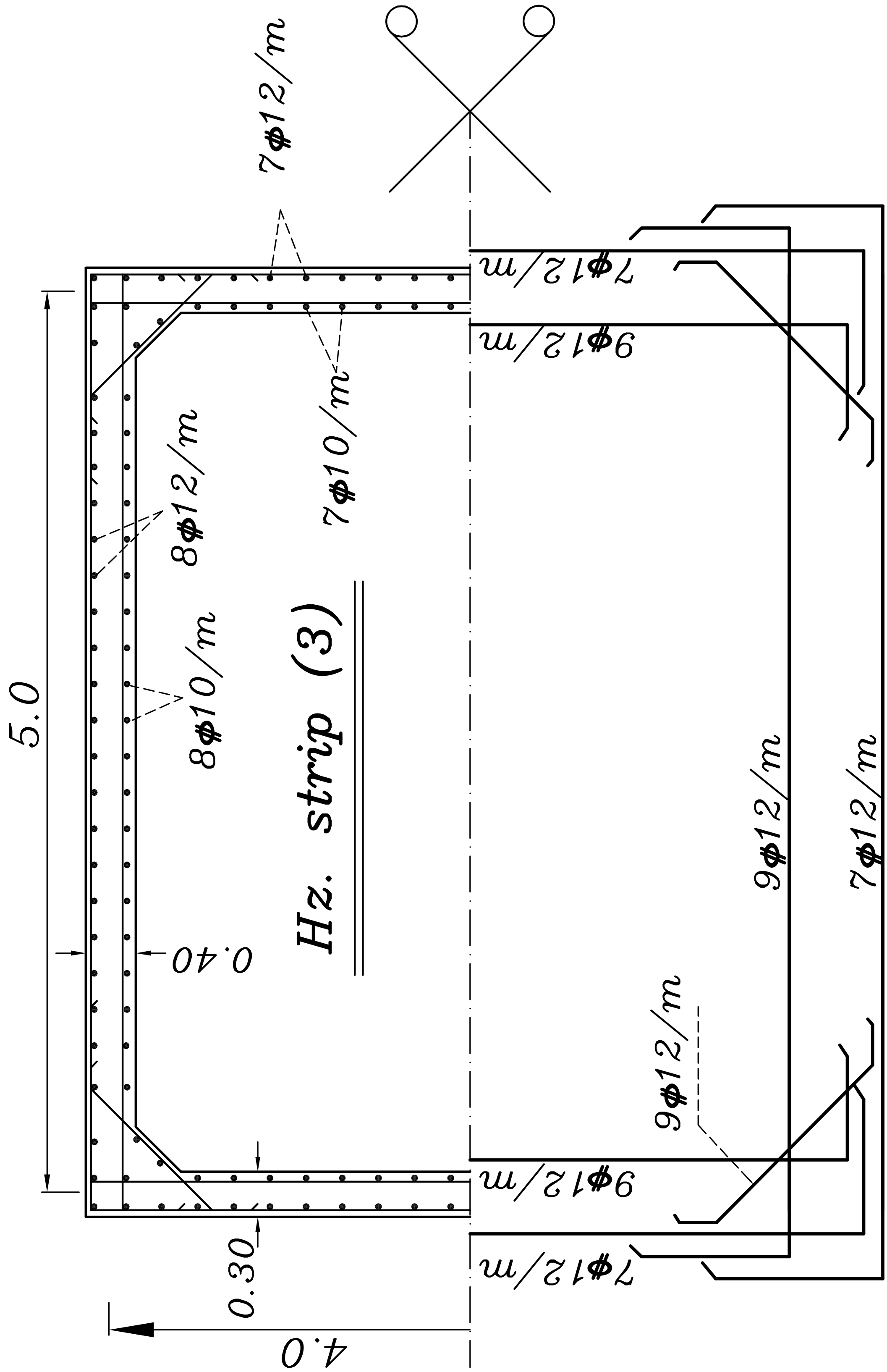

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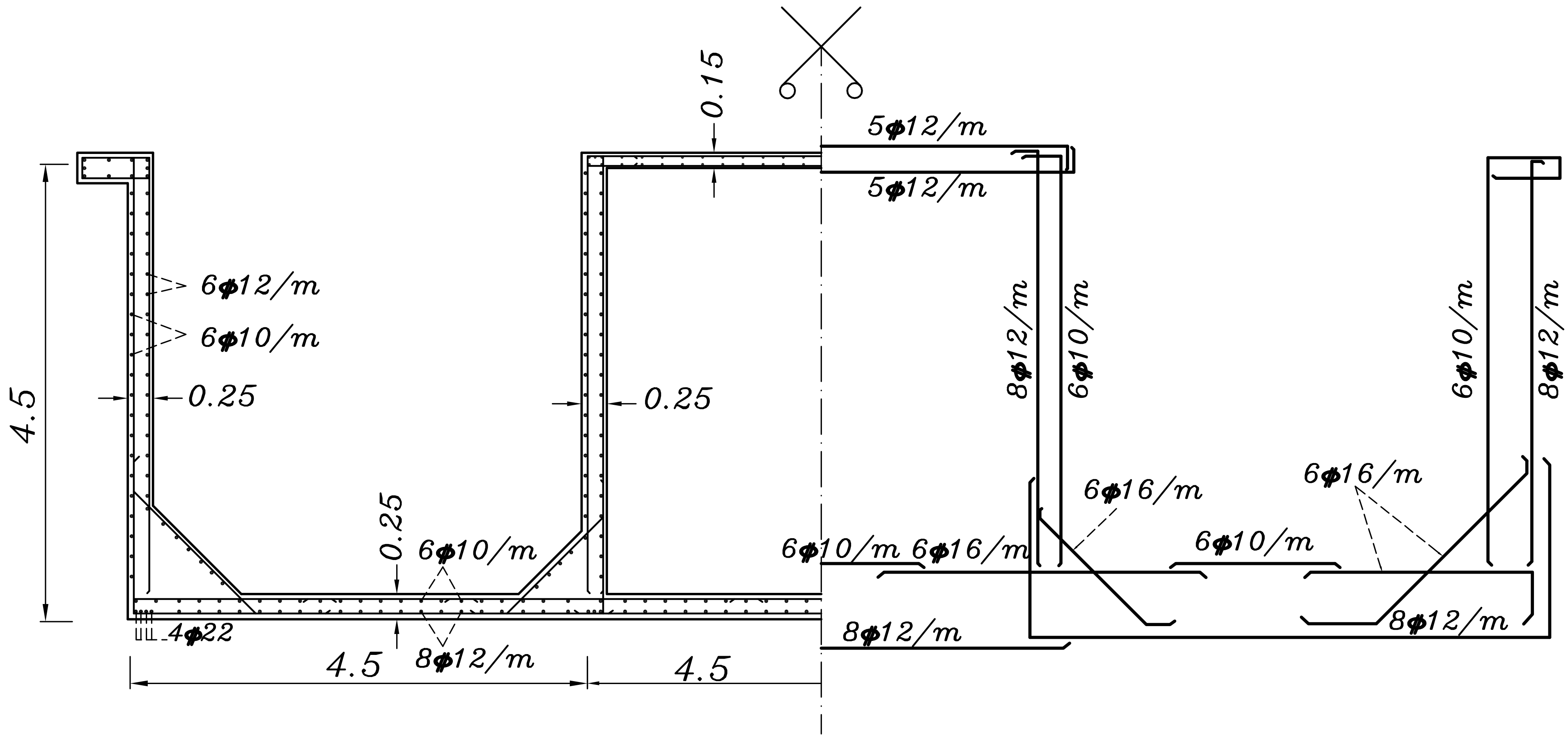
Details of RFT.



VL. strip (1)

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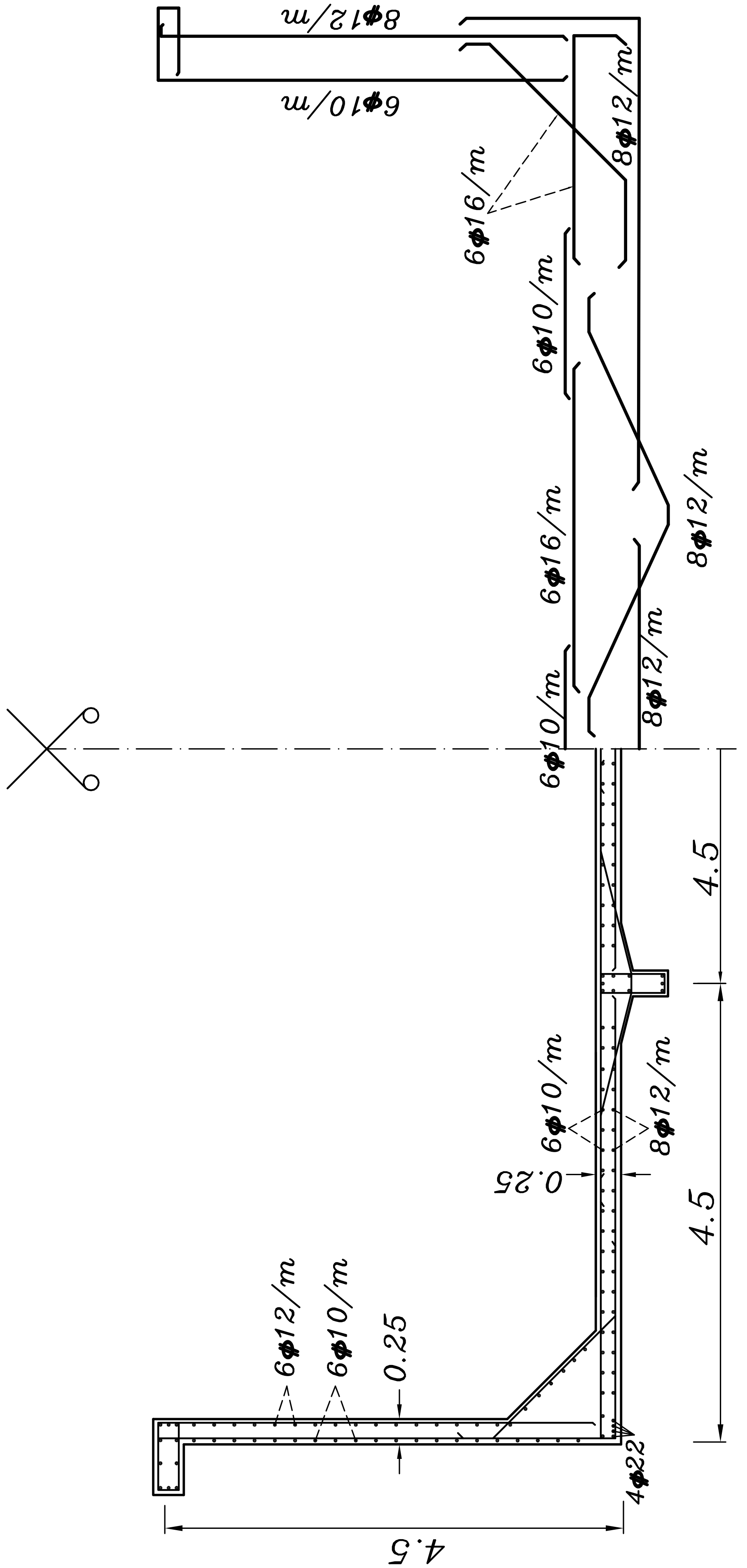

VL. strip (2)

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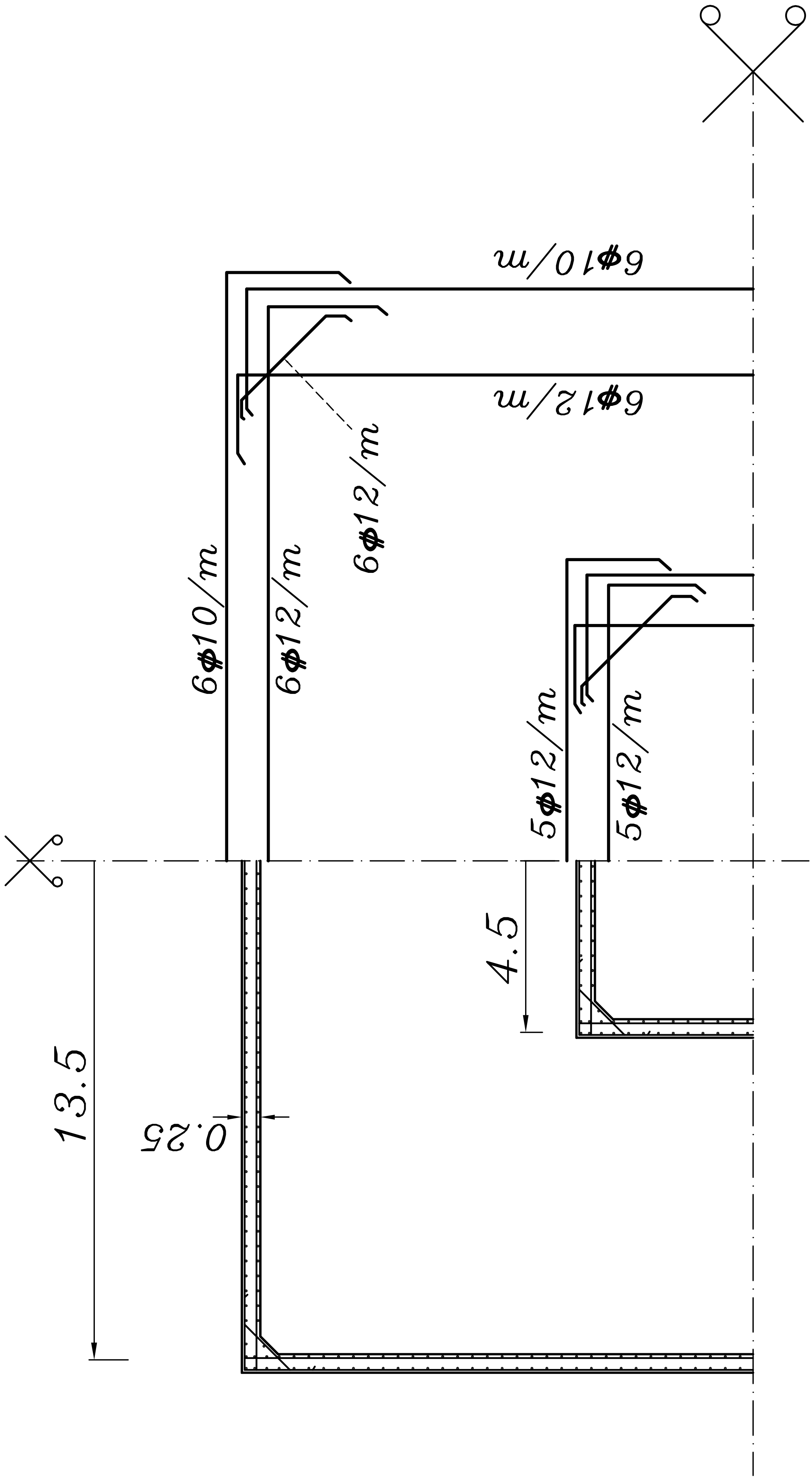

Hz. strip (3)

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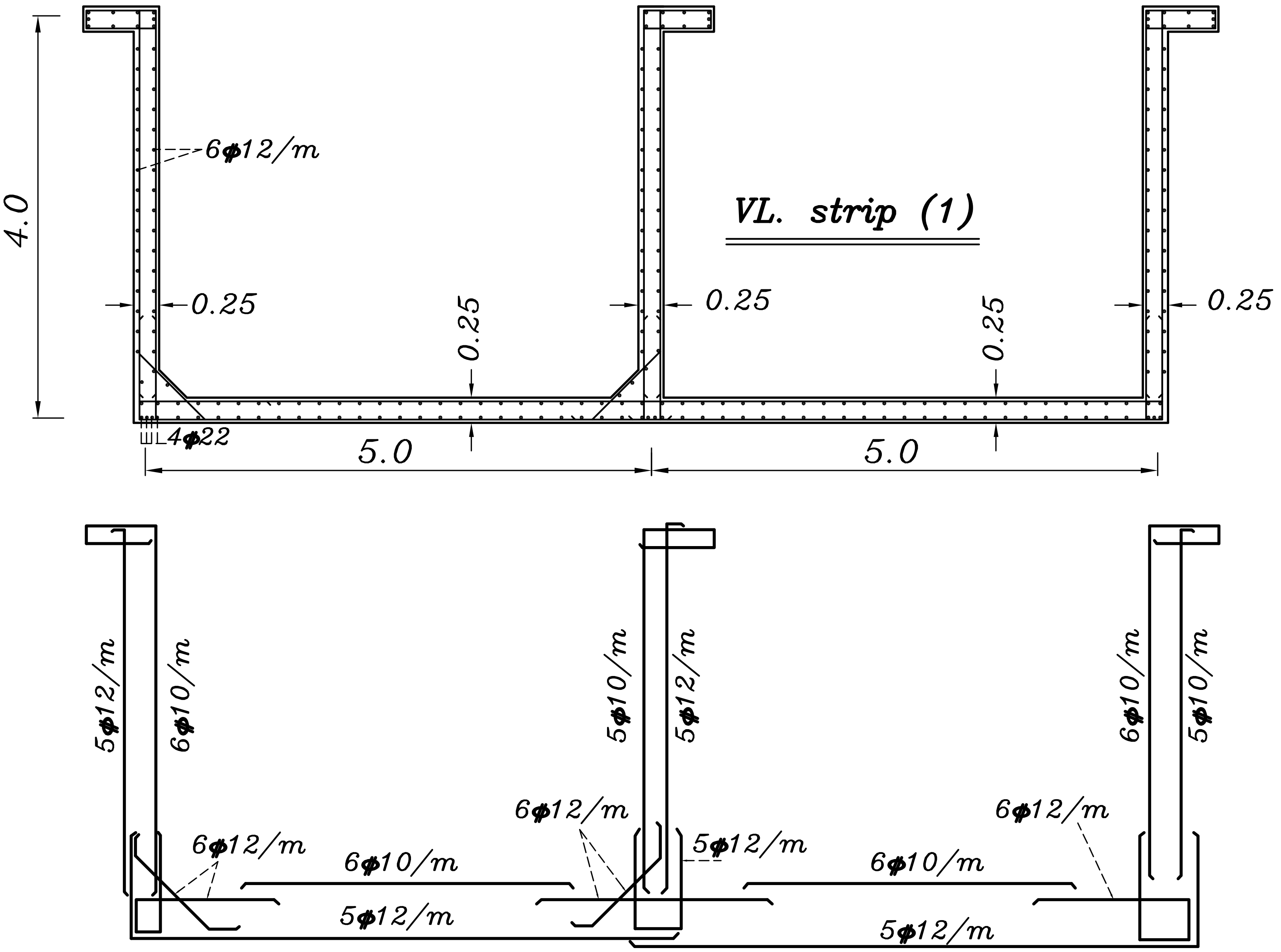
Details of RFT.



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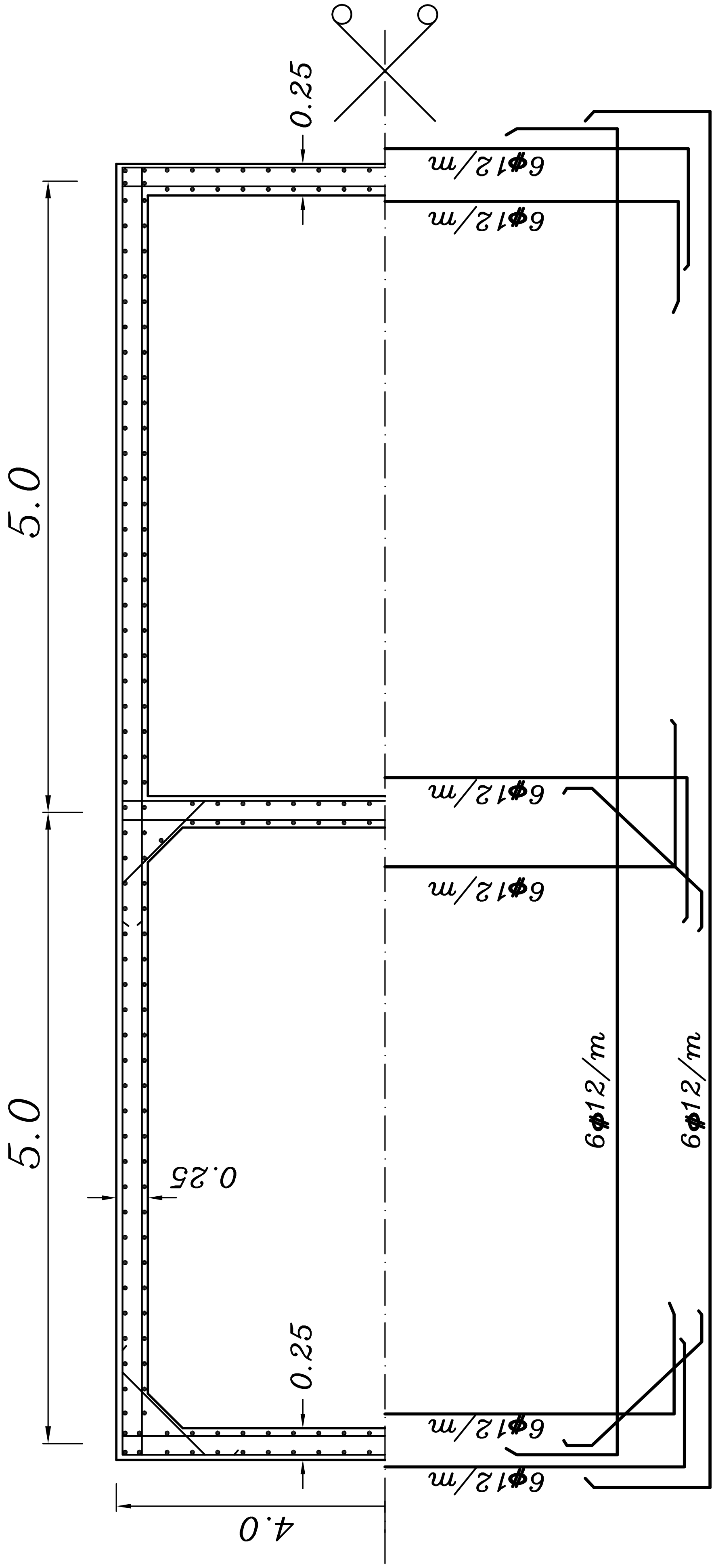
Hz. strip (2)



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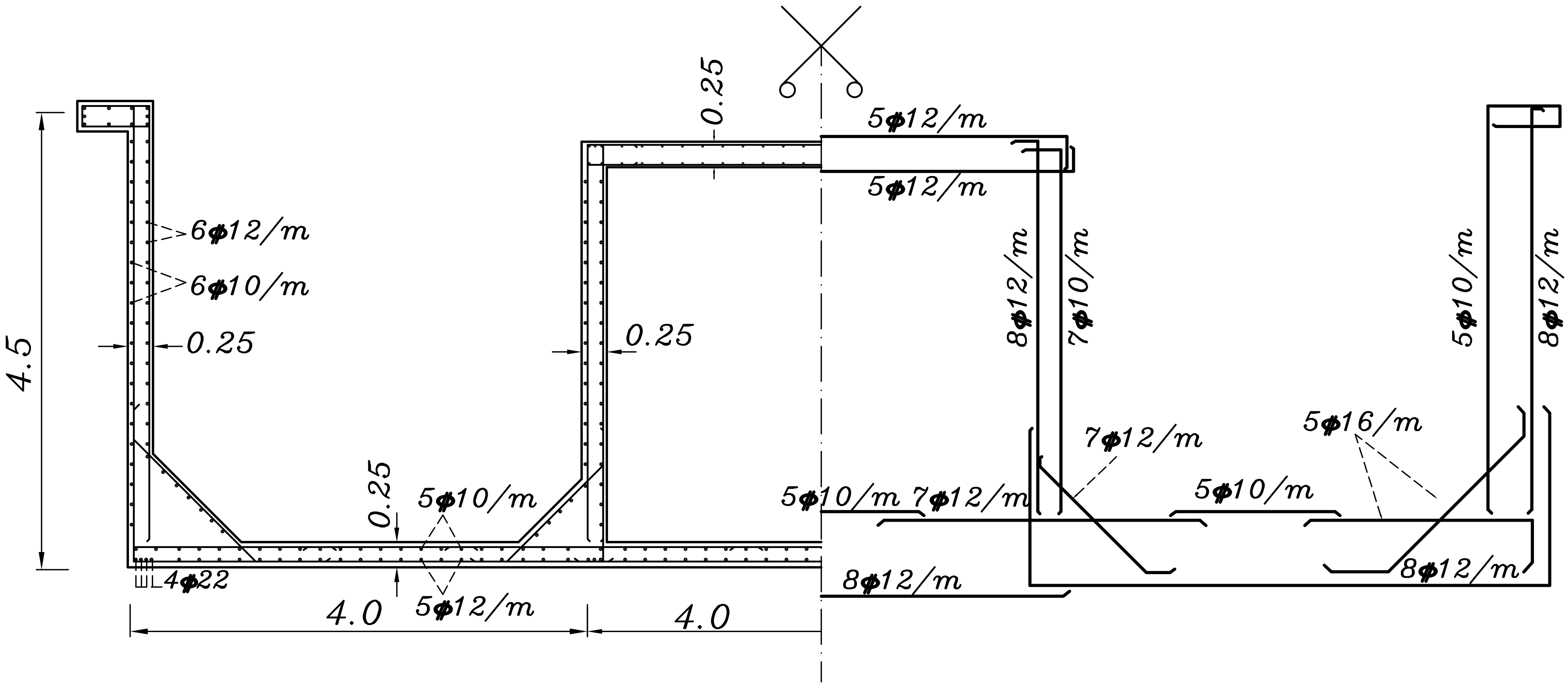
Details of RFT.



VL. strip (1)

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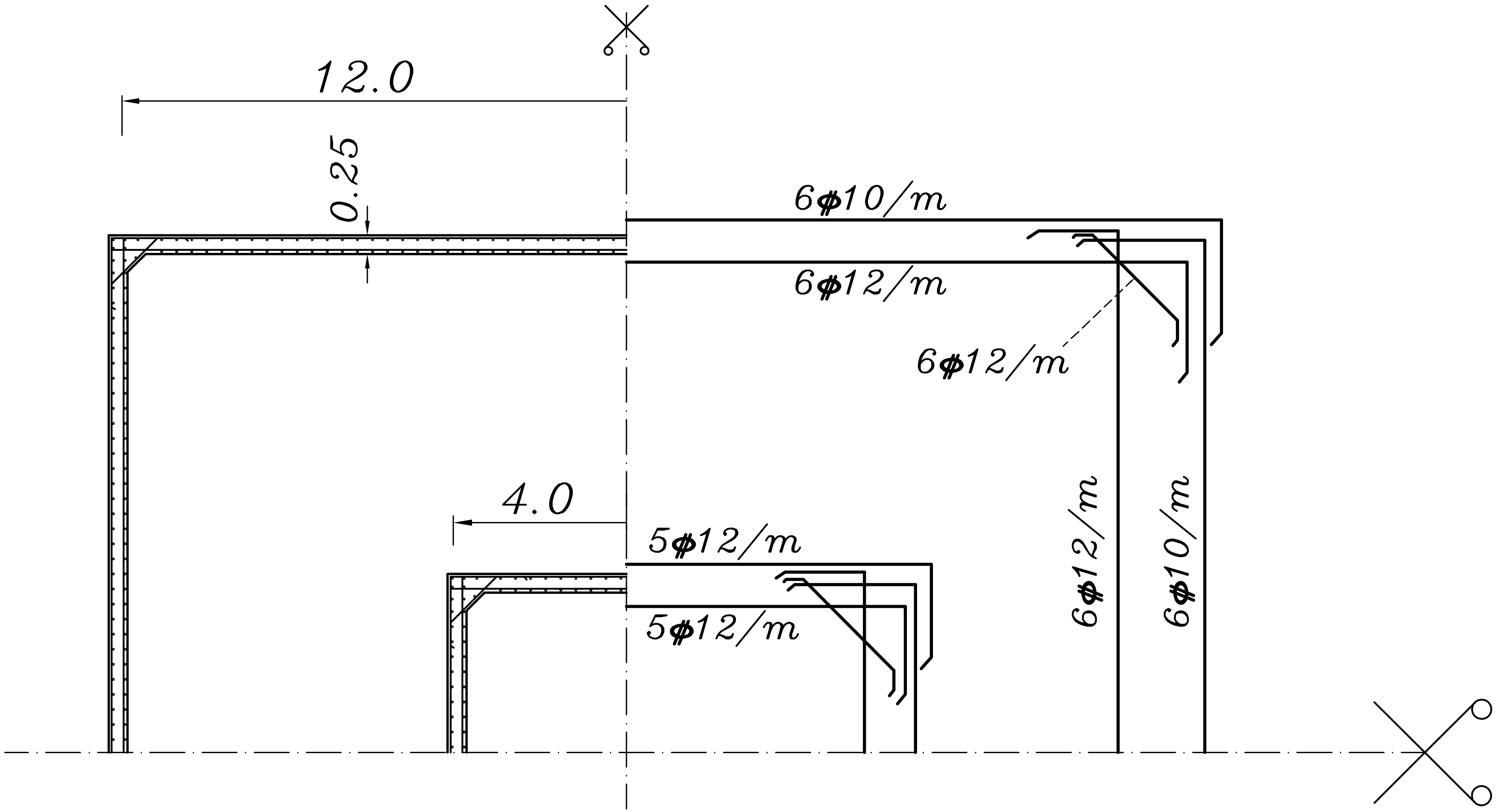

Hz. strip (2)

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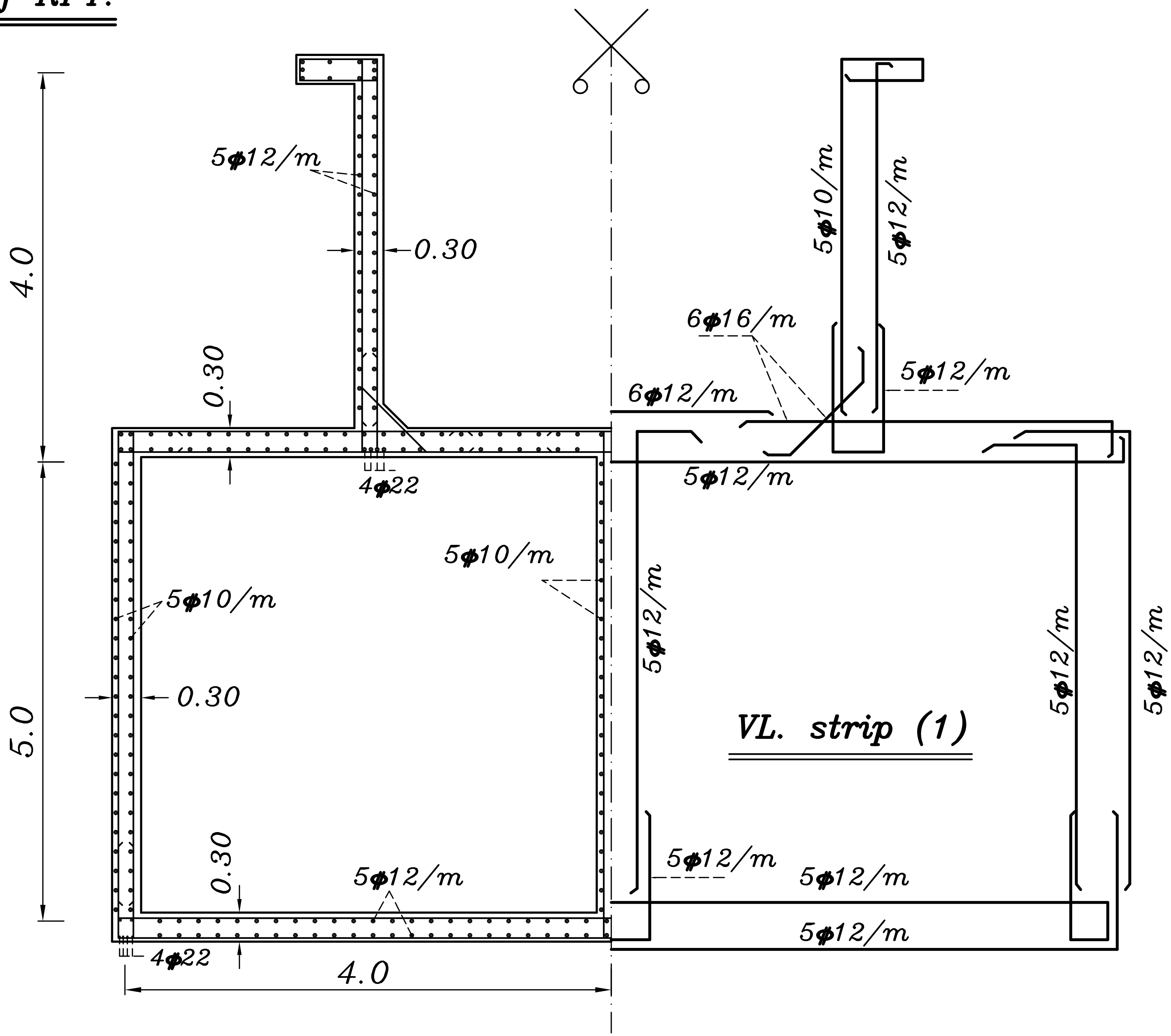
Details of RFT.



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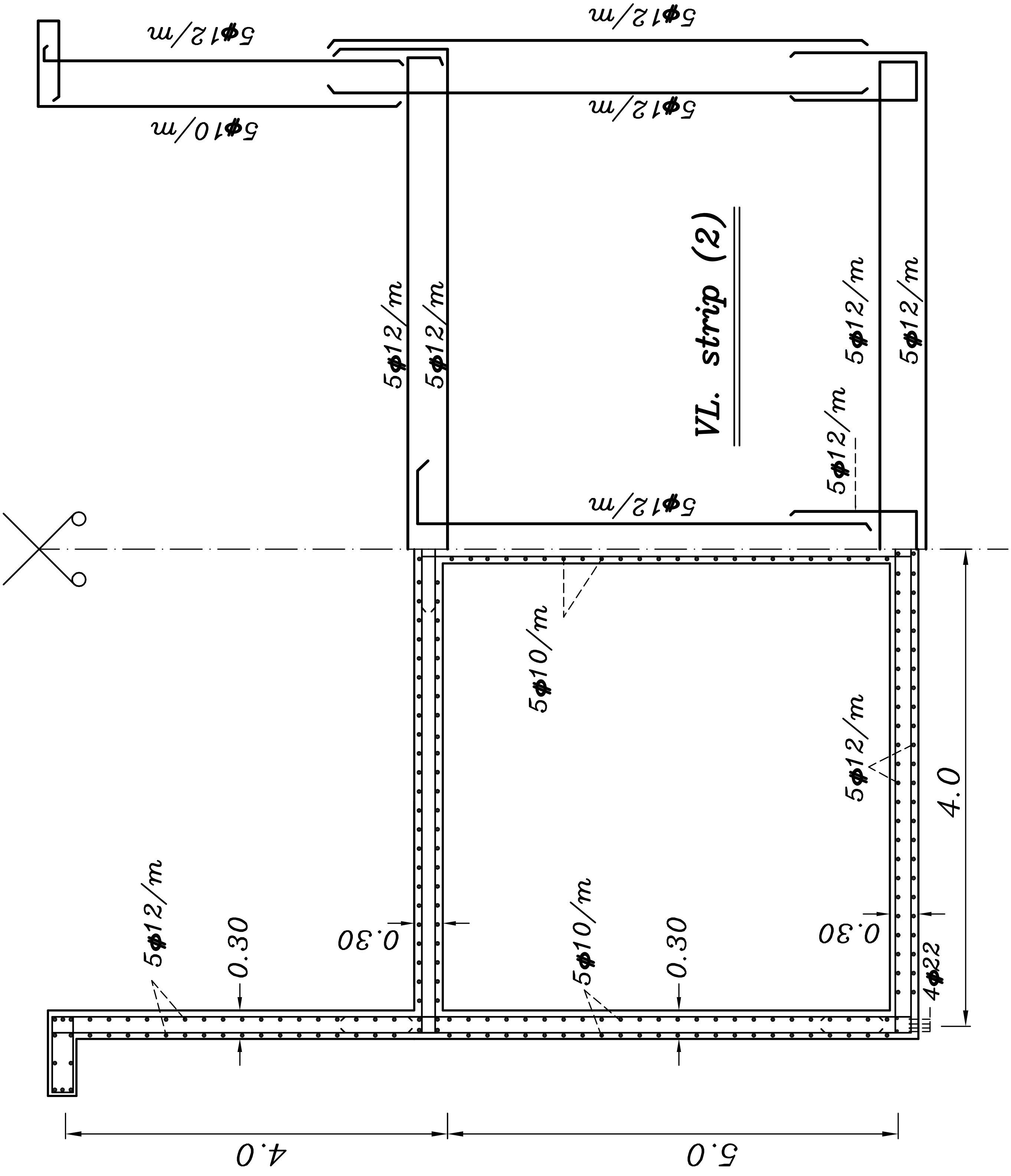

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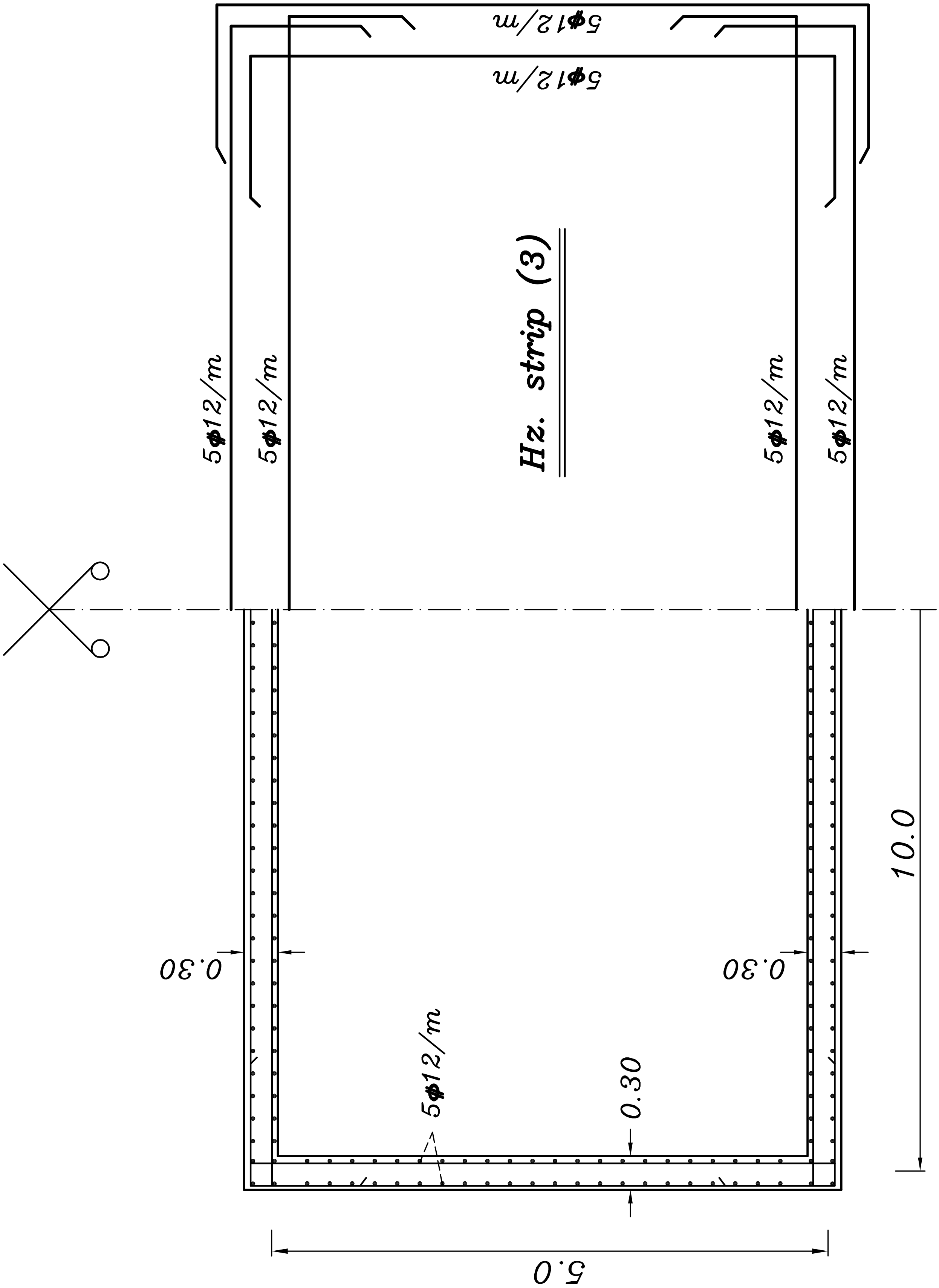

© Eng. Ezz El-Din Mostafa 2008.

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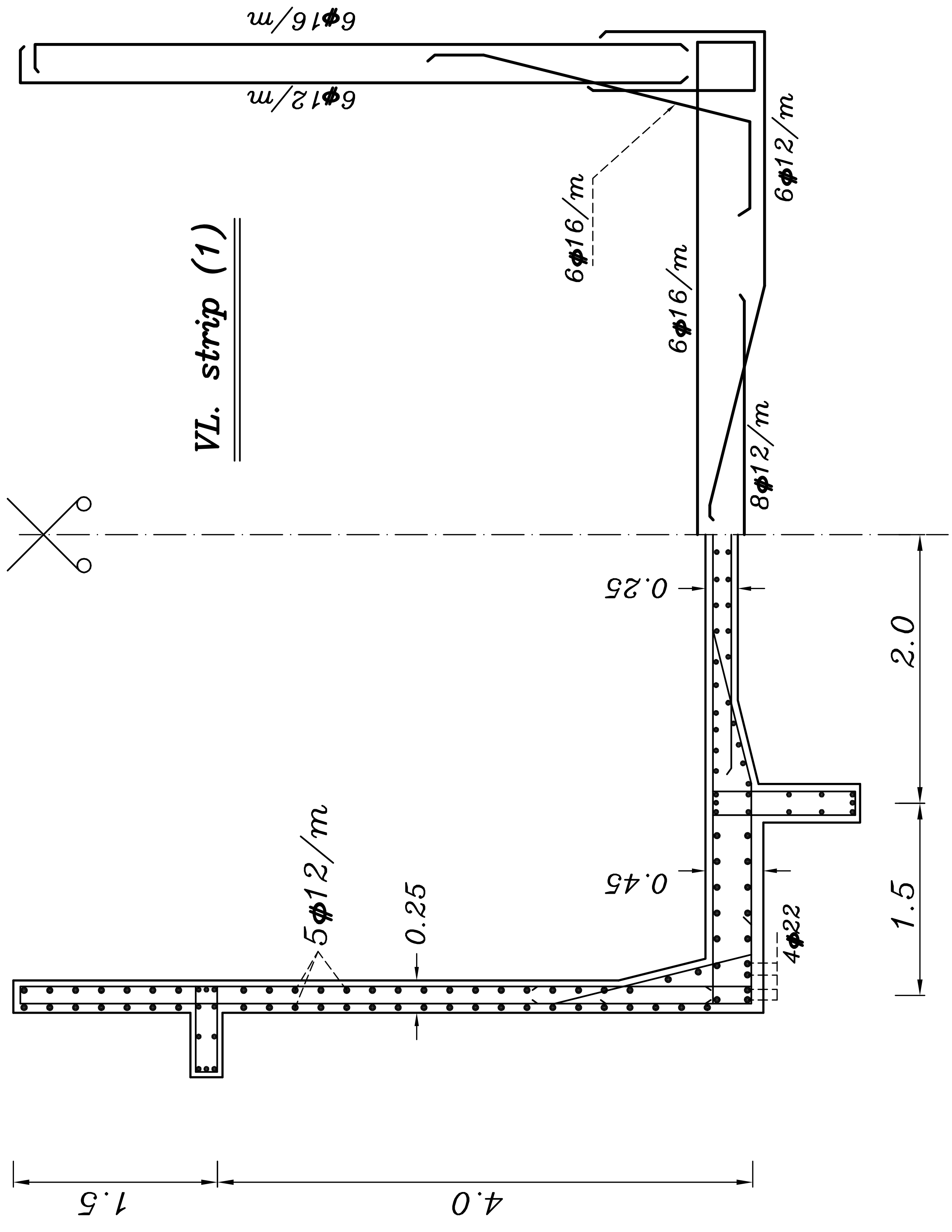

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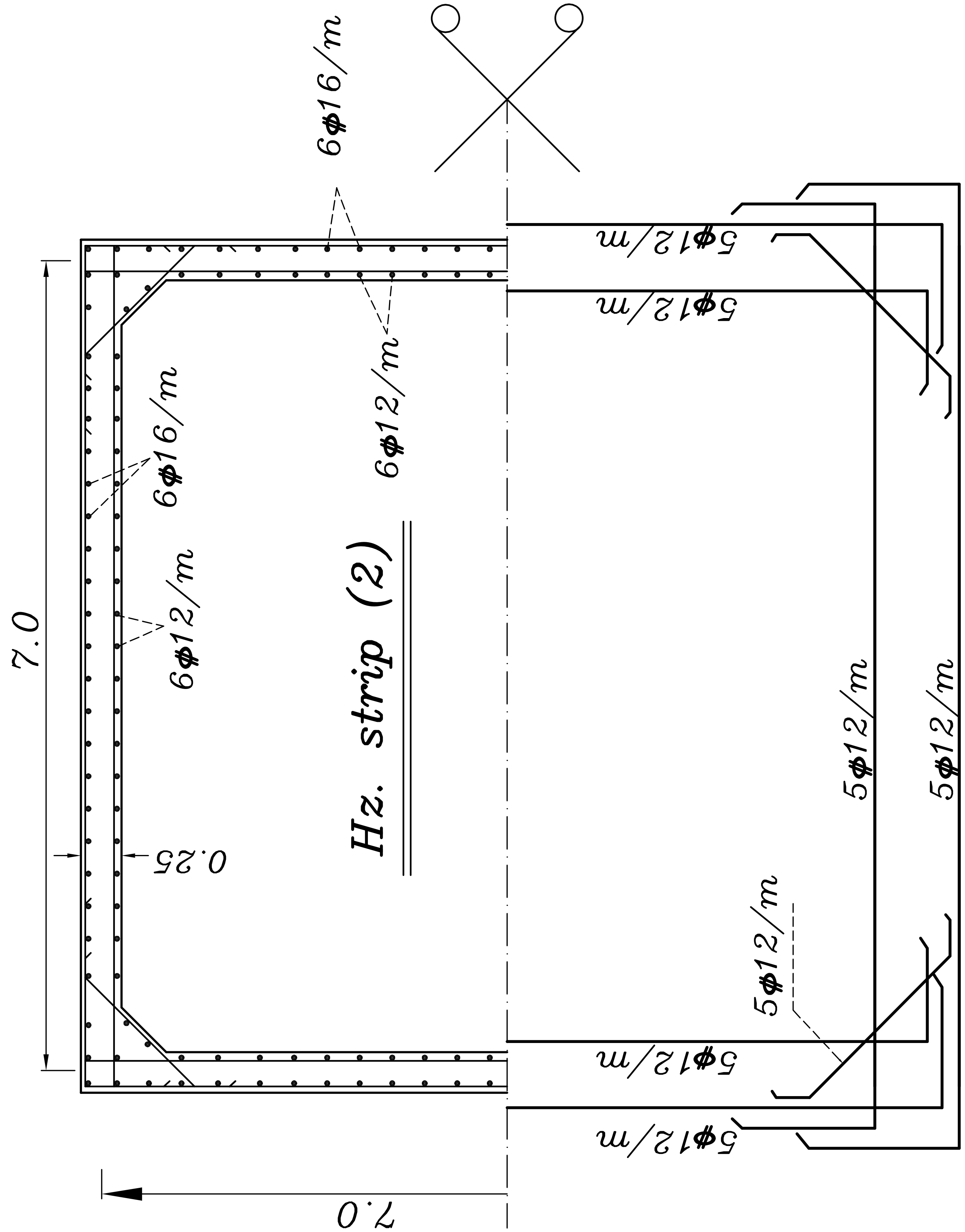

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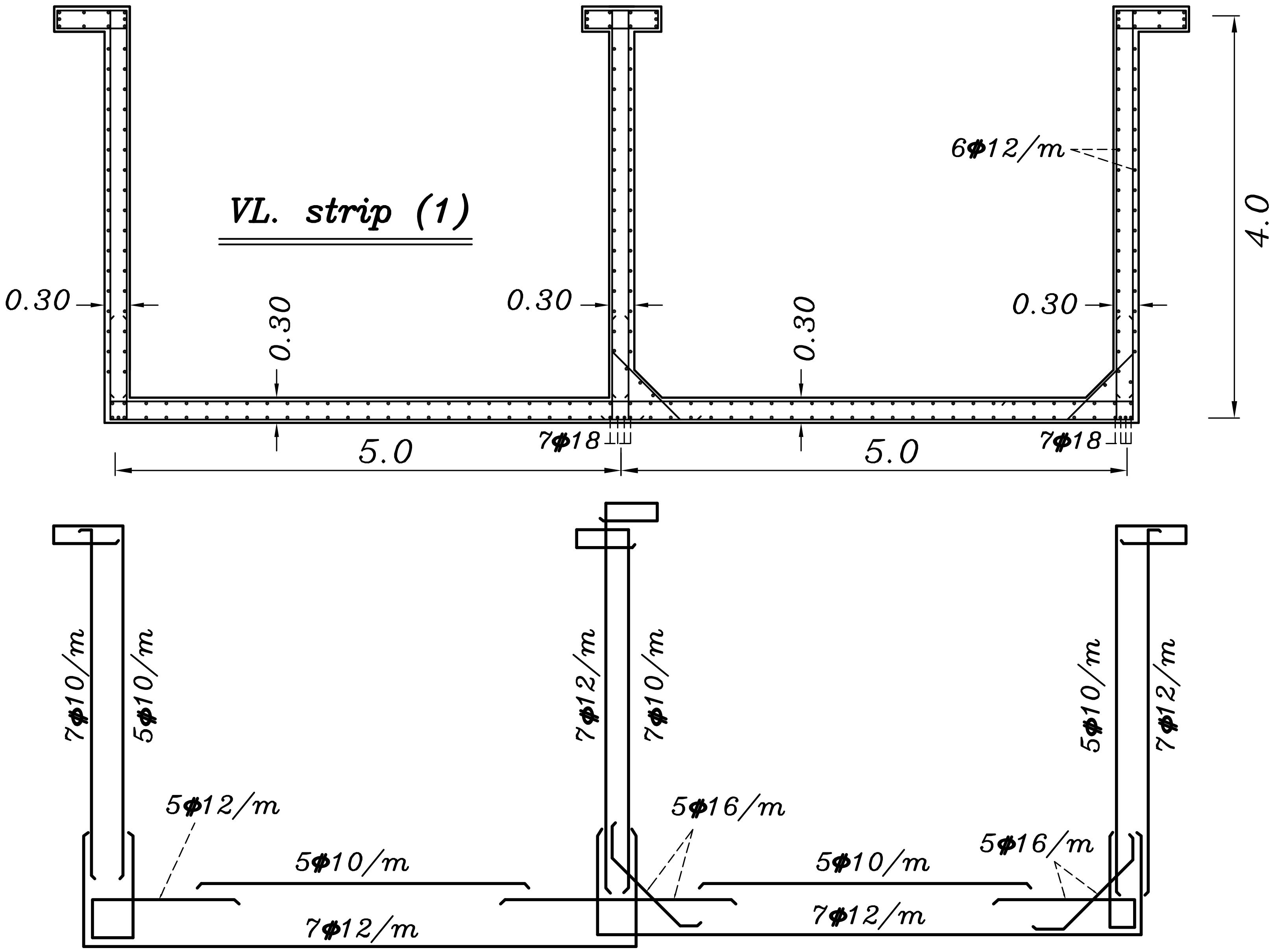
Details of RFT.



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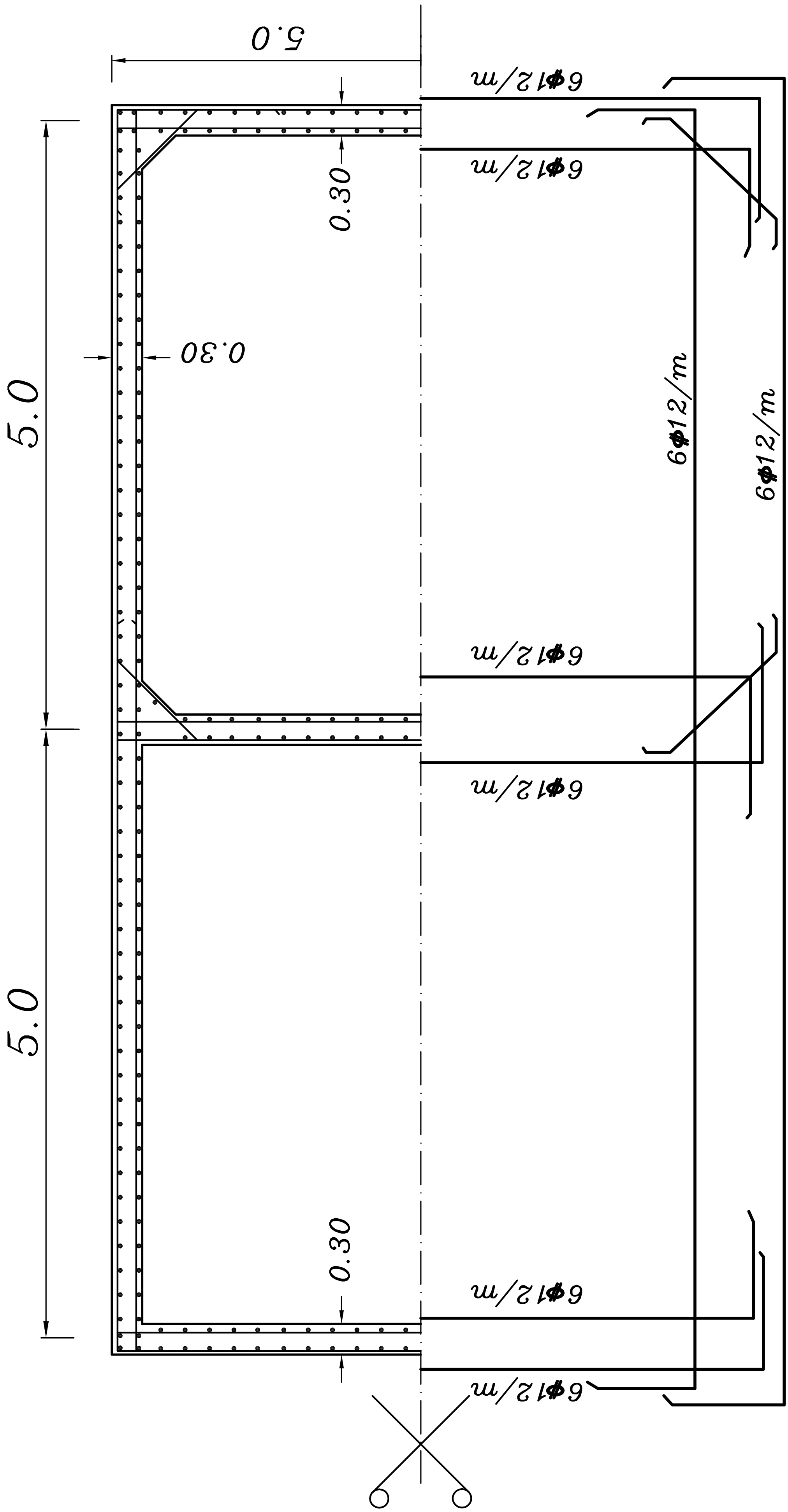
Hz. strip (2)



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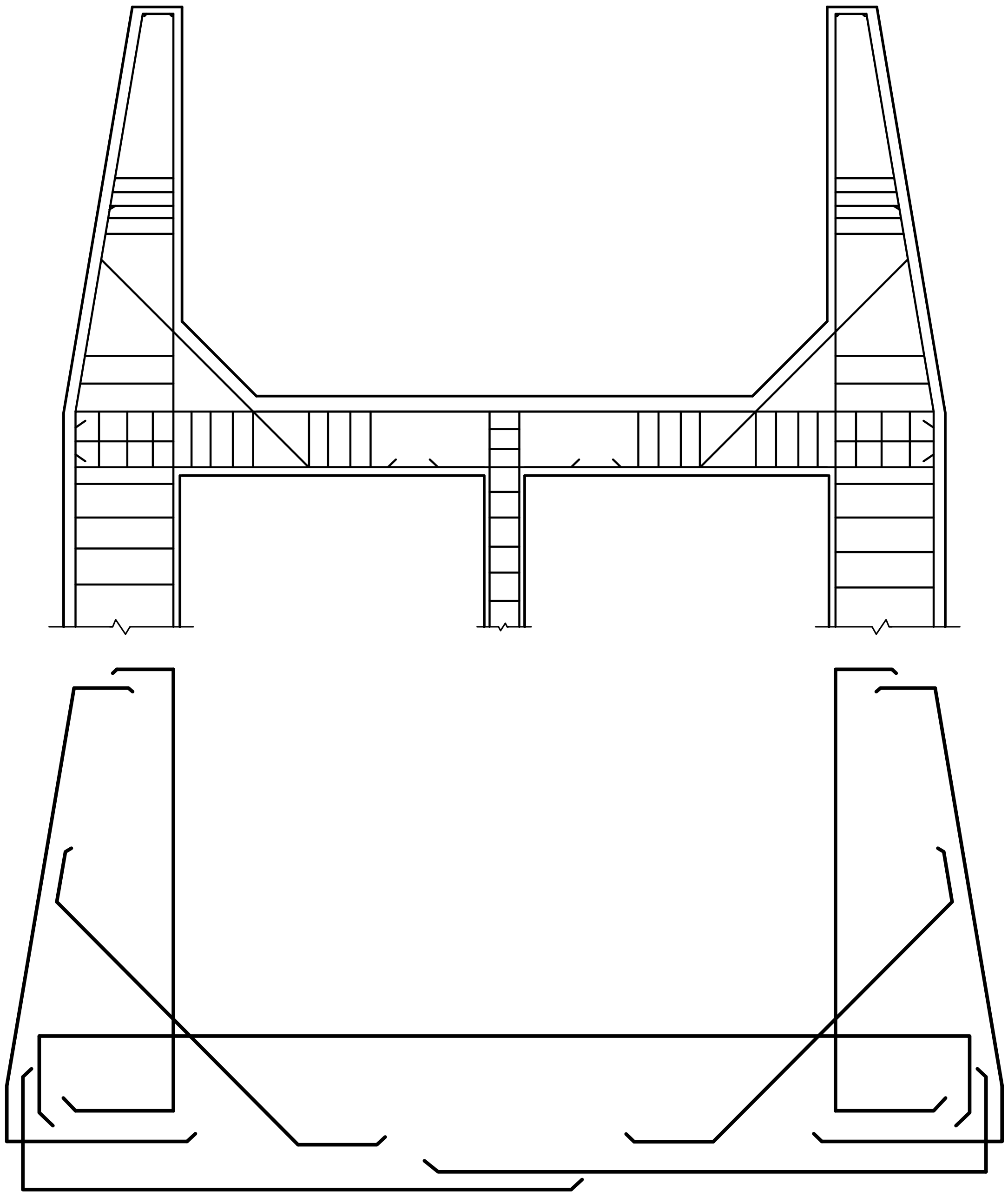
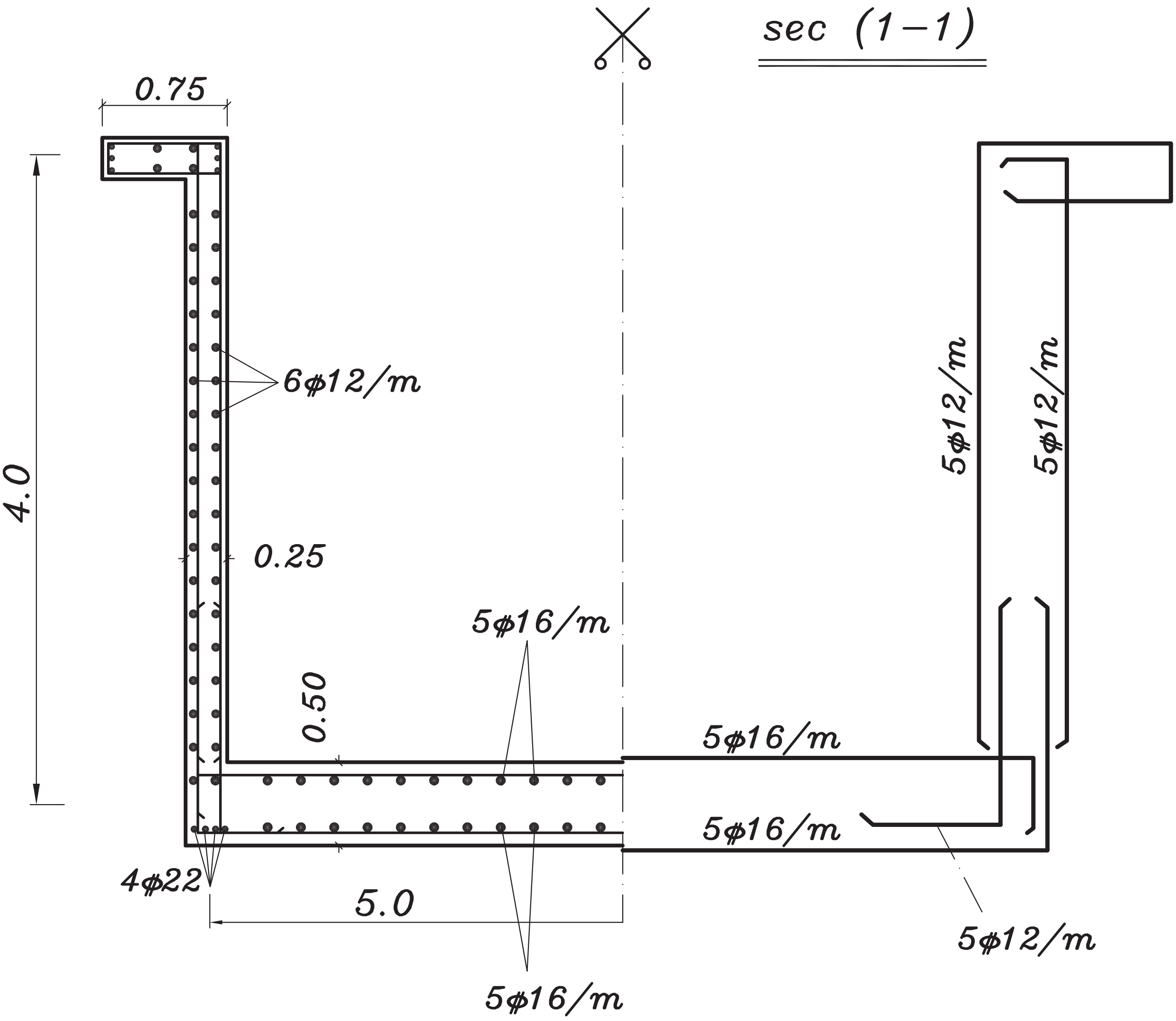
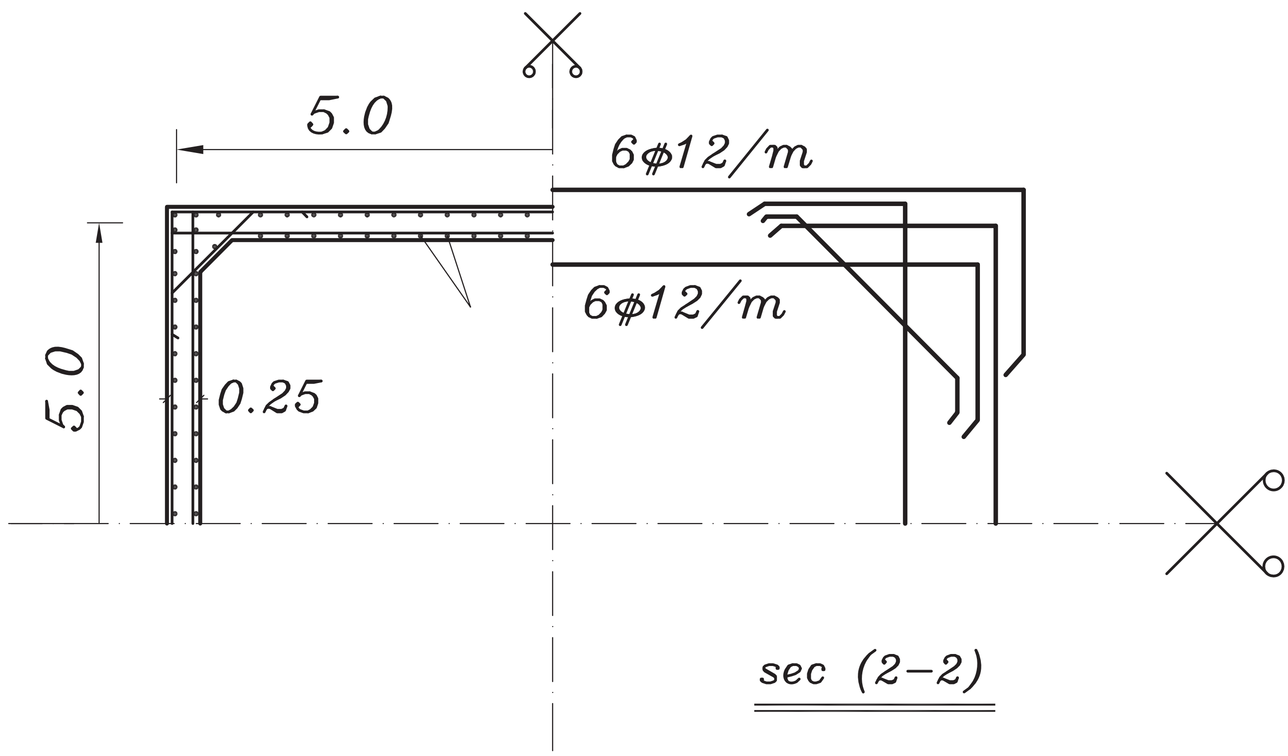
Details of RFT. of counterfort



© Eng. Ezz El-Din Mostafa 2008.

Details of RFT.





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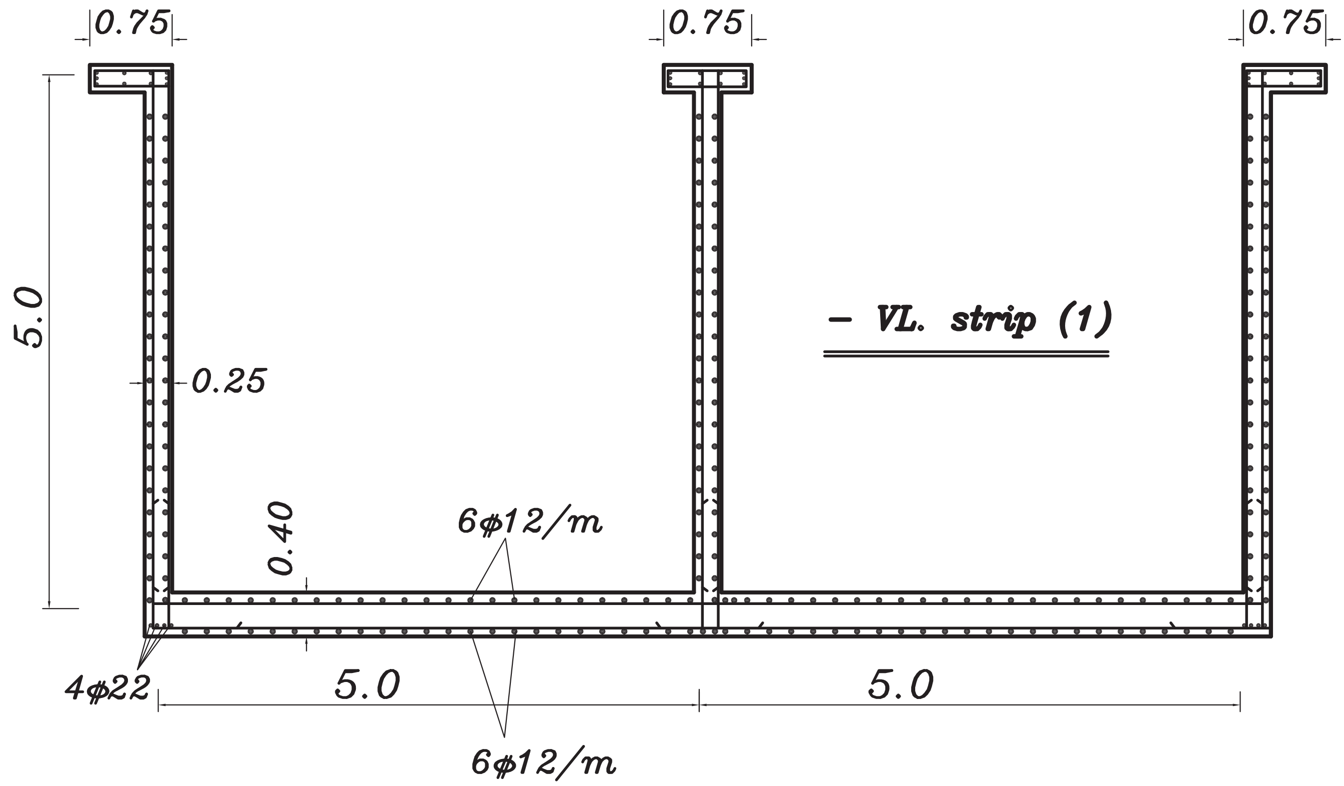
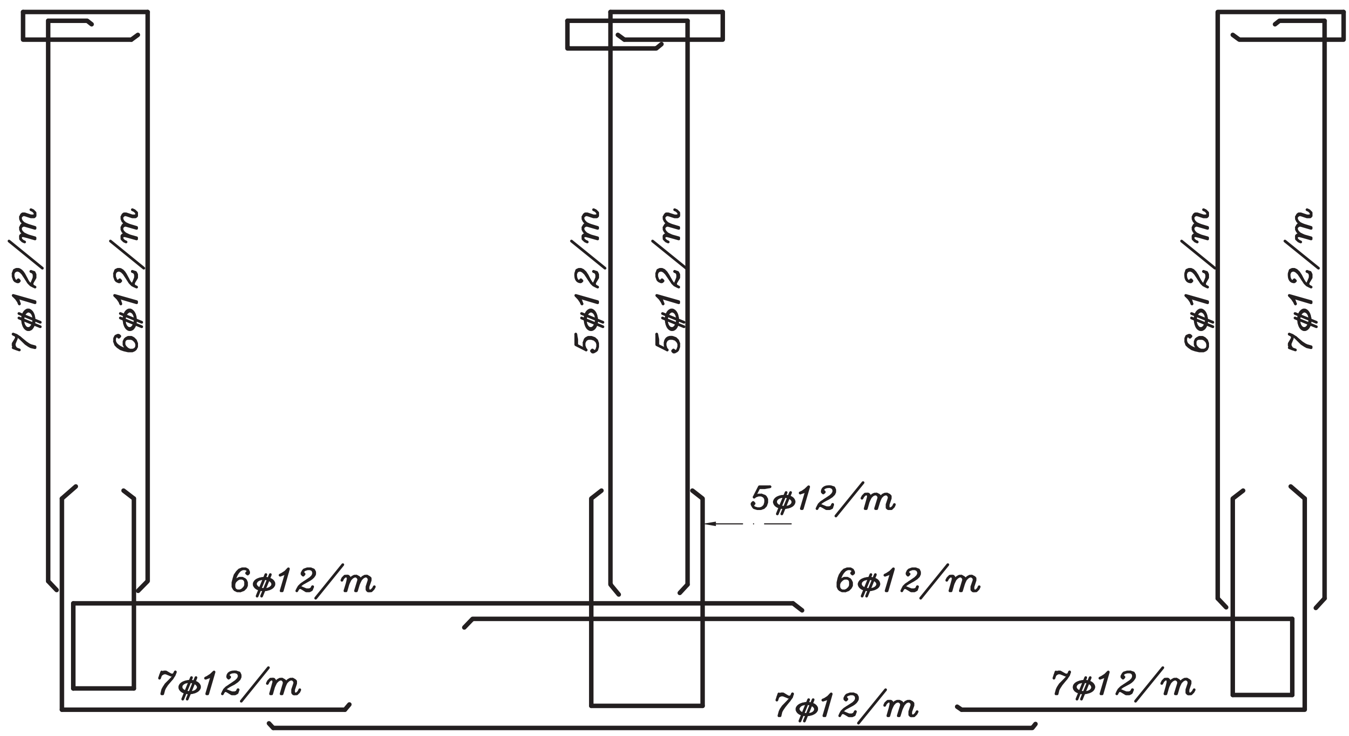
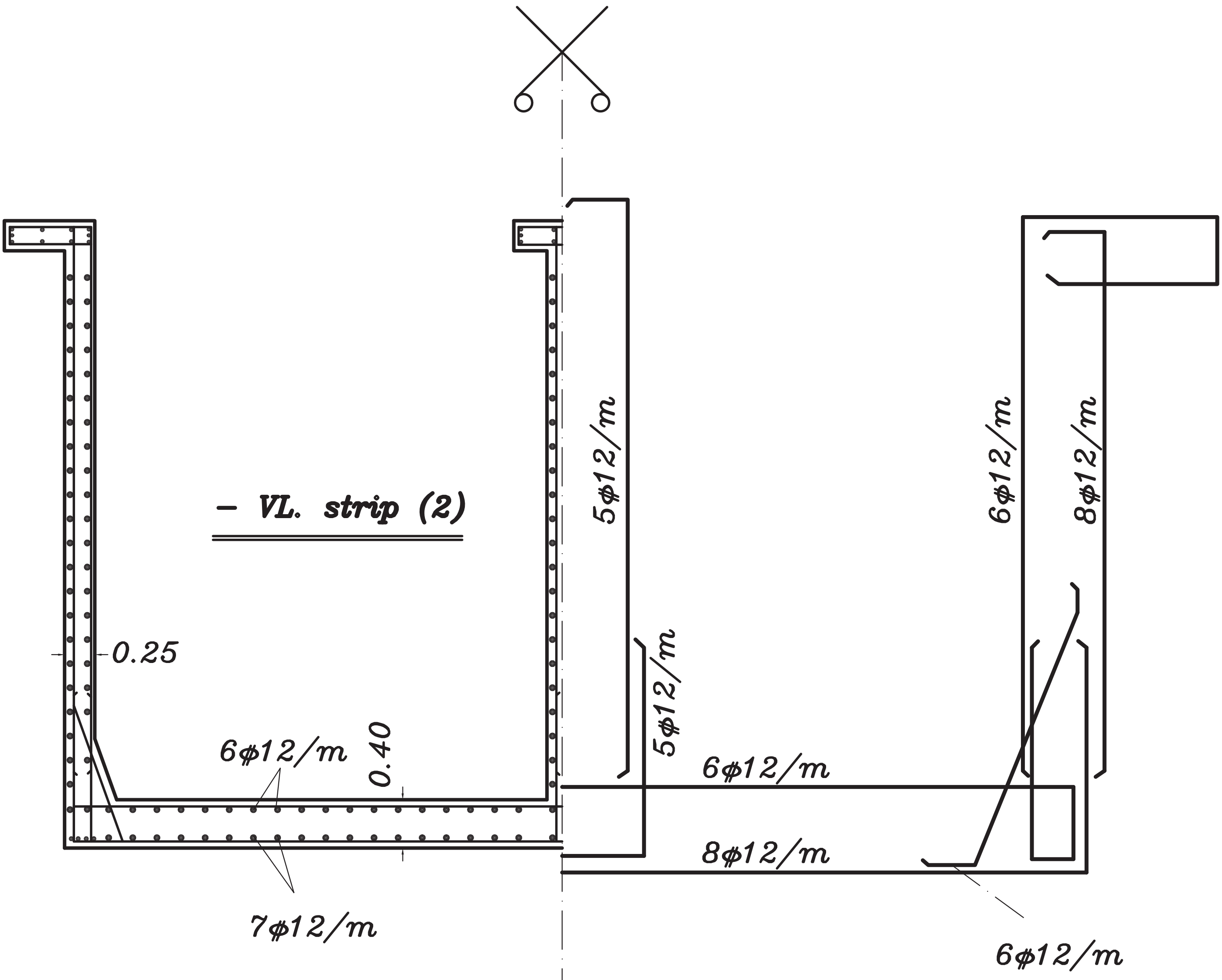
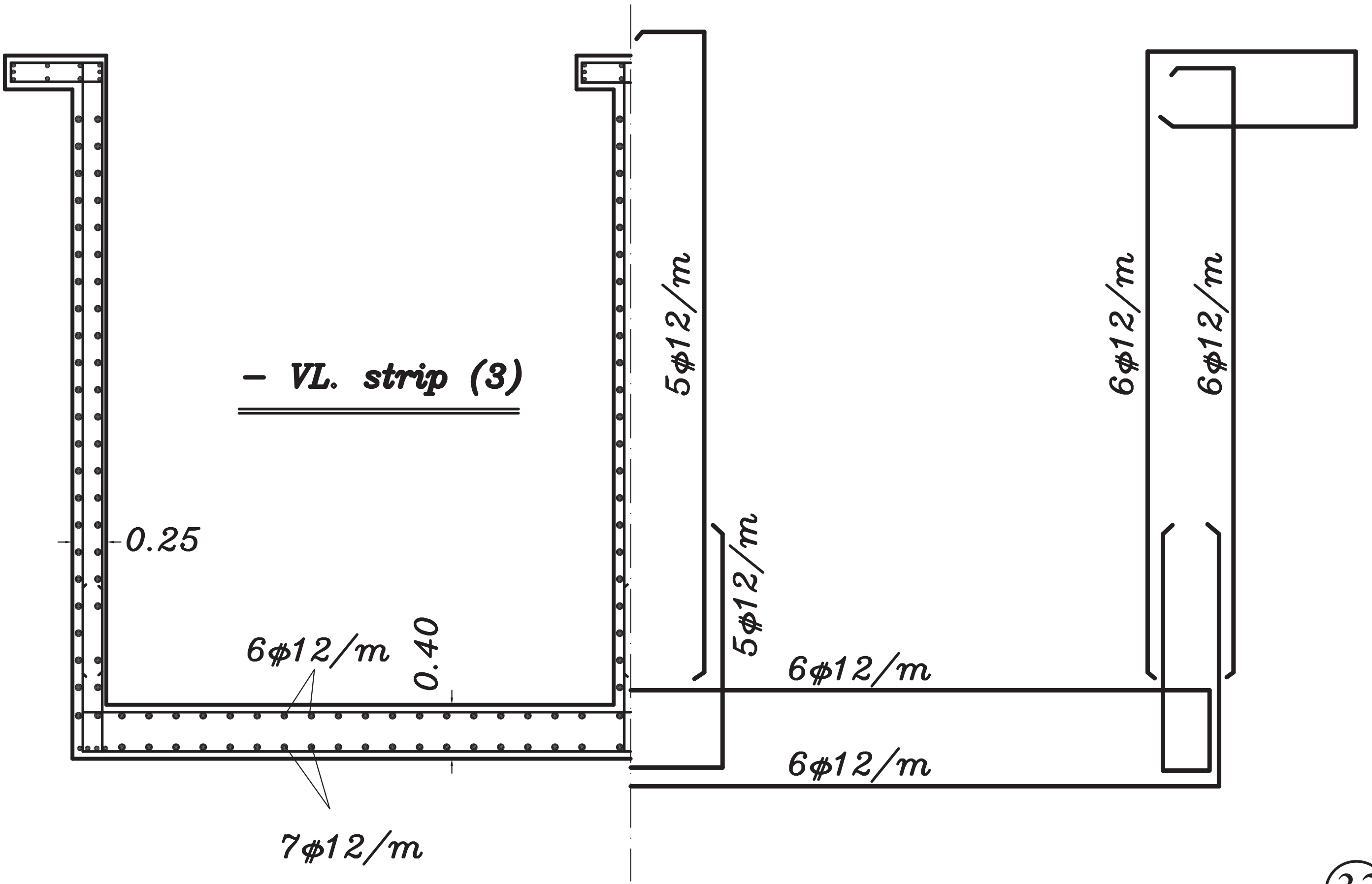
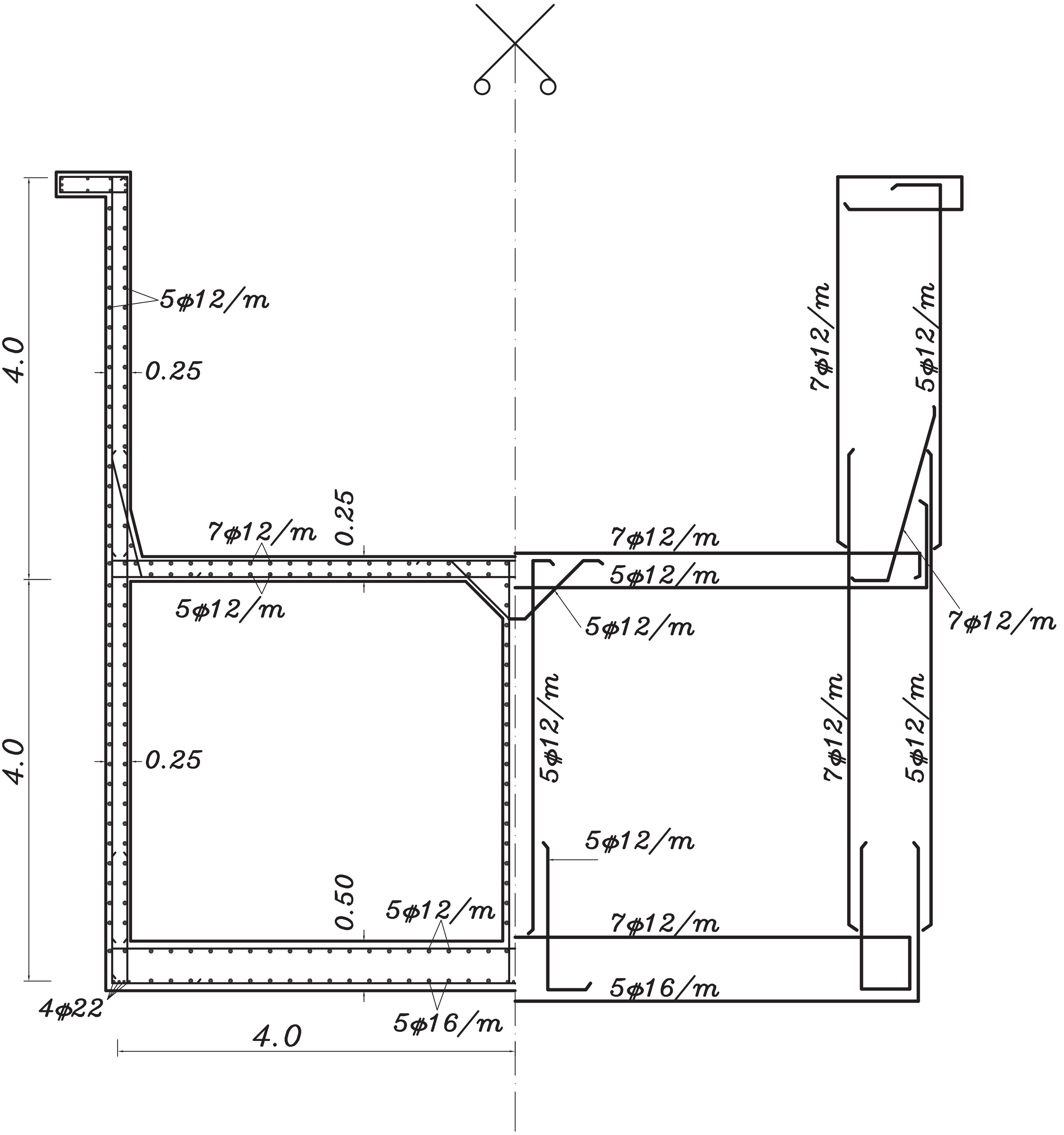




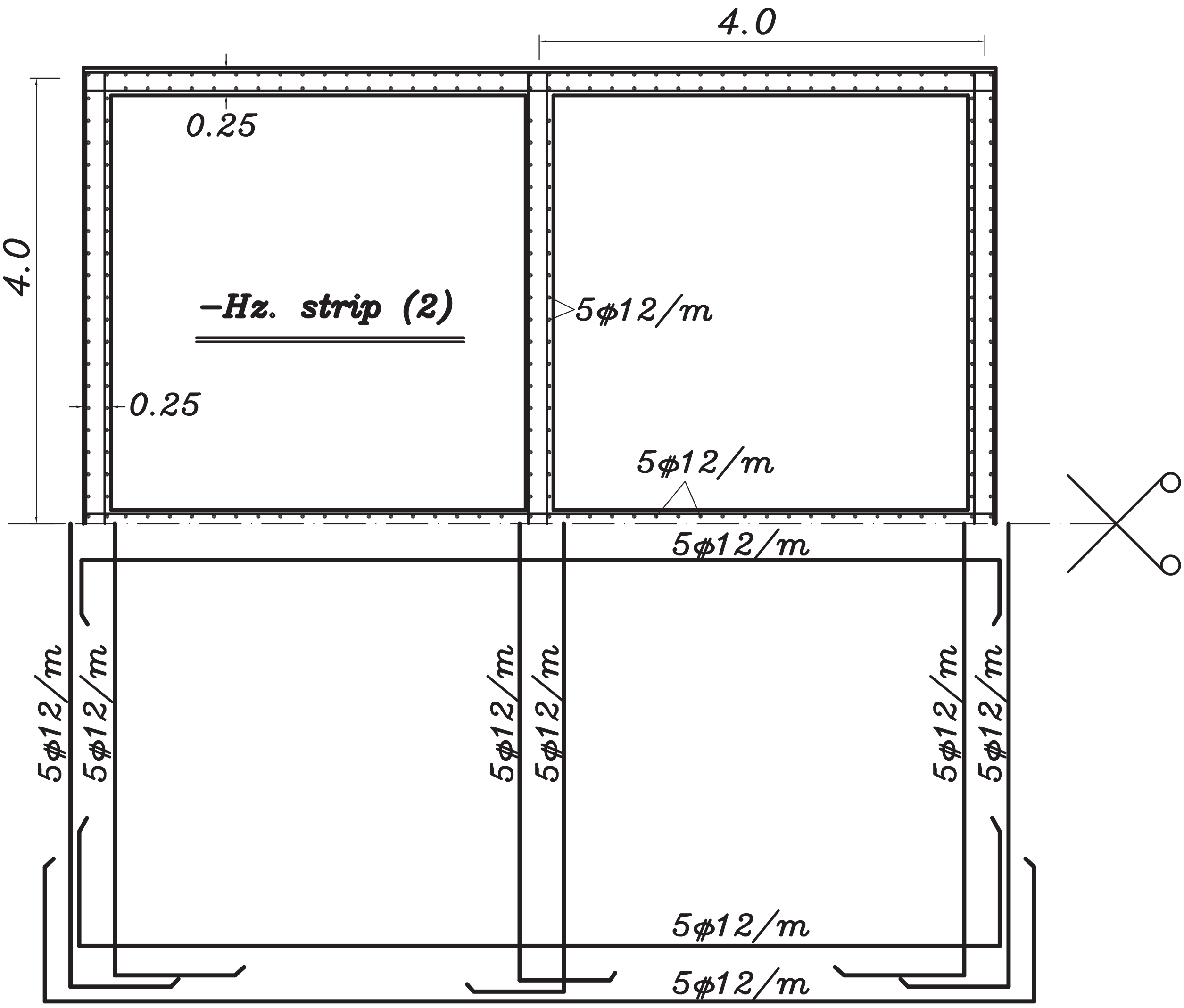

- VL. strip (2)
5φ12/m
6φ12/m
8φ12/m
0.25
5φ12/m
6φ12/m
0.40
6φ12/m
8φ12/m
7φ12/m
6φ12/m

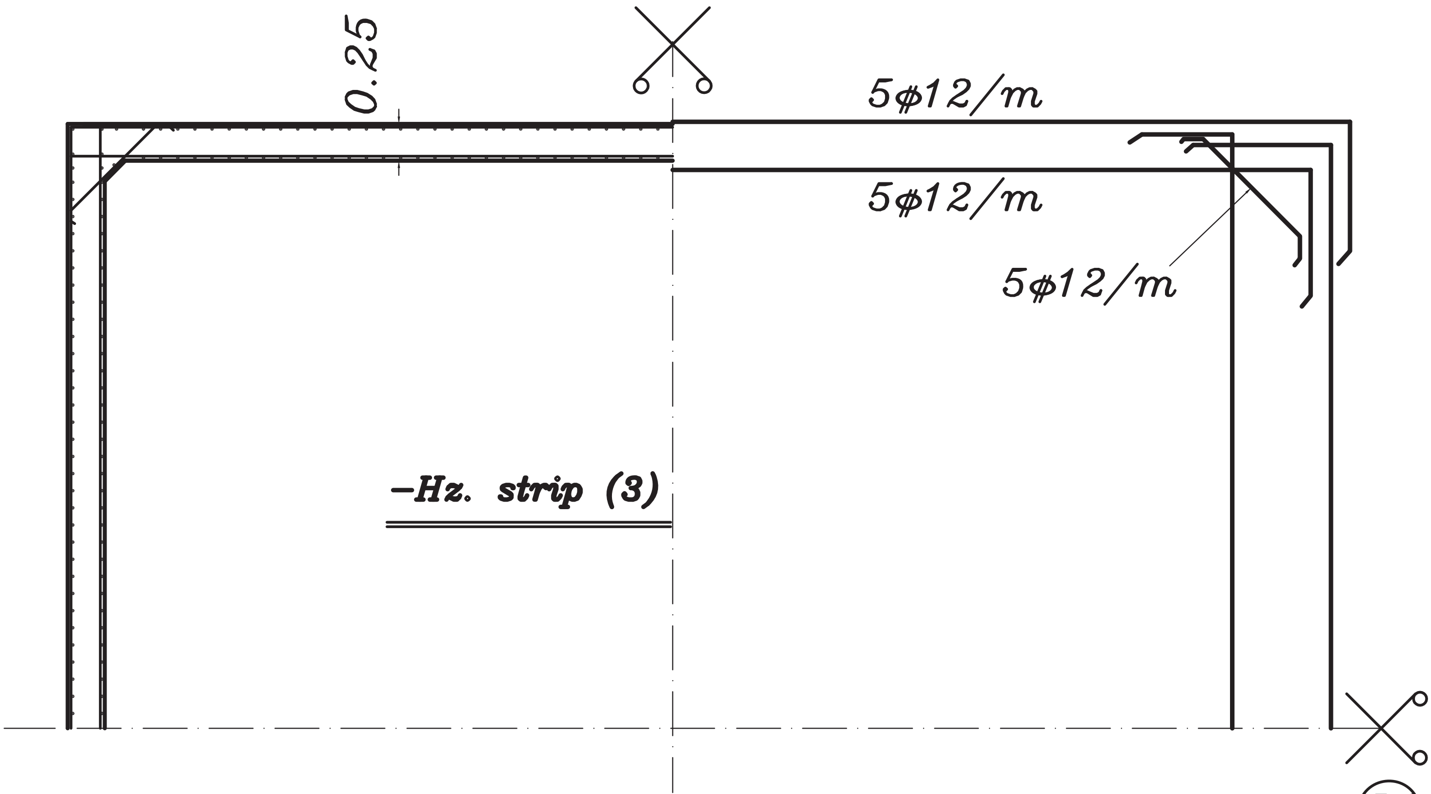

- VL. strip (3)
5φ12/m
6φ12/m
6φ12/m
0.25
5φ12/m
6φ12/m
0.40
6φ12/m
6φ12/m
7φ12/m

Details of RFT.

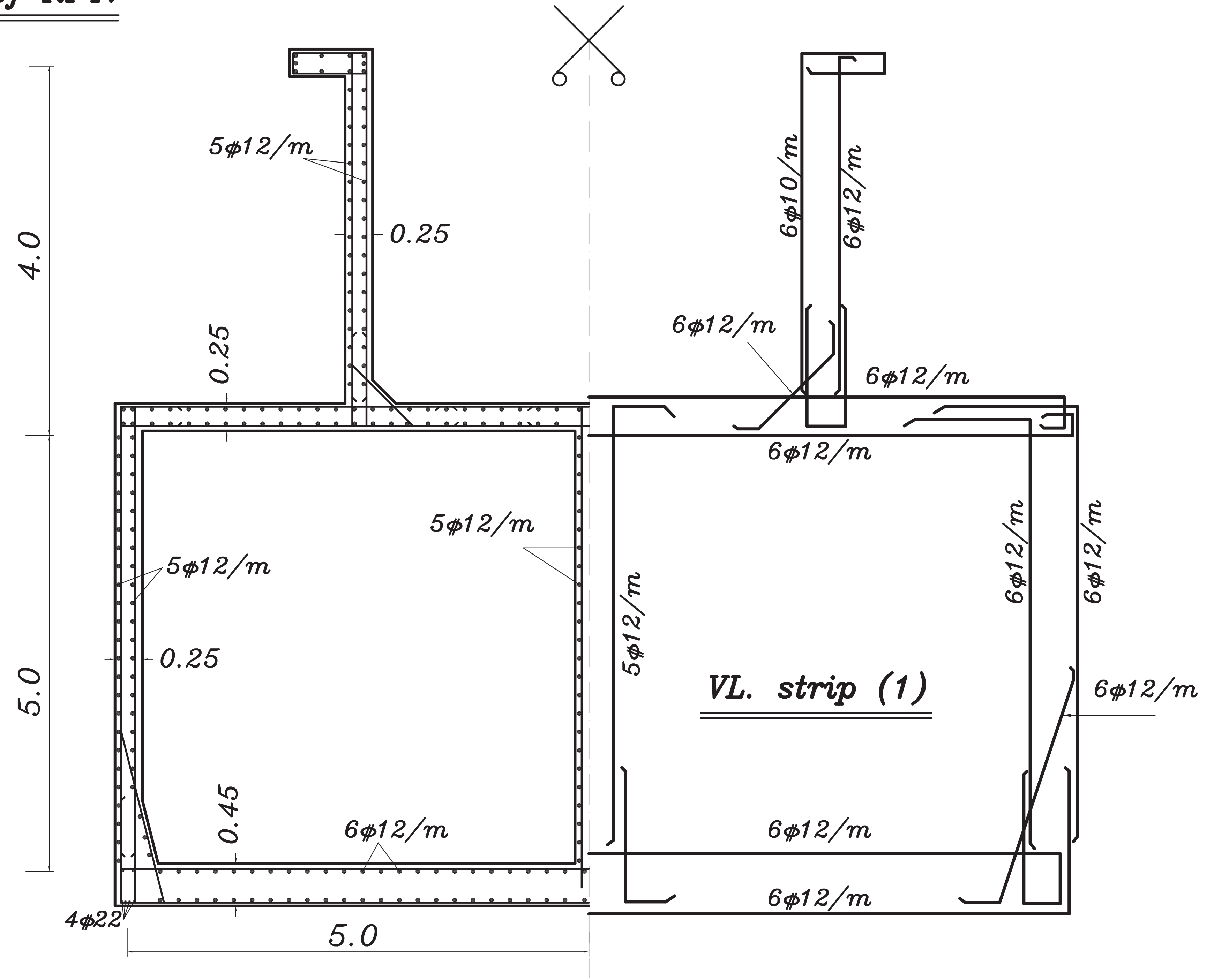


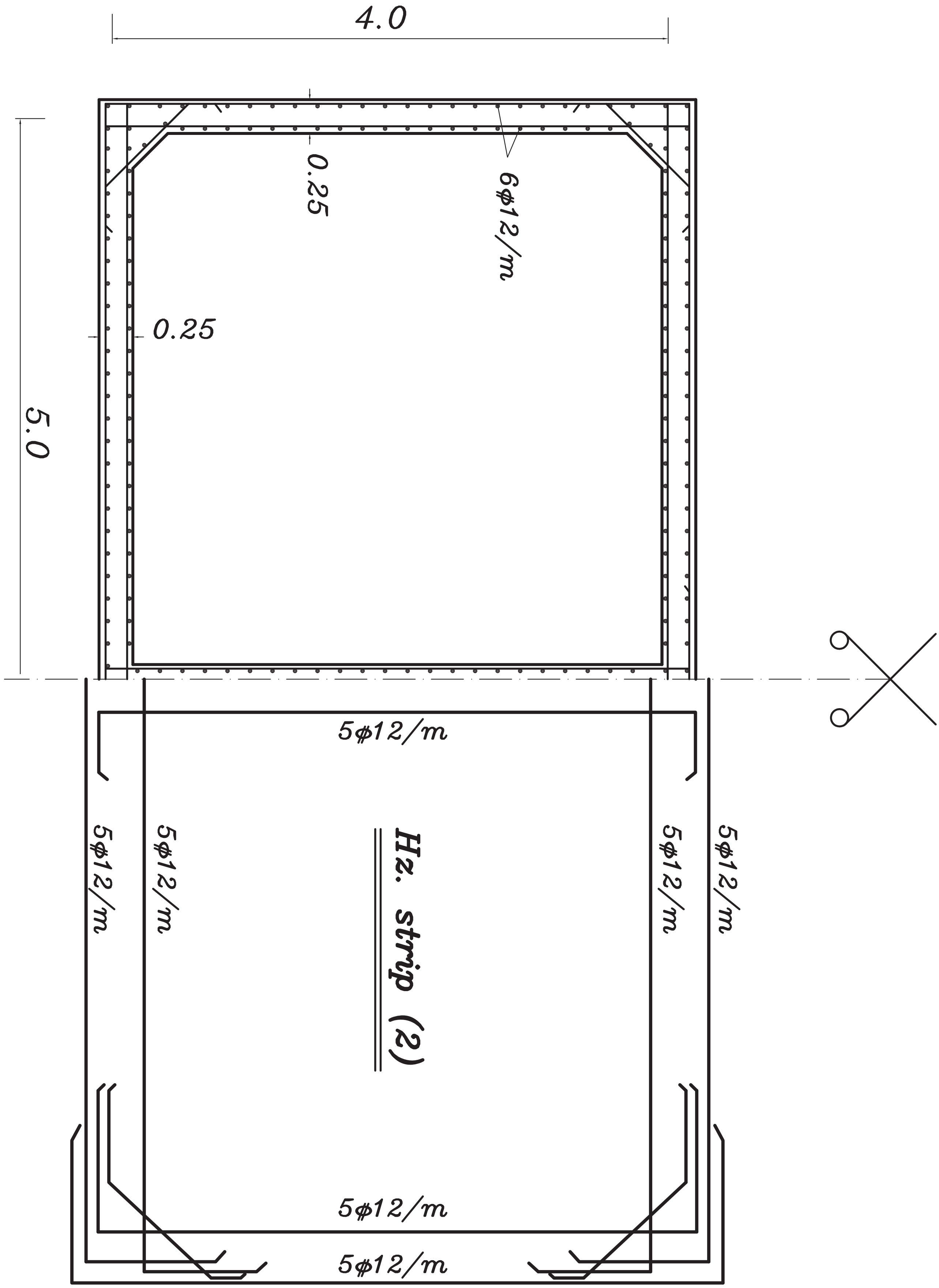
– VL. strip (1)

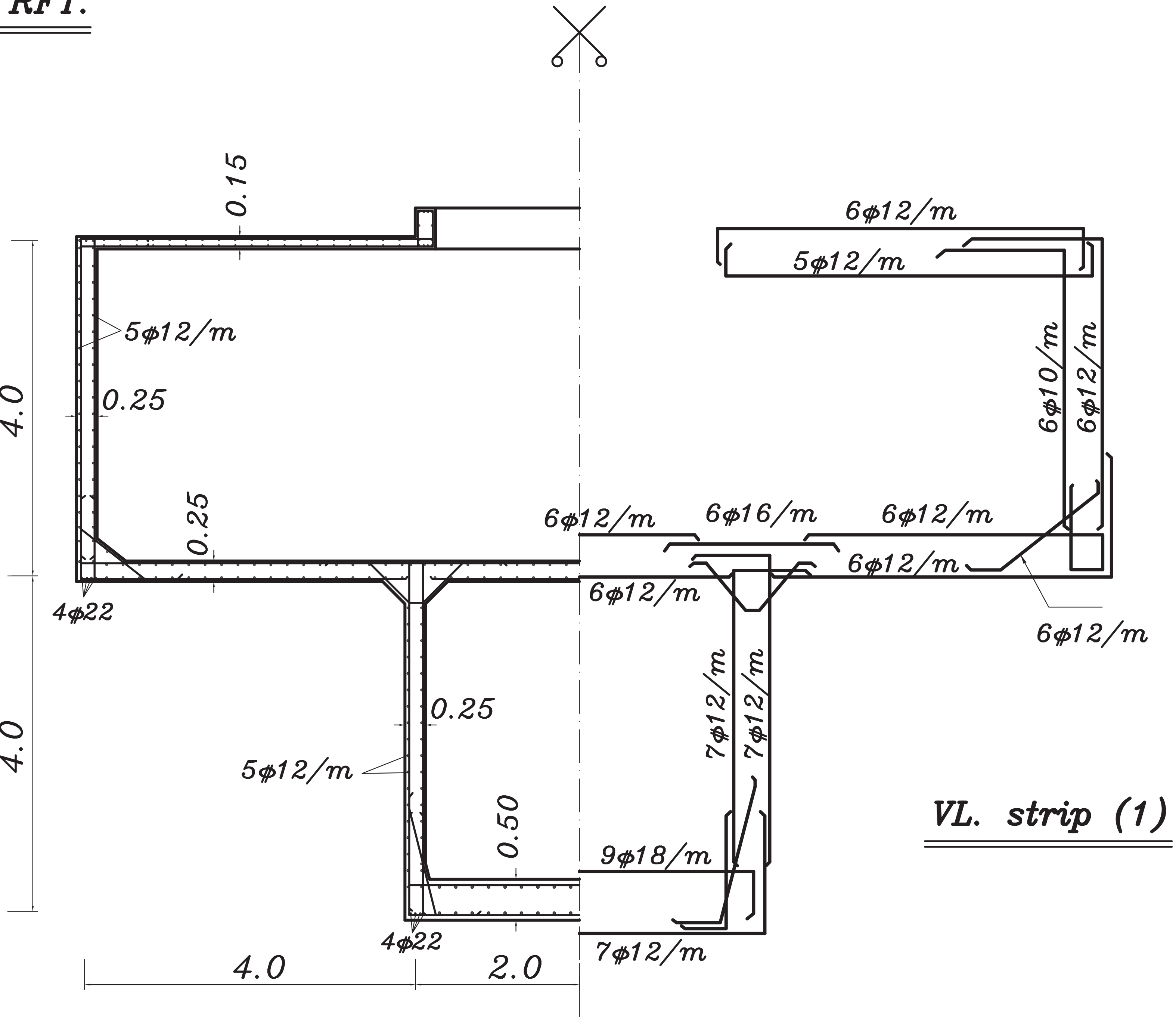

4.0
0.25
4.0
-Hz. strip (2)
5φ12/m
0.25
5φ12/m
5φ12/m
5φ12/m
5φ12/m
5φ12/m
5φ12/m
5φ12/m
5φ12/m
5φ12/m
5φ12/m
5φ12/m


0.25
5φ12/m
5φ12/m
5φ12/m
-Hz. strip (3)

Details of RFT.

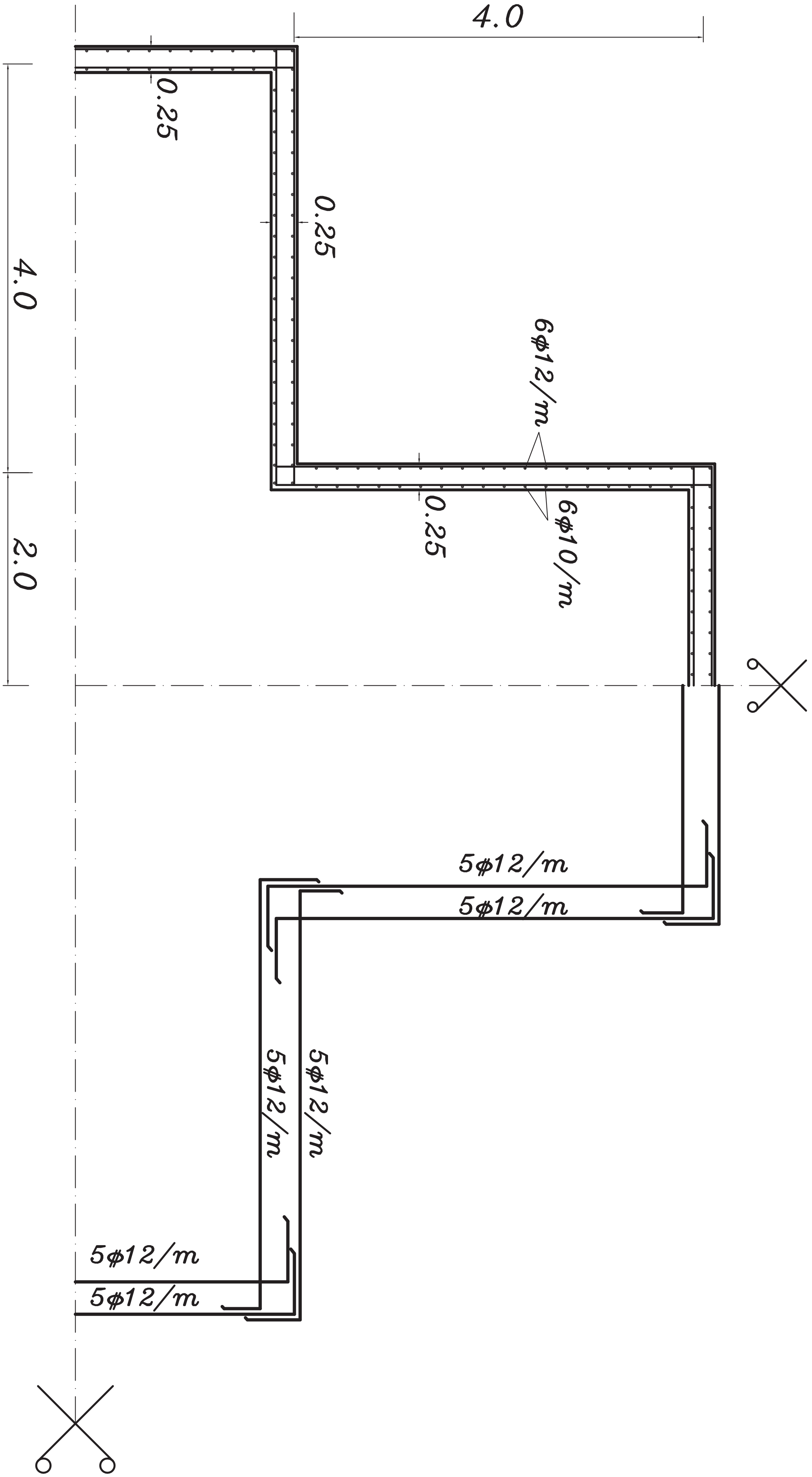



4.0
5.0
0.25
0.25
6φ12/m
5φ12/m
5φ12/m
5φ12/m
5φ12/m
5φ12/m
5φ12/m
5φ12/m
Hz. strip (2)


0.15
5φ12/m
0.25
4.0
0.25
4φ22
6φ12/m
6φ16/m
6φ12/m
6φ12/m
6φ12/m
6φ12/m
6φ12/m
5φ12/m
6φ10/m
6φ12/m
7φ12/m
7φ12/m
0.25
5φ12/m
4.0
0.50
9φ18/m
4φ22
7φ12/m
4.0
2.0

VL. strip (1)

Hz. strip (2)


4.0
0.25
0.25
4.0
6φ12/m
0.25
6φ10/m
2.0
5φ12/m
5φ12/m
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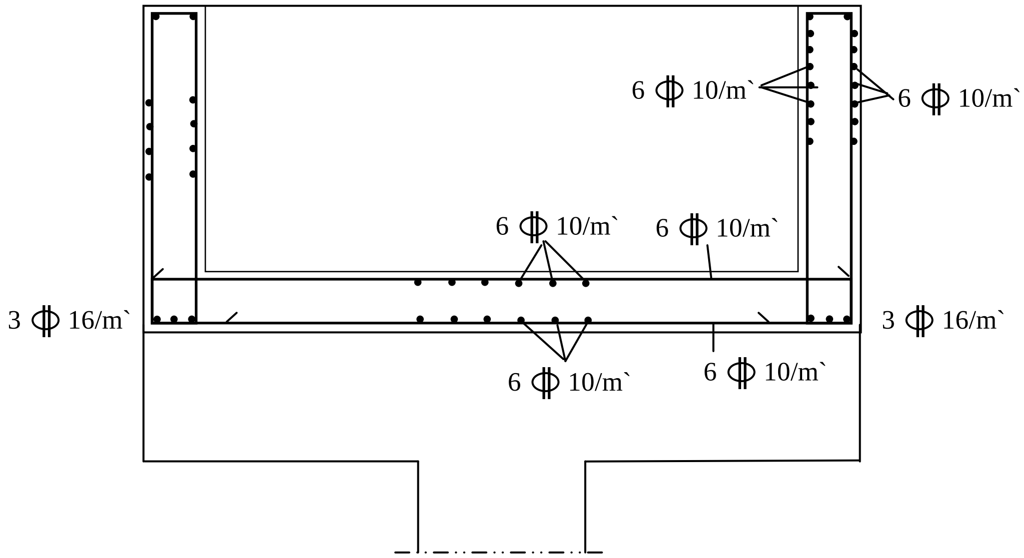
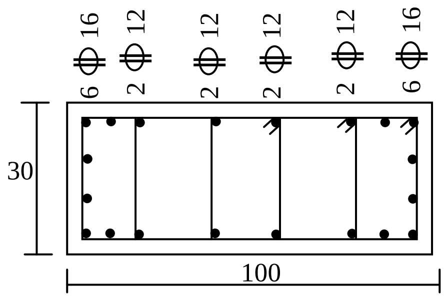
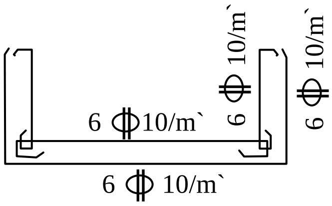
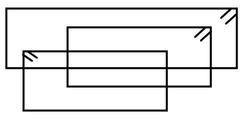
5φ12/m
5φ12/m
5φ12/m



Cross sec. Of column

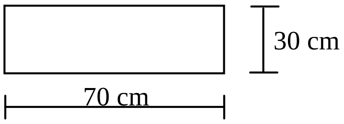






* Design for M & N

$M_u = 9.2$ m.t
$N_u = 48.83$ t



$$e = \frac{M_u}{N_u} = \frac{92}{488.3} = 0.2\text{m}$$

$$\frac{e}{t} = \frac{0.2}{0.7} = 0.3 > 0.05$$

use interaction diagram for $f_y = 360, \alpha = 1, \xi = 0.8$

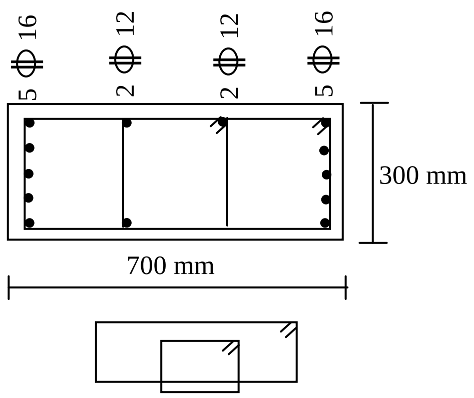
$$k = \frac{N_u}{f_{cu}bt} = \frac{488.3*1000}{25*300*700} = 0.093$$

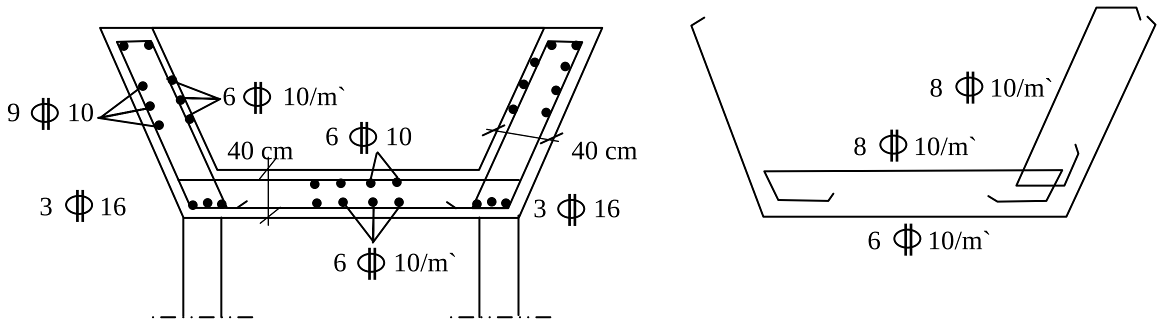
$$k\frac{e}{t} = \frac{M_u}{f_{cu}bt^2} = \frac{92*10^6}{25*300*\overline{700}^2} = 0.025, \quad \rho = o$$

$$\text{use min. steel} \quad A_s = \frac{0.4}{100}*300*700 = 8400 \text{ mm}^2/\text{side}$$

use 5 Φ 16

Sec. in column





Cross-section of tank