



مبانی طراحی و ساخت دریچه های کشویی



تیرماه ۱۳۷۱

نشریه شماره ۱۰۲ - ن

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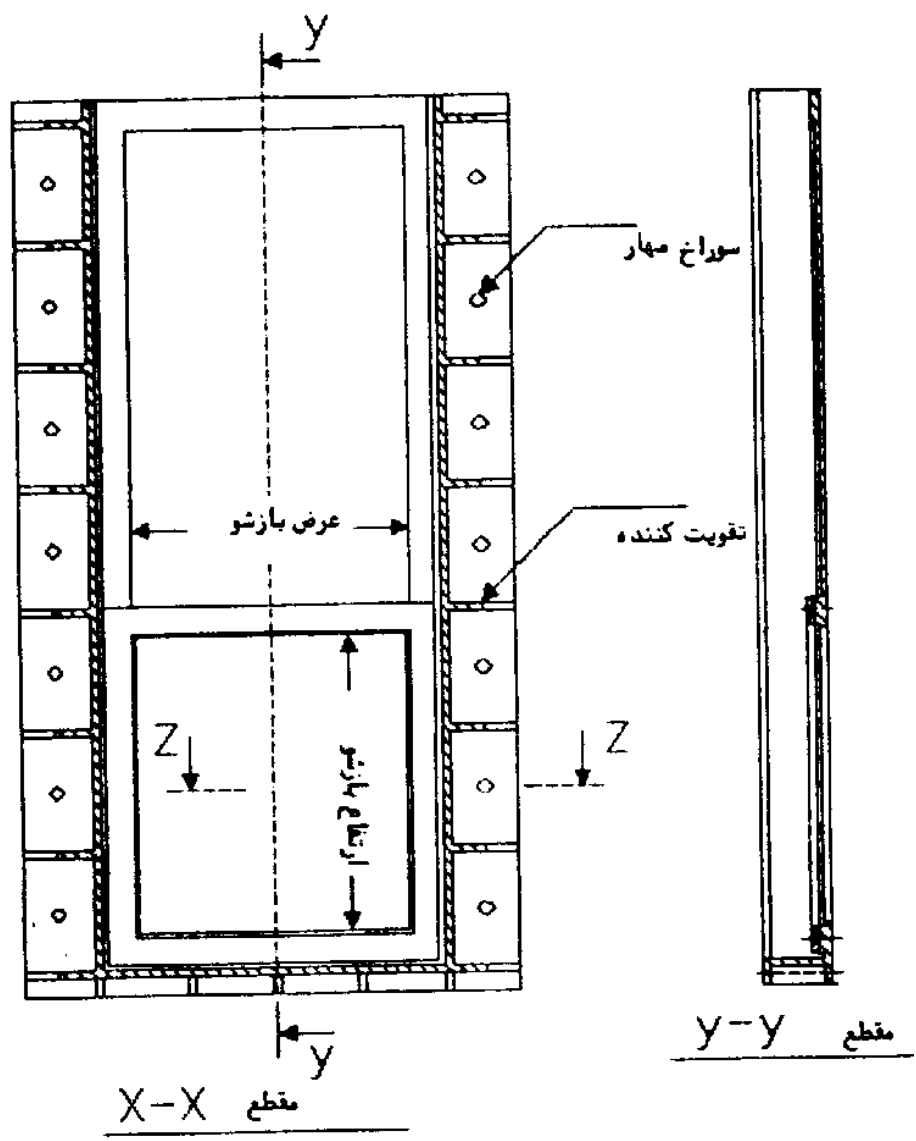
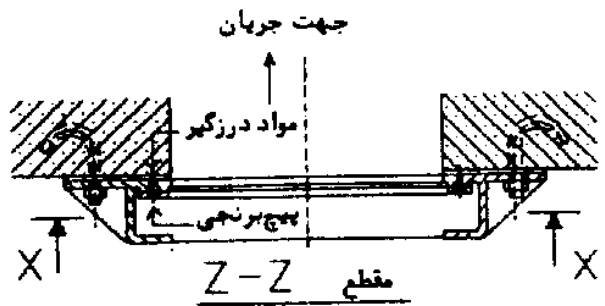
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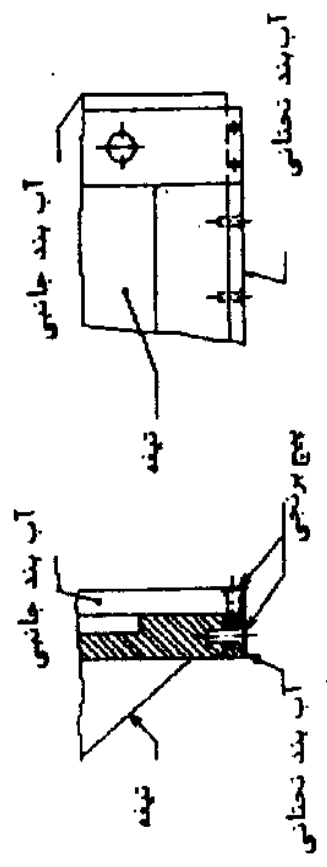
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- 1 – slide gate
 - 2 – gate leaf
 - 3 – Closed Conduit
 - 4 – Bulkinhead gate
 - 5 – Stop logs

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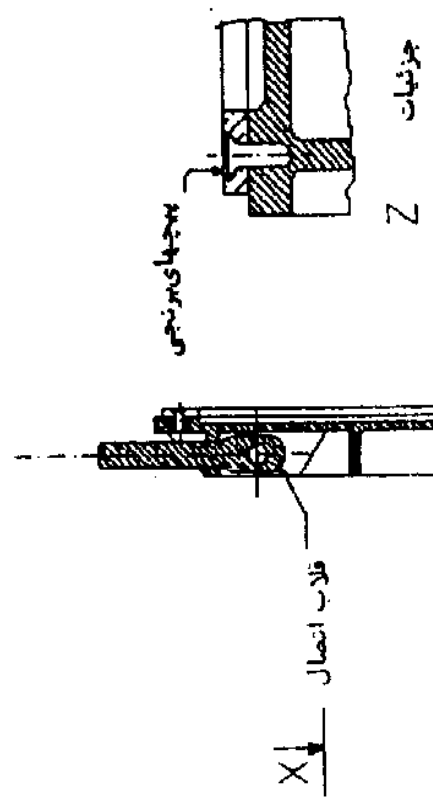
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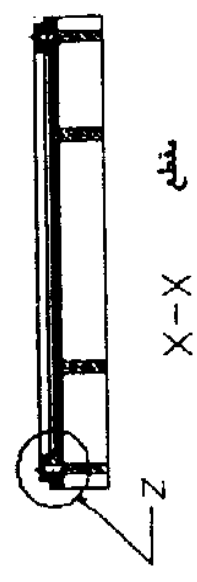




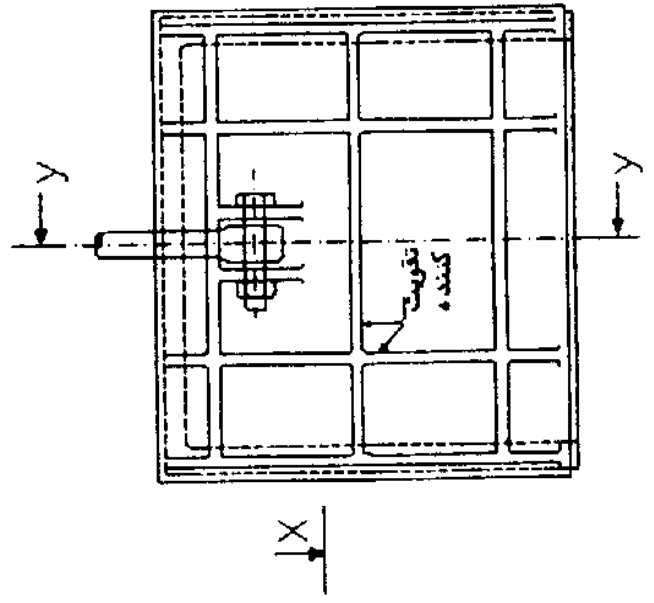
جزئیات A



مقطع Y-Y



مقطع X-X





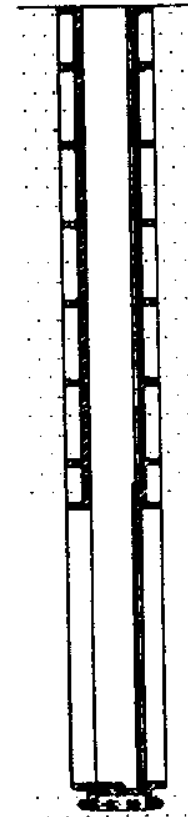
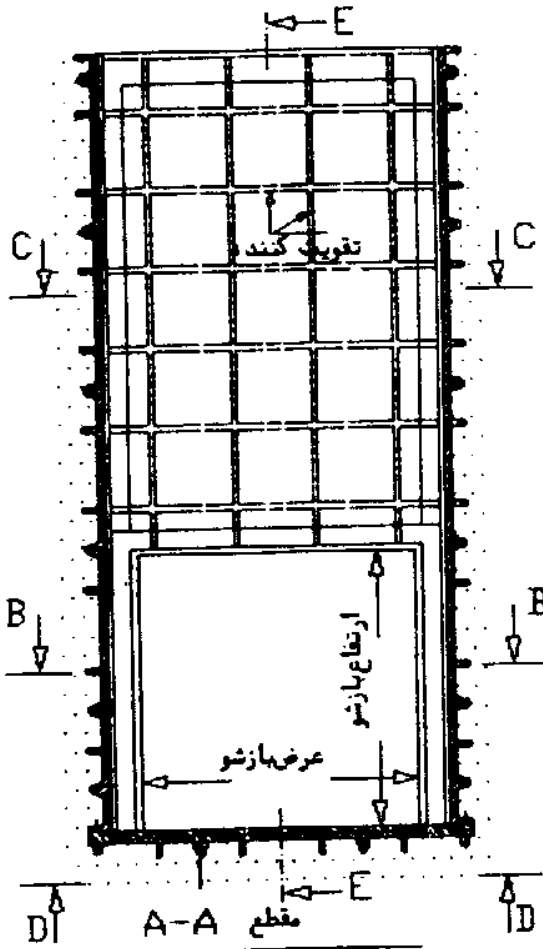
مقطع جریان C-C
جهت جریان



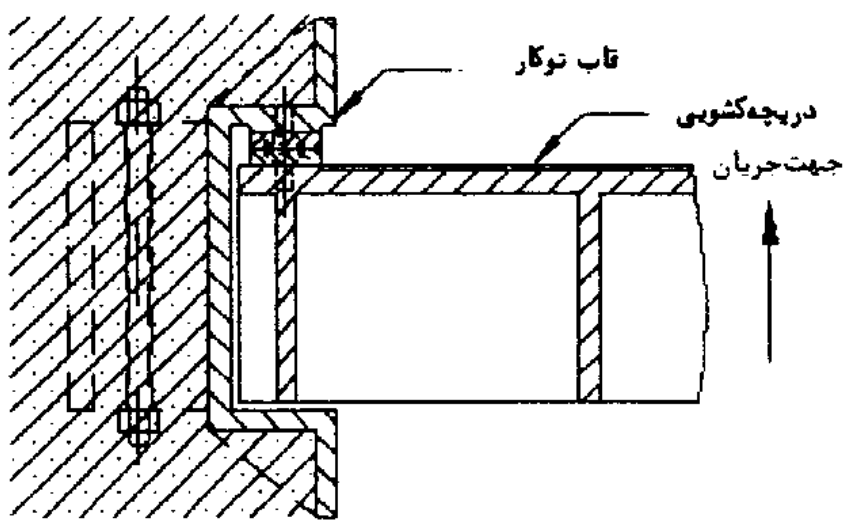
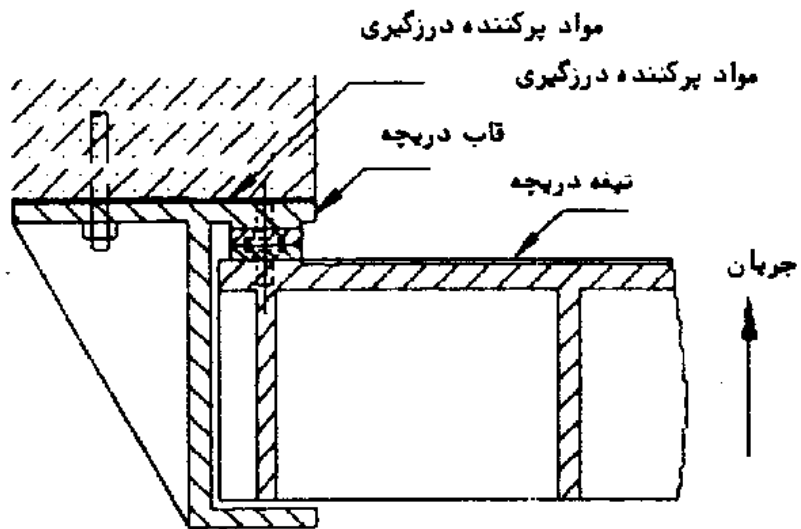
مقطع B-B



مقطع D-D



مقطع E-E



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- 1 - Skin plate
- 2 - Seals
- 3 - Frame
- 4 - Gun metal



				Kg/cm ²	
Kg/cm ²	Kg/cm ²	Kg/cm ²			
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T + B

=T ;

=B

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S

$$\delta_v = (\delta_x^2 + \delta_y^2 - \delta_x \delta_y + 3\tau^2 \times y)^{\frac{1}{2}}$$

= δ_x

X

= δ_x

Y

= δ_y

x-y

= $\tau_x y$

δ_y δ_x

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$$\frac{1}{800}$$

- 1 - span
- 2 - Girders
- 3 - Deflection

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) **B**

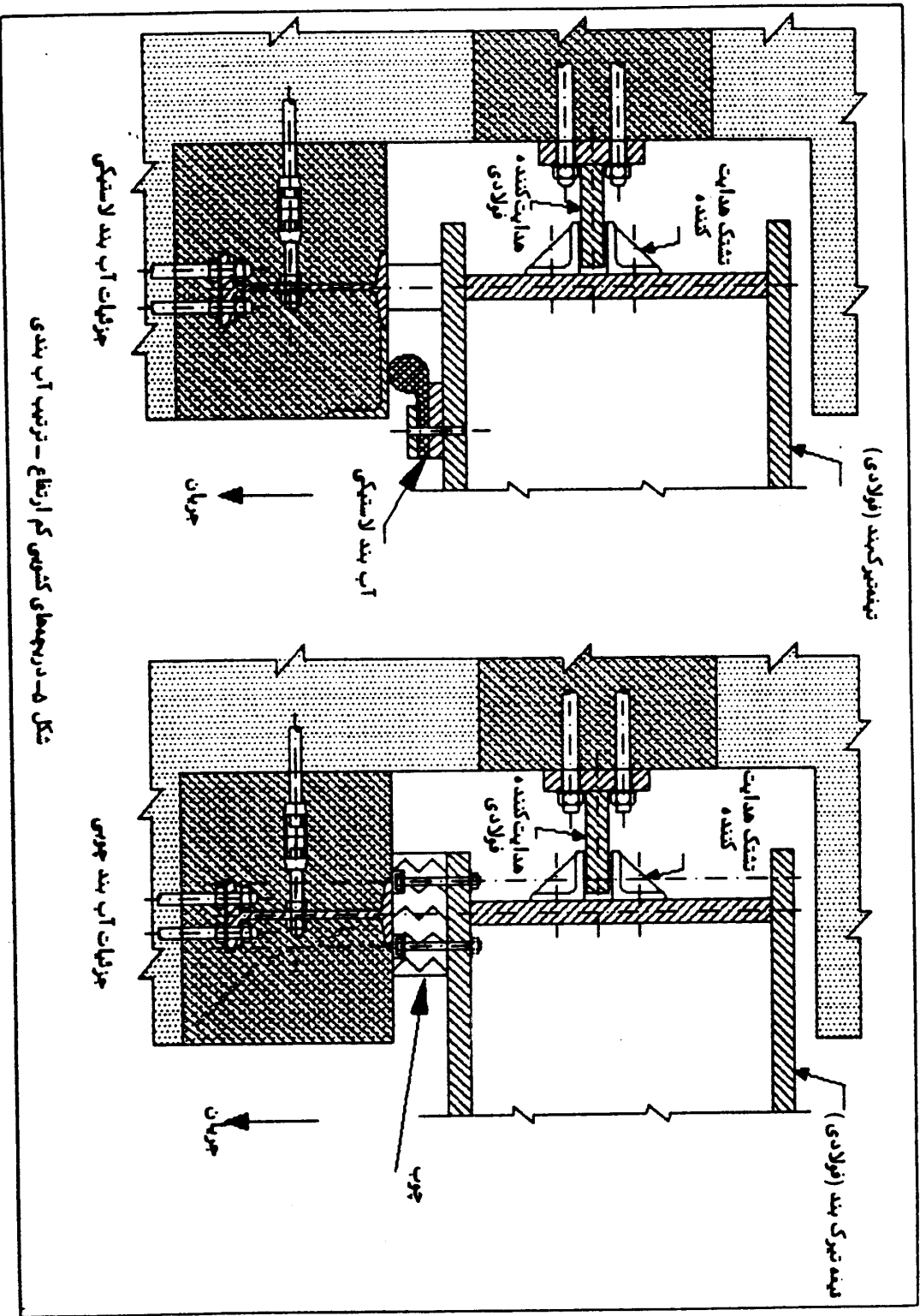
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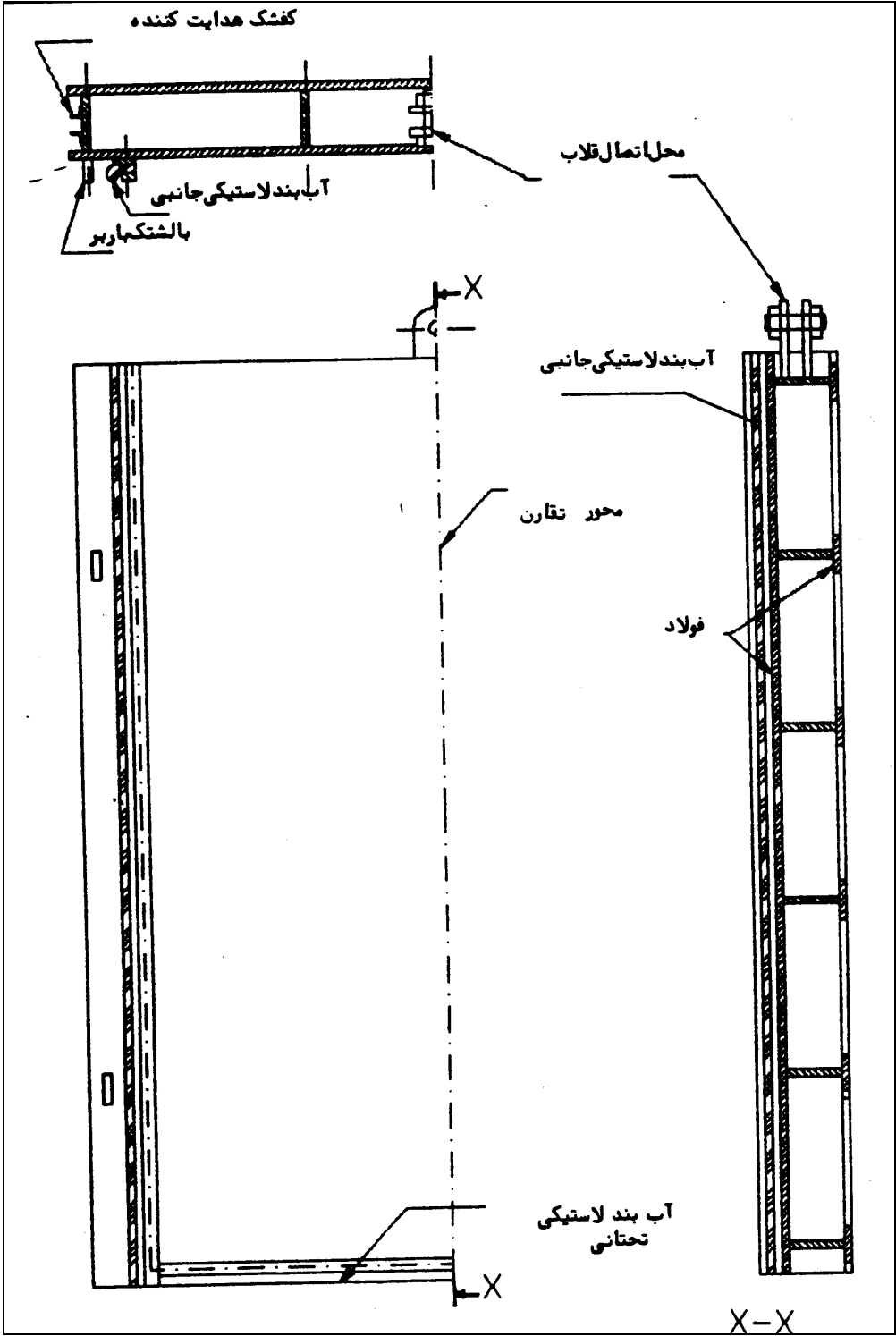
1 - Rigid
2 - Seals

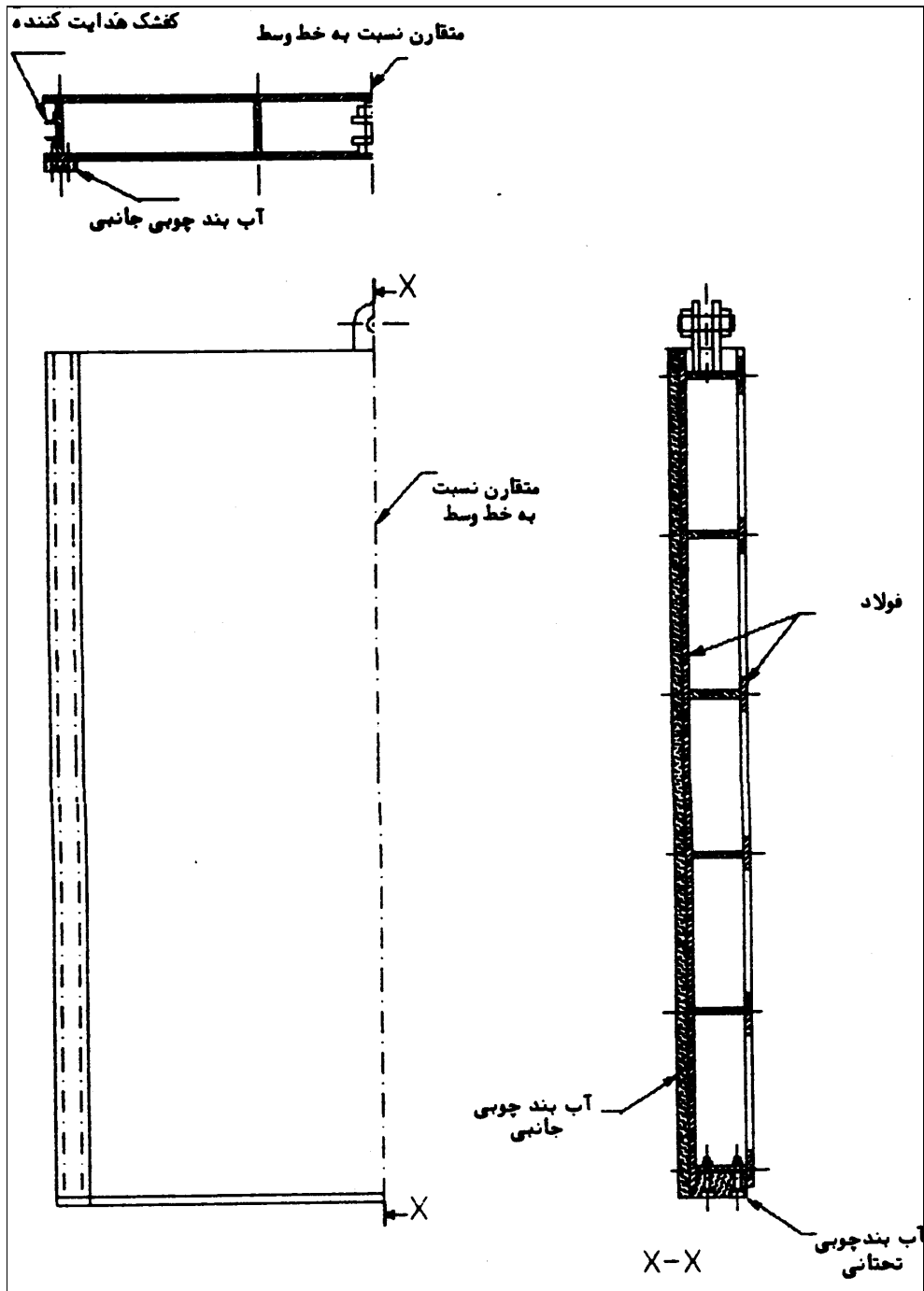
(J)

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- 1 - Socket head shoulder bolts
 - 2 - Counter sunk screw



شکل ۴-۲ درجه های کنونی - ترتیب آب بندی





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1 - Sill Beam
2 - Guides



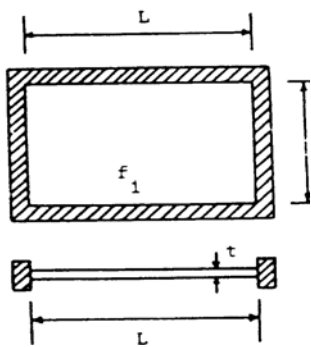
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/	/	/
/	/	/

- 1 - Clearance
- 2 - stem
- 3 - Alignment





$$f_1 = \frac{KpB^2}{2t^2} \left[1 + \frac{11}{35}(1-k) + \frac{79}{141}(1-k)^2 \right]$$

$$k = L^4 / (L^4 + B^4)$$

f_1

= L

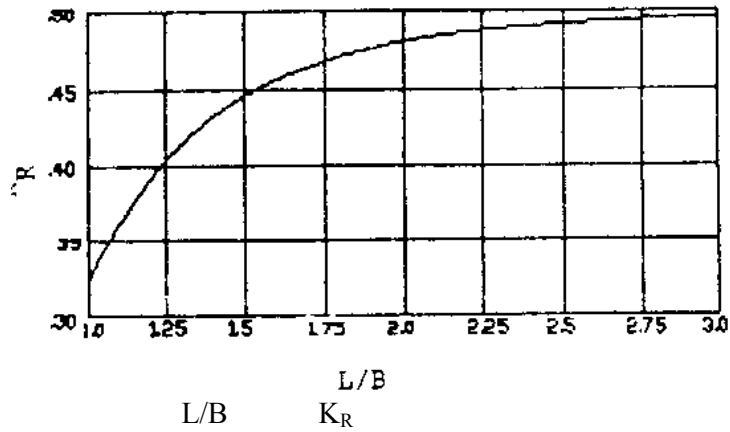
= B

= k

= P

= t

$$f_1 = k_R \times \frac{pB^2}{t^2}$$



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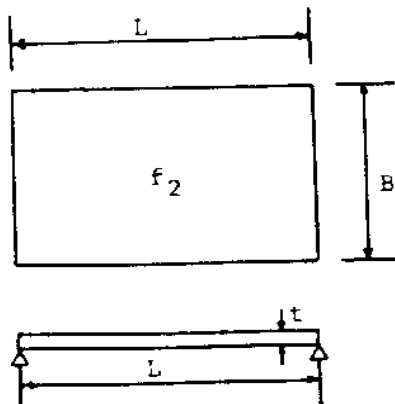
(mm)	; mm								(mm)
	600	800	1000	1200	1400	1600	1800	2000	
t=6	43.17	33.27	30.31	29.10	28.63	28.37	28.24	28.10	600
		24.28	19.50	17.68	16.83	16.40	16.16	16.02	800
			10.54	12.86	11.67	11.00	10.7	10.50	1000
				10.79	9.14	8.32	7.86	7.58	1200
					7.93	6.84	6.20	5.90	1400
t=8	56.70	49.10	43.89	41.83	40.90	40.44	40.20	40.00	600
		33.17	27.66	25.42	24.92	24.10	23.73	23.48	800
			27.63	22.87	20.74	19.64	19.03	18.66	1000
				19.19	16.70	14.79	13.97	13.47	1200
					14.10	12.16	11.11	10.48	1400
t=10	119.92	92.41	84.20	80.98	79.04	78.82	78.43	78.21	600
		67.40	54.16	49.10	46.76	45.00	44.19	44.01	800
			43.17	30.73	22.41	20.69	19.73	19.10	1000
				29.98	20.39	13.10	11.82	11.00	1200
					22.00	19.00	17.30	16.28	1400
t=12	127.68	133.08	121.20	116.62	114.04	113.00	112.94	112.62	600
		97.13	77.99	70.70	67.33	60.60	64.64	64.09	800
			62.16	51.40	46.67	44.20	42.11	41.98	1000
				43.17	36.07	33.27	31.41	30.31	1200
					31.72	27.36	24.99	23.08	1400
t=10	269.81	207.93	189.40	182.22	178.96	177.34	176.47	175.97	600
		101.77	121.86	110.47	100.20	102.00	101.01	100.14	800
			97.13	80.39	72.92	69.06	66.89	60.60	1000
				67.49	57.10	51.98	49.10	47.36	1200
					49.06	42.70	39.00	36.84	1400
t=10						37.94	33.21	30.47	1600
							29.98	26.06	1800
								24.28	2000

$$d = \frac{m^2 - 1}{m^2} \times \frac{kpB^4}{32Et^3} \left[1 + \frac{47}{210}(1-k) + \frac{200}{517}(1-k)^2 \right]$$

بین ۰/۲۵ تا ۰/۳۵ می باشد.

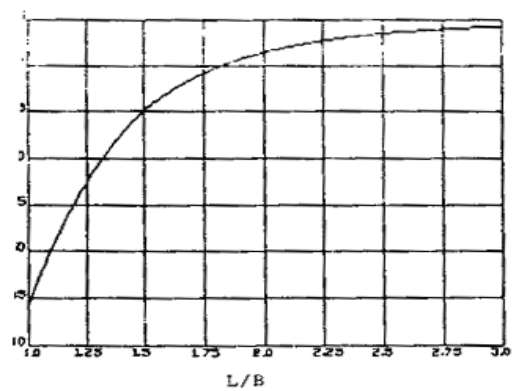
$$\mu \quad m = \frac{1}{\mu}$$

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$$f_2 = \frac{3}{4} \times \frac{kpB^2}{t^2} \left[1 + \frac{14}{75}(1-k) + \frac{20}{57}(1-k)^2 \right]$$

$$f_2 = k_s \times \frac{pB^2}{t^2}$$



L/B k_s

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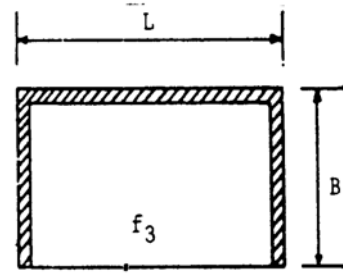
(mm)	: (mm)								(mm)
	6..	8..	10..	12..	14..	16..	18..	20..	
t=6	31.61	23.07 17.78	20.55 13.66 11.38	19.59 12.09 9.07 7.90	19.17 11.38 8.04 6.48 5.81	18.96 11.02 7.51 5.77 4.87 4.45	18.85 10.83 7.22 5.37 4.36 3.79 3.51	18.79 10.72 7.05 5.14 4.05 3.41 3.04 2.84	6.. 8.. 10.. 12.. 14.. 16.. 18.. 20..
t=8	56.20	41.01 31.61	36.53 24.28 20.23	34.83 21.49 16.13 14.05	34.08 20.23 14.29 11.52 10.32	33.71 19.59 13.36 10.25 8.66 7.90	33.52 19.25 12.84 9.55 7.74 6.75 6.24	33.40 19.05 12.54 9.13 7.20 6.07 5.41 5.06	6.. 8.. 10.. 12.. 14.. 16.. 18.. 20..
t=10	87.81	64.08 49.39	57.09 37.93 31.61	54.43 33.57 25.20 21.95	53.26 31.61 22.33 18.01 16.13	52.6130 29.62 20.87 16.02 13.53 12.35	52.37 29.08 20.07 14.92 12.10 10.54 9.76	52.19 28.77 19.59 14.27 11.26 9.48 8.45 7.90	6.. 8.. 10.. 12.. 14.. 16.. 18.. 20..
t=12	126.4 4	92.28 71.12	82.20 54.62 45.52	78.38 51.35 36.29 31.61	76.69 45.51 32.16 25.93 23.22	75.86 44.09 30.05 23.07 19.48 17.78	75.41 43.31 28.89 21.49 17.42 15.18 14.05	75.16 42.87 28.22 20.55 16.21 13.66 12.17 11.38	6.. 8.. 10.. 12.. 14.. 16.. 18.. 20..
t=15	197.5 6	144.19 111.13	128.44 85.35 71.12	122.46 75.54 56.70 49.39	119.83 71.11 50.24 40.51 36.29	118.53 68.19 46.96 36.05 30.43 27.78	117.83 67.68 45.15 33.57 27.22 23.72 21.95	117.43 66.98 44.09 32.11 25.23 21.34 19.01 17.78	6.. 8.. 10.. 12.. 14.. 16.. 18.. 20..

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$$d = \frac{m^2 - 1}{m^2} \times \frac{kpB^4}{32Et^3} \times \left[1 + \frac{37}{175}(1-k) + \frac{79}{201}(1-k)^2 \right]$$

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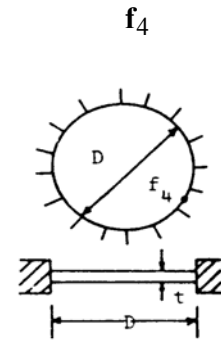
$$f_5 = \frac{1}{4(1 + \frac{L^4}{48B^4})} \times \frac{pL^2}{t^2}$$



$$d = \frac{5}{32(1 + \frac{L^4}{48B^4})} \times \frac{pL^2}{Et^3}$$

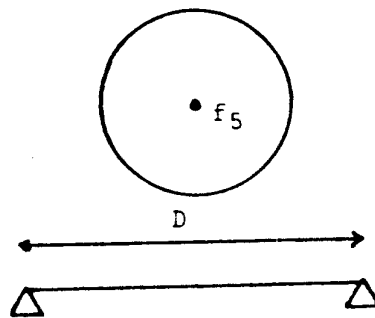
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$$f_4 = \frac{3}{16} \times \frac{pD^2}{t^2}$$



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$$f_5 = \frac{5}{16} \times \frac{pD^2}{t^2}$$



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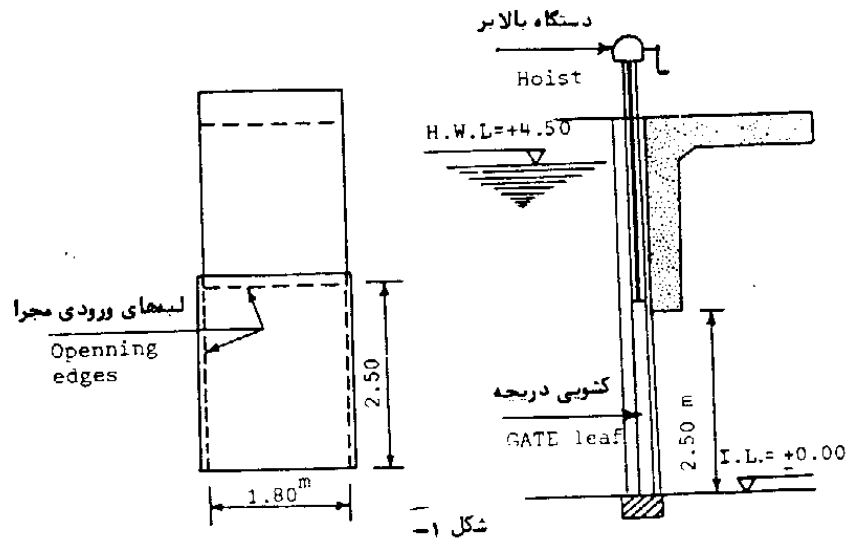
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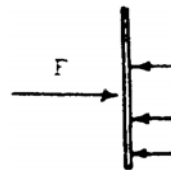
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$$F = nf$$

$$F =$$

$$f =$$

$$n =$$



f

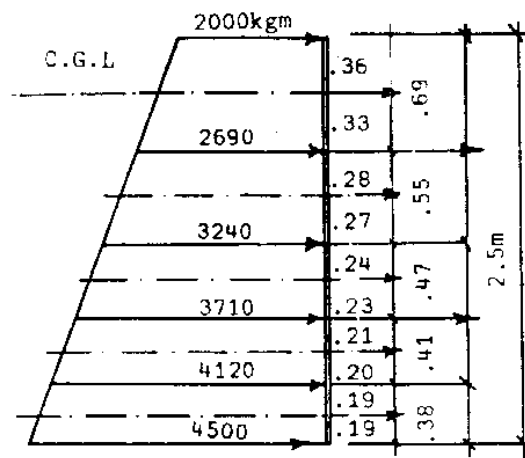
$$45 \times 1000 = 4500\text{kg}$$

$$2 \times 1000 = 2000\text{kg}$$

$$\frac{2000 + 4500}{2} \times 250 = 8125\text{kg/m}$$

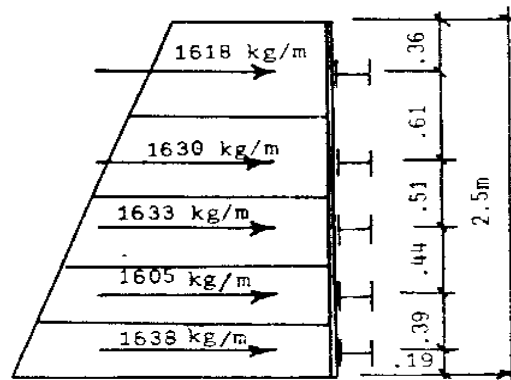
$$8125 \div 5 = 1625\text{kg/m}$$

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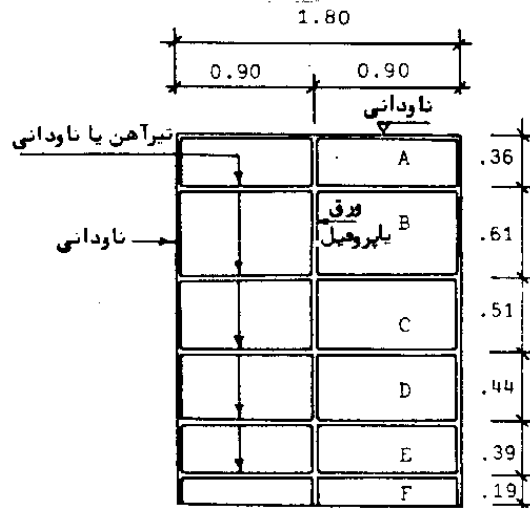
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C.G.L=Centre of Gravity Line



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F E D C B A



	$F(kg)$	$p(kg/cm^2)$
A	۱۴۱۳	۰.۲۱۸
B	۲۹۲۶	۰.۲۶۷
C	۲۹۶۱	۰.۳۲۳
D	۲۹۳۰	۰.۳۷۰
E	۲۸۸۹	۰.۴۱۲
F	۱۵۰۷	۰.۴۴۱

$$f = \frac{kpB^2}{2t^2} \left[1 + \frac{11}{35}(1-k) + \frac{79}{141}(1-k)^2 \right] \quad f = k_R \times \frac{pB^2}{t^2}$$

=f

$$k = B^4 / (L^4 + B^4)$$

= P
= k
= t
= B
= L

F E D C B A

	P.a (*)	B	L	k_R	F	
					t=0.8	t=0.6
A	/ * /	36	90	0.492	239	424
B	/ * /	61	90	0.444	751	1341
C	/ * /	51	90	0.467	674	1199
D	/ * /	44	90	0.481	592	1052
E	/ * /	39	90	_____	527	934
F	/ * /	19	90	xx	xx	xx

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B

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$$6+1.5=7.5$$

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- F

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$$L = 90$$

$$B = 19$$

$$K = 0.0218$$

$$f = \frac{1}{4(1 + \frac{L^4}{48B^4})} \frac{pL^2}{t^2} = k \frac{pL^2}{t^2}$$

$$f = 0.0218 \times \frac{0.441 \cdot 90^2}{0.6^2} = 216 \text{ kg/cm}^2$$

$$d = \frac{1}{4(1 + \frac{1}{48} \times \frac{L^4}{B^4})} \times \frac{pL^4}{12Et^3} = k \frac{pL^4}{12Et^3}$$

$$d = 0.0218 \times \frac{0.441 \times 90^4}{12 \times 2100000 \times 0.6^3} = 0.116 \text{ cm}$$

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$$) 40t + B = 40 \times 06 + B = 24 + B$$

$$) 0.11 \times 5 = 0.11 \times 180 = 20 \quad \mathbf{Cm}$$

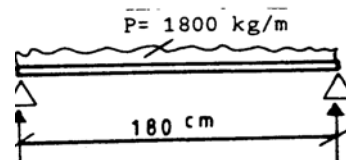
$$) \frac{19 + 34}{2} = 29$$

F E

$$P = 163 \times 1.10 = 1800 \text{ kg/m}$$

$$R = 1800 \times 1.80 \div 2 = 1620 \text{ kg}$$

$$M = \frac{PL^2}{8} = 1800 \times 1.80^2 \times 100 / 8 = 72400 \text{ cm}^2$$



$$f_a 1400 \times .9 = 1260 \text{ kg/cm}$$

$$Z = \frac{M}{f_a} = \frac{72400}{1260} = 57.9 \text{ cm}^3$$

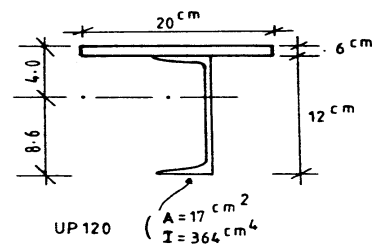
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up/□□

$$A = .6 \times 20 + 17 = 29 \text{ cm}^2$$

$$I = 12 \times 37^2 + 17 \times 2.6^2 + 364 = 643 \text{ cm}^3$$

$$Z = \frac{643}{8.6} = 74.8 > 58$$



$$P = 1800 \quad 1.80 = 3240 \text{ kg}$$

$$d = \frac{5 \times pl^3}{384EI} = \frac{5 \times 3240 \times 180^3}{384 \times 2100000 \times 643} = 0.182 \text{ cm}$$

۰/۱۸۲

$$\frac{L}{800} = \frac{180}{800} = 0.22:$$

۴۰۵۴۶ کیلوگرم بر سانتیمتر به دست می آید لذا مدول مقطع لازم برابر با $\frac{40546}{1260} = 32 \text{ cm}^3$ می شود، مدول مقطع ناودانی UP۱۲۰ برابر با ۶۷/۷ و بزرگتر از مدول مقطع مورد نیاز می باشد. حداکثر خیز را کنترل می کنیم $\frac{100}{800} = 0.126$ حداکثر خیز در وسط دهانه دوم، برابر با ۰/۰۲۴ - سانتیمتر می باشد

UP۱۲۰

