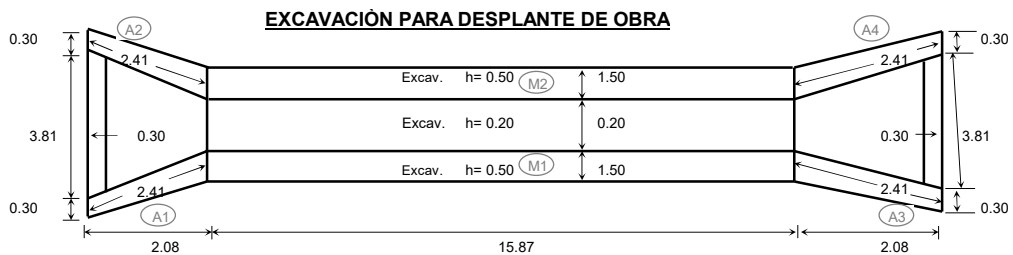


CAMINO: MONTERREY - COLOMBIA
 TRAMO: LA GLORIA - COLOMBIA
 ALCANTARILLA DE LOSA : DE 1.40 X 1.20 X 15.87
 ESTACION DE OBRA : 215+374.10 ESVIAJE NORMAL EN TANGENTE



EN MUROS = 23.80 M3

VM 1	=	15.87	X	1.50	X	0.50	=	11.90	M3
VM2	=	15.87	X	1.50	X	0.50	=	11.90	M3

EN ALEROS = 3.76 M3

VA1	=	((1.50 + 0.30) / 2.00)	X	2.08	X	0.50	=	0.94	M3
VA2	=	((1.50 + 0.30) / 2.00)	X	2.08	X	0.50	=	0.94	M3
VA3	=	((1.50 + 0.30) / 2.00)	X	2.08	X	0.50	=	0.94	M3
VA4	=	((1.50 + 0.30) / 2.00)	X	2.08	X	0.50	=	0.94	M3

EN PLANTILLA = 2.31 M3

VM	=	15.87	X	0.20	X	0.20	=	0.63	M3
VI	=	((3.81 + 0.20) / 2.00)	X	2.08	X	0.20	=	0.84	M3
VD	=	((3.81 + 0.20) / 2.00)	X	2.08	X	0.20	=	0.84	M3

EN DENTELLONES = 0.68 M3

VI	=	3.81	X	0.30	X	0.30	=	0.34	M3
VD	=	3.81	X	0.30	X	0.30	=	0.34	M3

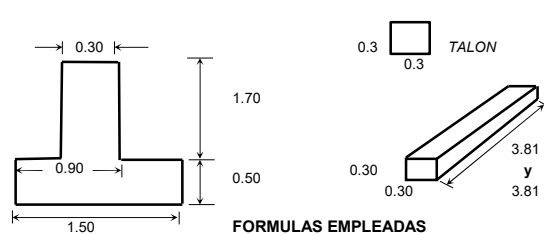
VOLUMEN TOTAL = 23.80 + 3.76 + 2.31 + 0.68

VOLUMEN TOTAL = 31 M3

CAMINO: MONTERREY - COLOMBIA
 TRAMO: LA GLORIA - COLOMBIA
 ALCANTARILLA DE LOSA : DE 1.40 X 1.20 X 15.87
 ESTACION DE OBRA : 215+374.10 ESVAIJE NORMAL EN TANGENTE

CONCRETO SIMPLE DE F'c = 200 KG/CM2

EN MUROS, ALEROS Y DENTELLONES

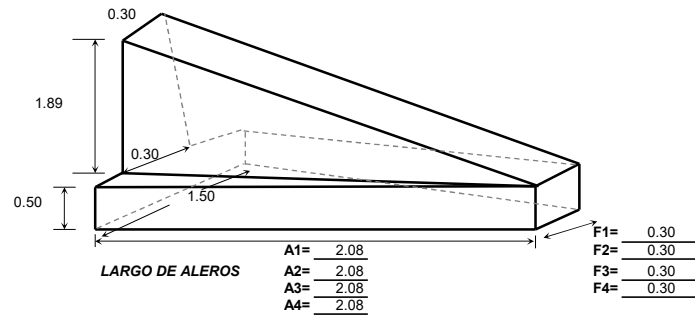


FORMULAS EMPLEADAS

CUBO: $V = L \times L \times L$

RECTANGULO: $V = (b \times h) \times H$

TRIANGULO: $V = (b \times h) / 2 \times H$



EN MUROS = 42.85 M3

$$\begin{aligned} VM &= ((1.50 \times 0.50) + ((1.70 \times 0.30) \times 15.87)) \times 2.00 = 2.86 \text{ M3} \\ VTAL &= 0.30 \times 0.30 \times 3.81 = 0.35 \text{ M3} \end{aligned}$$

EN ALEROS = 6.12 M3

$$\begin{aligned} VA1 &= (((1.50 + 0.30) / 2) \times 2.00) \times 0.50 = 0.90 \text{ M3} \\ VA2 &= (((1.50 + 0.30) / 2) \times 2.00) \times 0.50 = 0.90 \text{ M3} \\ VA3 &= (((1.50 + 0.30) / 2) \times 2.00) \times 0.50 = 0.90 \text{ M3} \\ VA4 &= (((1.50 + 0.30) / 2) \times 2.00) \times 0.50 = 0.90 \text{ M3} \end{aligned}$$

EN DENTELLONES = 0.68 M3

$$\begin{aligned} VI &= 0.30 \times 0.30 \times 3.81 = 0.35 \text{ M3} \\ VD &= 0.30 \times 0.30 \times 3.81 = 0.35 \text{ M3} \end{aligned}$$

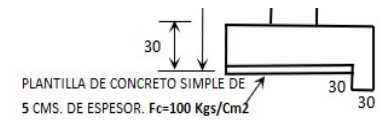
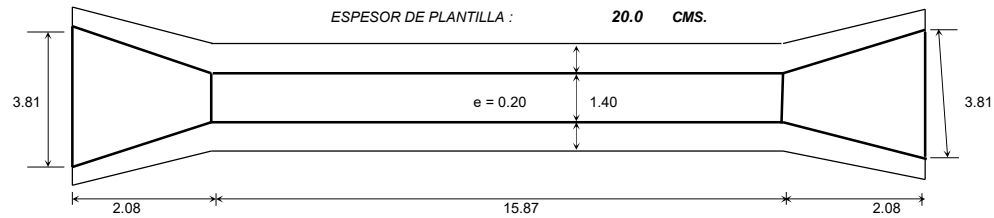
$$VOLUMEN \text{ TOTAL} = 42.85 + 6.12 + 0.68 = 49.65 \text{ M3}$$

$$VOLUMEN \text{ TOTAL} = 49.46 \text{ M3}$$

CON DESCUENTO DE ACERO

CAMINO: MONTERREY - COLOMBIA
 TRAMO: LA GLORIA - COLOMBIA
 ALCANTARILLA DE LOSA : DE 1.40 X 1.20 X 15.87
 ESTACION DE OBRA : 215+374.10 ES VIAJE NORMAL EN TANGENTE

CONCRETO SIMPLE DE $F_c = 100 \text{ KGS/CM}^2$

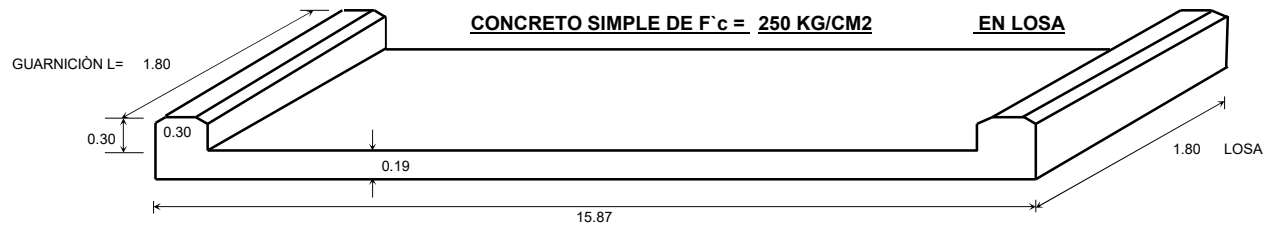


EN PLANTILLA = 9.60 M3											
VAM	=	15.87	X	1.40	X	0.20	=	4.44	M3		
VPLA	=	20.04	X	1.50	X	0.05	X	2.00	=	3.01	M3
VA1	=	((3.81	+	1.40)	/	2.00)	X	2.08)	X	0.20	= 1.09 M3
VA2	=	((3.81	+	1.40)	/	2.00)	X	2.08)	X	0.20	= 1.09 M3
VOLUMEN TOTAL = 4.44 + 3.01 + 1.09 + 1.09											
VOLUMEN TOTAL = 9.60 M3											

CAMINO: MONTERREY - COLOMBIA
 TRAMO: LA GLORIA - COLOMBIA

ALCANTARILLA DE LOSA :
 ESTACION DE OBRA : 215+374.10

DE 1.40 X 1.20 X 15.87
 ESVAJE NORMAL EN TANGENTE
 CONCRETO SIMPLE DE F'c = 250 KG/CM2 EN LOSA



EN LOSA = 5.43 M3
 V = 15.87 X 1.80 X 0.19 = 5.43 M3

EN GUARNICIONES = 0.32 M3
 V = 0.30 X 0.30 X 1.80 X 2.00 = 0.32 M3

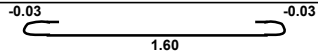
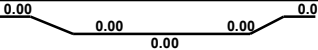
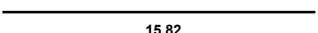
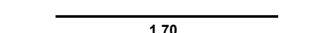
VOLUMEN TOTAL = 5.43 + 0.32

VOLUMEN TOTAL = 5.75 M3 - 0.05 = 5.70 M3

CON DESCUENTO DE ACERO

CAMINO: MONTERREY - COLOMBIA
TRAMO: LA GLORIA - COLOMBIA
ALCANTARILLA DE LOSA : DE 1.40 X 1.20 X 15.87
ESTACION DE OBRA : 215+374.10 ESVAJE NORMAL EN TANGENTE

ACERO DE REFUERZO PARA LOSA

LISTA DE VARILLAS Y PESOS						
DESIGNACION	NUMERO	DIAMETRO	CROQUIS	LONGITUD	ESPACIO	PESO (KG)
VARILLAS " A "	159	4		1.54	0.100 Y 0.200	244
VARILLAS " B "	0	0		0.00	0.000	0
VARILLAS " C "	11	4		15.82	0.200	174
VARILLAS " D "	0	0		0.00	0.000	0
VARILLAS " E "	0	0		0.00	0.000	0
VARILLAS " F "	4	4		1.70	0.100	7

VARILLAS	"A"	159	X	1.54	X	1.000	=	244	KGS.
VARILLAS	"B"	0	X	0.00	X	0.000	=	0	KGS.
VARILLAS	"C"	11	X	15.82	X	1.000	=	174	KGS.
VARILLAS	"D"	0	X	0.00	X	0.000	=	0	KGS.
VARILLAS	"E"	0	X	0.00	X	0.000	=	0	KGS.
VARILLAS	"F"	4	X	1.70	X	1.000	=	7	KGS.

VARILLAS	"A"	244	KGS.
VARILLAS	"B"	0	KGS.
VARILLAS	"C"	174	KGS.
VARILLAS	"D"	0	KGS.
VARILLAS	"E"	0	KGS.
VARILLAS	"F"	7	KGS.

PESO TOTAL	425	KGS.
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CAMINO: MONTERREY - COLOMBIA
TRAMO: LA GLORIA - COLOMBIA
ALCANTARILLA DE LOSA : DE 1.40 X 1.20 X 15.87
ESTACION DE OBRA : 215+374.10 ES VIAJE NORMAL EN TANGENTE

DESCUENTO DE ACERO DE REFUERZO A CONCRETO SIMPLE EN LOSA DE 250 KG/CM2

VARILLAS	"A"	159	X	1.54	X	1.000	=	244	KGS.
VARILLAS	"B"	0	X	0.00	X	0.000	=	0	KGS.
VARILLAS	"C"	11	X	15.82	X	1.000	=	174	KGS.
VARILLAS	"D"	0	X	0.00	X	0.000	=	0	KGS.
VARILLAS	"E"	0	X	0.00	X	0.000	=	0	KGS.
VARILLAS	"F"	4	X	1.70	X	1.000	=	7	KGS.

VARILLAS	"A"	244	KGS.
VARILLAS	"B"	0	KGS.
VARILLAS	"C"	174	KGS.
VARILLAS	"D"	0	KGS.
VARILLAS	"E"	0	KGS.
VARILLAS	"F"	7	KGS.

PESO TOTAL 425 KGS.

Tipo de varillas	Diametro	Area de Acero en (m2)	Numero de Varillas	Longitud (m)	Volumen (m3)
A	4	0.000127	159	1.54	0.03
B	0	0	0	0.00	0.00
C	4	0.000127	11	15.82	0.02
D	0	0.000000	0	0.00	0.00
E	0	0.000000	0	0.00	0.00
F	4	0.000127	4	1.70	0.00

0.05 POR LOSA

VOLUMEN DE ACERO EN MUROS 0.24 EN MUROS

VOLUMEN TOTAL DE DESCUENTO EN LOSA Y MUROS = 0.29 M3

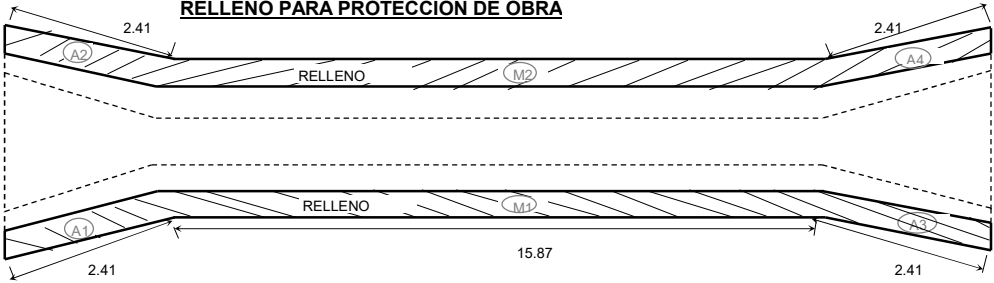
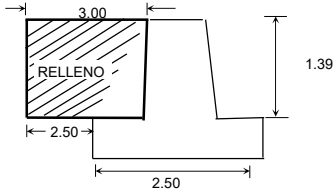
VAR. No.	DIAM.	PLGS.	AREA (CM2)	PESO (KG)
2.5	0.79	5/16"	0.49	0.384
3	0.95	3/8"	0.71	0.560
4	1.27	1/2"	1.27	1.000
5	1.59	5/8"	1.99	1.570
6	1.91	3/4"	2.87	2.260
7	2.22	7/8"	3.87	3.070
8	2.54	1"	5.07	4.000
9	2.86	1 1/8"	6.42	5.100
10	3.18	1 1/4"	7.94	6.300
11	3.49	1 3/8"	9.56	7.600
12	3.81	1 1/2"	11.40	9.000

DENSIDAD DEL ACERO
7,860 KGS/M3

CAMINO: MONTERREY - COLOMBIA
TRAMO: LA GLORIA - COLOMBIA
ALCANTARILLA DE LOSA :
ESTACION DE OBRA :

DE 1.40 X 1.20 X 15.87
ESVIAJE NORMAL EN TANGENTE

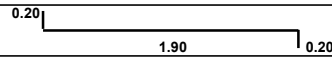
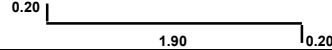
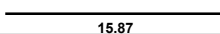
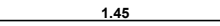
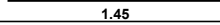
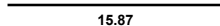
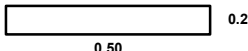
RELLENO PARA PROTECCIÓN DE OBRA



EN MUROS =		121.33	M3
VM 1y2	=	((2.50 + 3.00) / 2.00) X 1.39 X (15.87) X (2.00)	= 121.33 M3
EN ALEROS =		17.85	M3
VA1	=	((2.41 X 1.39) / 2.00) X (3.00 + 2.50 + 2.50) / 3.00	= 4.46 M3
VA2	=	((2.41 X 1.39) / 2.00) X (3.00 + 2.50 + 2.50) / 3.00	= 4.46 M3
VA3	=	((2.41 X 1.39) / 2.00) X (3.00 + 2.50 + 2.50) / 3.00	= 4.46 M3
VA4	=	((2.41 X 1.39) / 2.00) X (3.00 + 2.50 + 2.50) / 3.00	= 4.46 M3
VOLUMEN TOTAL =		121.33 + 17.85	
VOLUMEN TOTAL		= 139	M3

CAMINO: MONTERREY - COLOMBIA
TRAMO: LA GLORIA - COLOMBIA
ALCANTARILLA DE LOSA : DE 1.40 X 1.20 X 15.87
ESTACION DE OBRA : 215+374.10 ESVAJE NORMAL EN TANGENTE

ACERO DE REFUERZO EN MURO

LISTA DE VARILLAS Y PESOS						
DESIGNACION	NUMERO	DIAMETRO	CROQUIS	LONGITUD	ESPACIO	PESO (KG)
VARILLAS " A "	80	5		2.30	0.200	289.00
VARILLAS " B "	64	3		2.30	0.250	82.00
VARILLAS " C "	17	3		15.87	0.250	151.00
VARILLAS " D "	64	4		1.45	0.250	93.00
VARILLAS " E "	80	4		1.45	0.200	116
VARILLAS " F "	16	3		15.87	0.250	142
VARILLAS " G "	80	3		1.40	0.200	63

VARILLAS	"A"	80	X	2.30	X	1.57	=	289	KGS.
VARILLAS	"B"	64	X	2.30	X	0.56	=	82	KGS.
VARILLAS	"C"	17	X	15.87	X	0.56	=	151	KGS.
VARILLAS	"D"	64	X	1.45	X	0.99	=	93	KGS.
VARILLAS	"E"	80	X	1.45	X	1.00	=	116	KGS.
VARILLAS	"F"	16	X	15.87	X	0.56	=	142	KGS.
VARILLAS	"G"	80	X	1.40	X	0.56	=	63	KGS.

VARILLAS	"A"	289	KGS.
VARILLAS	"B"	82	KGS.
VARILLAS	"C"	151	KGS.
VARILLAS	"D"	93	KGS.
VARILLAS	"E"	116	KGS.
VARILLAS	"F"	142	KGS.
VARILLAS	"F"	63	KGS.

PESO TOTAL	936	X	2	=	1,872	KGS.
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