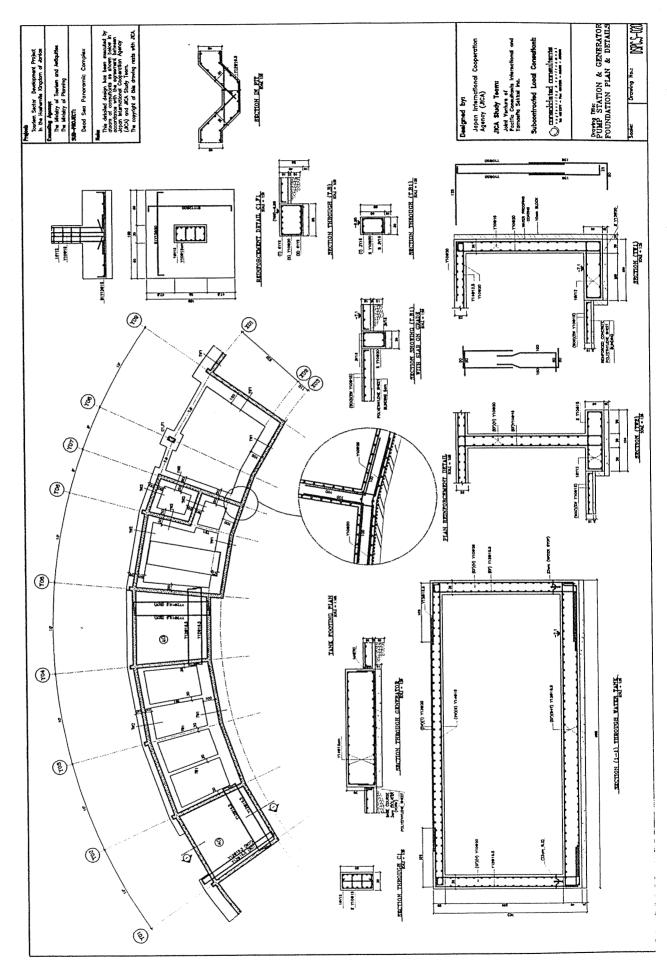
انداد المستشاريين للهندسة والبينة

# **Structural Calculations**

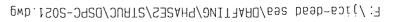
# OF

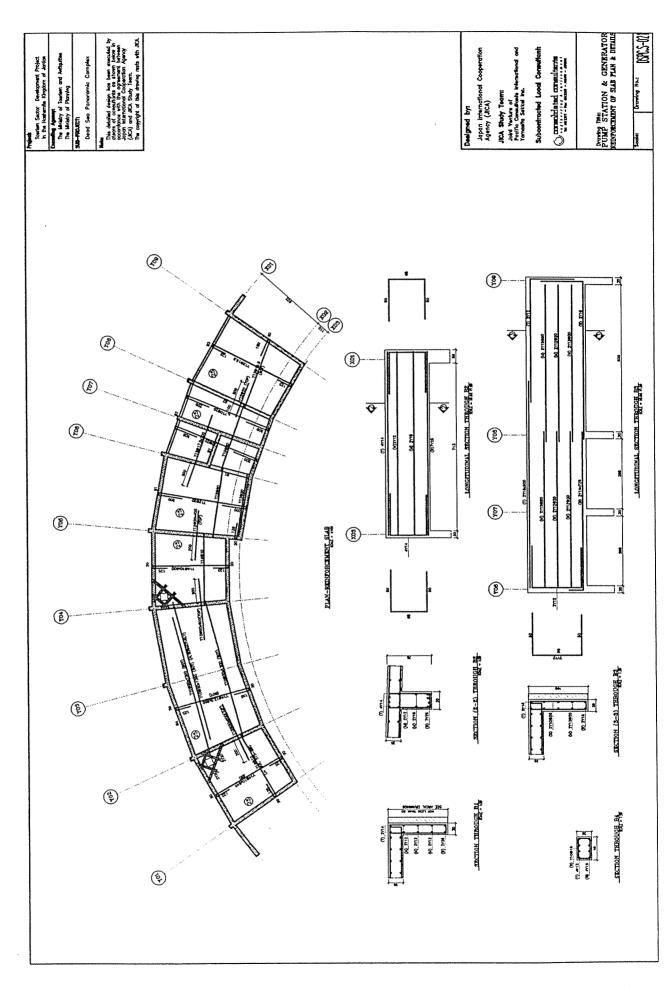
## GENERATOR AND WATER TANK



F:/jica-dead sea/DRAFTING/PHASE2/STRUC/DSPC-S020.dwg

157



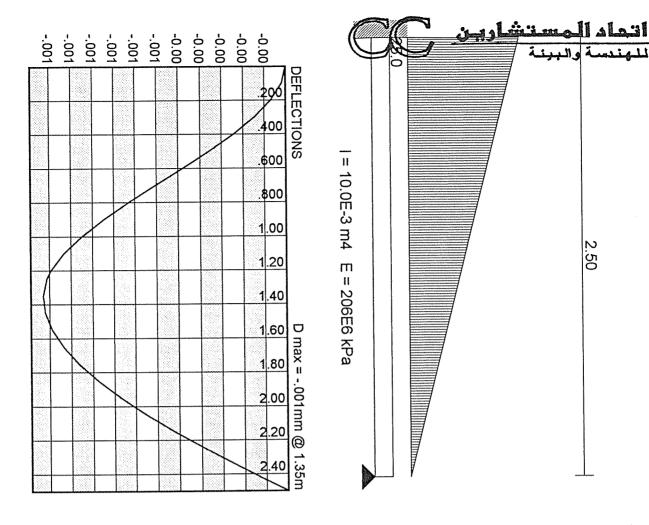


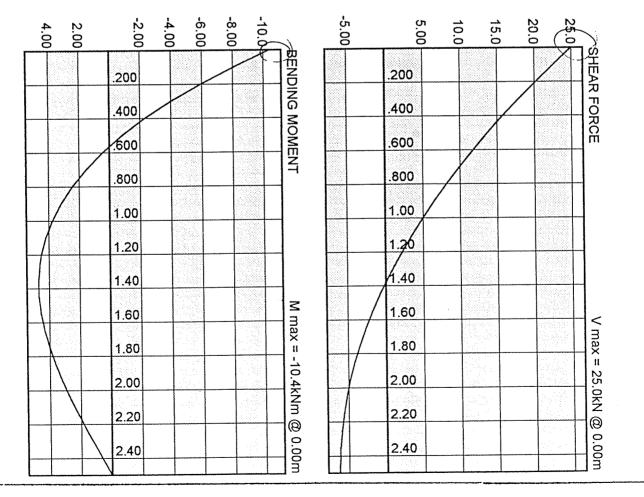
لمستشاريين والبينة Design of water Tank: la/lb=6/2.5=2-4>2 way One VS= 25 KIV Ms= 10.4 KN-m From Appendix USE \$12215 P= Th Ka USE \$ 122/15 N=6.95 For Exterior 16.7 <u>∫</u>, √−D For Corners  $A_5 = 7.5 = 5.77 c_m 2/m$ 71.3  $\tau \uparrow \uparrow \uparrow$ allowable A s=2.885cm2/m/Face: stress USE \$10 @ 20/side For Top Slab:weight of Sand=16.4×1.4×0.1=2.3 KN/m<sup>2</sup> 5 = Tiling=23×0.06×1.4=1.932 KN/m<sup>2</sup> Z Wa = 8.6KA/m2 4ve Joan = 1.6x2 = 3.2 Total= 3.2+8.6= 11.8 weight of slab= 0.2x25x1.4 Total= 11.8+0.2x25x1.4 = [18.8 KH/m2

ماتف: ٨٨- ٦٢٢، ٦١٢٣٧٧ قاكس: ٦١٢٣٨٠ ص.ب ٨٣٠٧٢٦ عمان -- الأردن

	RECTANG	ULAR PANEL	S SUPPO	TEDO	Four	تشاريح	<u>اد المسا</u>	
fcu = 25 fy = 414	MPa MPa		SIDE 1 Continuous SIDE 2 Free			+	Ly 2	+ + 
Lx = 5.725 Ly = 6	metres metres	SIDE		inuous		1	2	3   Lx
w = 18.8 h = 250	kN/m^2 mm						4	
	М	d R	x/d	p	p'	As	As'	
SIDE 1 SIDE 2	-27.9 +0.0	200 0.70 200 0.00	0.00	0.20	0.00	401 0	0 0	
SIDE 3 SIDE 4	-27.9 +0.0	2000.702000.00		0.20 0.00	0.00	401 0	0 0	
SIDE 4 SPAN X	+24.6	200 0.62		0.18	0.00	352	õ	
SPAN y	+21.0	200 0.52	0.05	0.15	0.00	298	0	
OTHER 2 h	3	4ANOTHE PANEL		5	6		OTHER 8 Material	FINISH
	RECTANG	ULAR PANEL	S SUPPC	RTED O	N FOUI	R SIDES		
fcu = 25 fy = 414	RECTANG MPa MPa	SIDE	1 Cont	inuous		R SIDES	Ly	+ 
fcu = 25	MPa	SIDE SIDE SIDE	1 Cont 2 Free	inuous inuous		R SIDES		+ + + + + + + + + + + + + + 
fcu = 25 fy = 414 Lx = 6	MPa MPa metres metres kN/m^2	SIDE SIDE SIDE	1 Cont 2 Free 3 Cont	inuous inuous		+	Ly	3 L2
fcu = 25fy = 414Lx = 6Ly = 7.3w = 18.8	MPa MPa metres metres kN/m^2	SIDE SIDE SIDE	1 Cont 2 Free 3 Cont	inuous inuous		+	Ly 2	
fcu = 25fy = 414Lx = 6Ly = 7.3w = 18.8h = 250SIDE 1	MPa MPa metres metres kN/m^2 mm M 	d R 200 0.77	1 Cont 2 Free 3 Cont 4 Free <u>x/d</u> 0.08	p 0.22	p' 0.00	+	Ly 2 4 <u></u> 0	3 L2
fcu = 25fy = 414Lx = 6Ly = 7.3w = 18.8h = 250	MPa MPa metres metres kN/m^2 mm	d R 200 0.77 200 0.77	1 Cont 2 Free 3 Cont 4 Free x/d  0.08 0.00 0.08	p 0.22 0.00 0.22	p' 0.00 0.00 0.00	+ 1 1 As 442 0 442	Ly 2 4  As'	
fcu = 25fy = 414Lx = 6Ly = 7.3w = 18.8h = 250SIDE 1SIDE 2SIDE 3SIDE 4	MPa MPa metres metres kN/m^2 mm M 	d R 200 0.77 200 0.77 200 0.00 200 0.00	1 Cont 2 Free 3 Cont 4 Free 0.08 0.00 0.08 0.00	p 0.22 0.00 0.22 0.00	p' 0.00 0.00 0.00 0.00	+ 1 1 As 442 0 442 0 442 0	Ly 2 4 <u></u> <u></u> 0 0 0 0 0 0	
fcu = 25fy = 414Lx = 6Ly = 7.3w = 18.8h = 250SIDE 1SIDE 2SIDE 3	MPa MPa metres metres kN/m^2 mm M -30.7 +0.0 -30.7	d R 200 0.77 200 0.77	1 Cont 2 Free 3 Cont 4 Free 0.08 0.00 0.08 0.00 0.10	p 0.22 0.00 0.22	p' 0.00 0.00 0.00	+ 1 1 As 442 0 442	Ly 2 4  <u>As'</u> 0 0 0	

				K 528 NGULAR	b PANELS	SUPPC	TED	FOUR	<mark>تشاریب</mark> خ <sup>SIDES</sup> خ	اد المعند دسة والإل	<b>اند</b> نىين
fcu	ı =	25	MPa						+	— Ly —	
fy	=	414	MPa		SIDE 1 SIDE 2					2	
$\mathbf{L}\mathbf{X}$	==	6	metres		SIDE 3		inuous			2	
Ly	==	6.3	metres		SIDE 4	Free	:		1		3 L:
w	=	18.8	kN/m^2							4	
h		250	mm						L		
			M	d	R	x/d	p	p'	As	As′	
	SID	E 1	+0.0	200	0.00	0.00	0.00	0.00	0	0	
	SID	E 2	+0.0	200	0.00	0.00	0.00	0.00	0	0	
	SID	E 3	-39.3	200	0.98	0.10	0.29	0.00	572	0	
	SID	E 4	+0.0	200	0.00	0.00	0.00	0.00	0	0	
	SPA	N X	+32.7	200	0.82	0.08	0.24	0.00	472	0	
	SPA	N Y	+29.4	200	0.74	0.08	0.21	0.00	423	0	





ماتف: AT·YEL ، ماكلين: AT·YEL ص.ب AT·YEL عمان - الأودن 162

2.50



#### Analysis settings

The following additional Settings can be made on the Input page:

• E modulus : Young's modulus for the beam (kPa).

Material	E modulus (kPa)
Timber	5E6 to 15E6
:::::Concrete:::::: :::(normal:strength):::	25E6 to 35E6
Aluminium	· · · · ± 70Ė6· · · · ·
Structural steel	::::::::::::::::::::::::::::::::::::::

• K modulus : Foundation modulus (kN/m<sup>3</sup>).

Soil type K modulus (kN/m <sup>3</sup> )
Clay
Stiff
Yery stiff         32E3 to 64E3           Hard         46E3 to 96E3
Sand
Medium: 19E3 to 96E3

• Allow negative pressure :

- Yes : Enable full adhesion between beam and elastic medium.
- No : Allow uplift, i.e. zero adhesion between beam and elastic medium.

#### Note

• The foundation modulus, Km, is multiplied with the support width to obtain the support stiffness per unit length of the beam. Enter a zero value for no foundation stiffness, i.e. a gap in the elastic medium.

انداد المستشاريين للمندسة والبينة

## Design OF TANK WALL

Project name:

Date :

*01/02/00* 

Calculated mo	ment	
	×	
M(calc.) =	10.4	(KN.m)

Determination the depth of the neutral axis

h =	300	(mm)
d =	250	(mm)
<b>b</b> =	1000	(mm)
<b>f</b> st =	130	(N/mm2)
<i>f</i> cc =	11	(N/mm2)
Es/Ec =	15	
<i>x</i> =	139.830508	(mm)

Checking the moment of resistance of the concrete

M(res.) =	156.420569	(KN.m)										
Calculation th	Calculation the area of tension steel											
As(Requ.) =	393.333333	(mm2)										
As(Min.) =	750	(mm2)										
Assume d =	10	(mm)										
Use	6	Ø	12	/m								
As(Prov.)=	471.238905	(mm2)			. •							
Cracking chec	ck											
<i>r</i> =	0.0015708											
<b>X</b> =	152.151794	(mm)										
f ct (calc.)=	0.66432732	(N/mm2)	<	fct(Table)=	1.84	(N/mm2)	О.К					

حاتف: ٨٨-١٢٢، ٦١٢٣٧٧ فاكس: ٦١٢٣٨٠ ص.ب ٨٣٠٧٤٦ عمان - الأردق

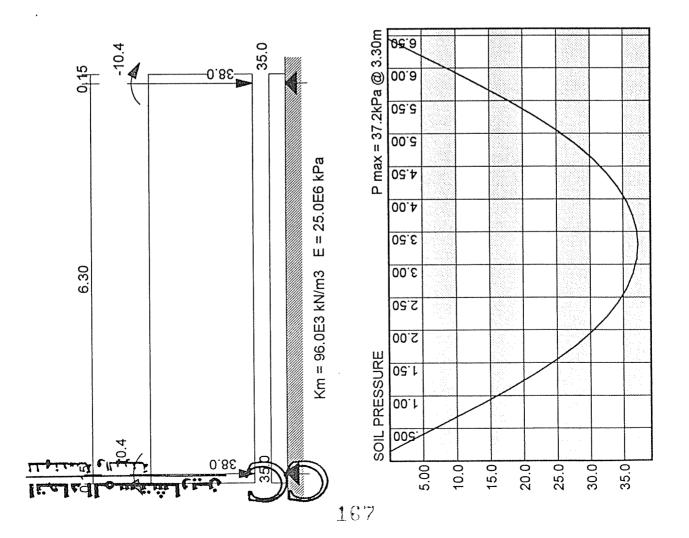
Ŵ	IATE	r TA	ик)	RECTA	NGULAI	R PANEL	S SUPPO	RED	N FOUL	in the second se	د المسينة سة والبينية	<b>اتما</b> للهند
	fcu fy		25 414	MPa MPa		SIDE SIDE	1 Cont 2 Free	inuous		+	Ly2	+ + 
	Lx Ly		5.72 6	5 metres metres		SIDE SIDE	3 Free 4 Free			1		3 Lx
	W h	=	16.9 250	98 kN/m^2 mm							4	I I
				М	d	R	x/d	р	p'	As	As'	
	:	SIDI	E 1	-32.3	200	0.81	0.08	0.23	0.00	466	0	
		SID	E 2	+0.0	200	0.00	0.00	0.00	0.00	0	0	
		SID		+0.0	200	0.00	0.00	0.00	0.00	0	0	
		SID		+0.0	200	0.00	0.00	0.00	0.00	0	0	
		SPAI		+26.8	200	0.67	0.07	0.19	0.00	384	0	
		SPAI	у И	+24.2	200	0.61	0.06	0.17	0.00	346	0	

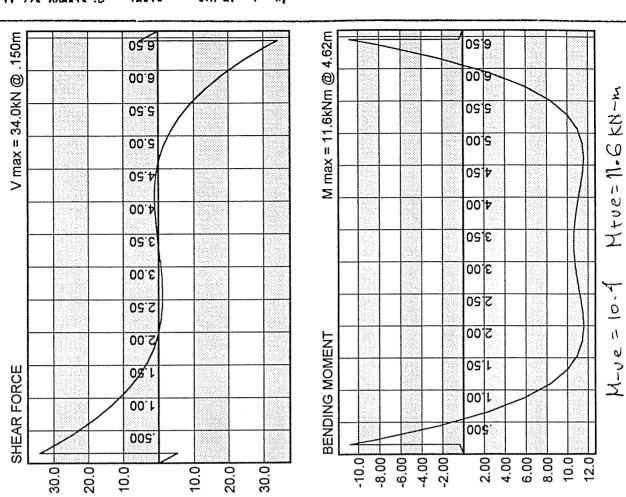
RECTANGULAR PANELS SUPPORTED ON FOUR SIDES (Pumping Room)

· · · · · · · · · · · · · · · · · · ·	fcu fy Lx		25 414 6	MPa MPa metres		SIDE SIDE SIDE	2 Free	cinuous e cinuous		+	Ly2	+ 
1	Ly	=	12	metres		SIDE	4 Free			1		3 Lx
	w h	=	16.98 250	8 kN/m^2 mm		-					4	I
	<u> </u>		,,, <u>,</u> ,, <u>,,,,,</u> ,,,,,,,,,,,,,,,,,,,,,,,	М	d	R	x/d	p	p <b>'</b>	As	As'	
		SIDI SIDI SIDI SIDI SPAI SPAI	E 2 E 3 E 4 N X	$ \begin{array}{r} -27.7 \\ +0.0 \\ -27.7 \\ +0.0 \\ +61.3 \\ +20.8 \end{array} $	200 200 200 200 200 200 200	0.6 0.0 0.6 0.0 1.5 0.5	0 0.00 9 0.07 0 0.00 3 0.16	0.20 0.00 0.20 0.00 0.46 0.15	0.00 0.00 0.00 0.00 0.00 0.00	398 0 398 0 920 296	0 0 0 0 0 0	



PANS SPANS	Prepa	ared by	7 H. Sa	alysis affari	s Progr Ini 2/2	am V4 /93	.1 SF	PANS PANS			
ESIGN	OF ONE	E WAY S	SLAB								
Number	of spa	ans =	1		Numbe	r of	load ca	ises =	1		
pan	Lengt	:h	Width	Ι	Depth		inge .ckness				
1	6.00	00	1.000	· · · (	0.250		000	1.000			
Load ca	ase nur	mber :		-	L						
Span 1 16	UDL 5.98		Dis	Load Val 0.0		Val	nd 3 Dis 0.0	Load Val 0.0		Load Val 0.0	Dis
JI -	L	ine Loa	ad	From	n Le	ength	Intens	ity			
Support 1 2	E	0	idth .000 .000	Redi	stribut	ion 0 % 0 %					
Invelop	pe										
	Span 1		BM 0.0		n BM 6.4		BM D.0	lft SF 50.9		gt SF -50.9	
Requi	ired S <sup>.</sup>	teel A	reas (	mm sq	uare)						
Span 1		L B 27	ot L 0	_	M Bot 0 10	<b>5 M</b> 085	Top R 327	Bot R 0			
Maxin Span 1	le	a L-zo	ne spa	cinq	irrups dia. 1 8	R-zone	m e spaci D 16	ng dia 1	. Rest 8 1	-spc d. 61	ia. 8
Span Span/De Allowal	epth ble	27. 30.									
32 0 Φ 5 Φ 56	0 12	0 5		327 Ф 12 Ф 0 565	Requ. Prov.						
О Ф О Ф	 0 0			↓ 0 Φ 0	Requ.	Bot					





T=25KN

مانند: ۲۸، ۱۲، ۲۲، ۲۲، ۲۲، ۲۵، ۲۰۰۰، ۲۲، ۲۸، ۲۸، ۲۸، ۲۸، ۲۰ ماند.

اتماد المستشاريين

# Section Design for Crack Widths : TANK BOTTOM SLAB

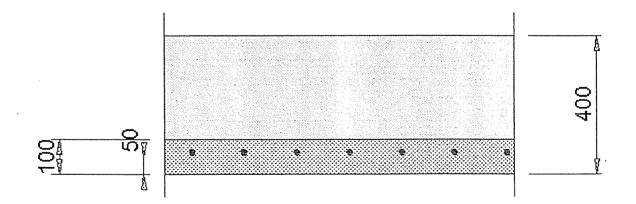
### nput Data

Slab or Beam Depth h (mm)	400
Surface zone depth he (mm)	100
Beam width b (mm)	500
Cover c (mm)	50
Thermal expansion coefficient	12E-6
Restraint Factor R	0.5
Design Crack Width (mm)	.2
fcu (MPa)	25
fy (MPa)	414

#### Load Cases

L	.C no.	Designation	T1 ("C)	T2 ("C)	SLS Tensile Force (kN)	Force ULS factor	SLS Moment (kNm)	Mome⊓t ULS factor
1		DL	20	22.5	12.5	1.6	11.6	1.6

BS8007 - 1987



# **CROSS - SECTION**

ماتف: ٨٨ . ١٢٢٢، ٦١٢٢٧٧ فاكس: ١٦٢٣٨ ص.ب ٨٣ . ٢٢ عمان - الأردن

1

اتماد المستنشاريين للهندسة والبيئة

## Jutput for Load Case 1:DL

LOAD CASE 1:DL		Optimum				
Configurations	1	2	3	4	†	
Bars	Y16@275	Y20@300	Y25@300	Y32@300	Y12@18	
Crack width (M+T+T2) (mm)	0.10	0.09	0.07	0.05	0.01	
Crack width (T1 only) (mm)	0.09	0.08	0.06	0.05	0.01	
Crack width (T1+T2) (mm)	0.19	0.16	0.13	0.10	0.02	
Reinforcement Area (mm²/m)	731	1047	1636	2681	6463	
Steel Stress (MPa)	64	45	30	19	8	
Mu capacity (kNm/m)	62.3	79.6	121.0	190.6	477.7	
Tu capacity (kN/m)	68.0	86.0	132.0	210.0	516.0	
Concrete Tensile strength fct = 1.	15 MPa		Critical load ca	se:LC 1		
fct/fb = 0.67 ; fb = bond strength Ro critical = 0.64						



#### Retaining Wall Design : Propped cantilever exam

#### Input Data

	Wall D	imensions		Live L	oads	General Pa	rameters	Design Par	ameters
H1 (m)	3	C (m)	0.4	⟨V (kN/m²)	2	Soil Frict (")	35	SF Overt.	1.5
H2 (m)	.5	F (m)		P (kN)		Fill slope (")		SF Slip	1.5
H3 (m)		xf (m)	0.00	xp (m)		vVall Frict (*)	12	DL Factor	1.2
Hw (m)		At (m)	.3	L (kN/m)	38.6	Conc Density	25	LL Factor	1.6
Hr (m)		Ab (m)	.3	xl (m)	.15	Soil Density	20	Pmax (kPa)	250
B (m)	1	Cover: wall	50	Lh (kN/m)		fcu (MPa)	25		
D (m)		Cover: base	50	x (m)		fy (MPa)	414		

Seepage allowed

Theory : Coulomb Wall type : Propped cantilever

#### SEISMIC ANALYSIS SETTINGS:

Seismic Analysis ON/OFF:ON

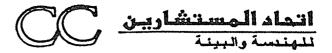
Hor Accel. (g) .15 Vert Accel. (g) .05 Include LL's Ŷ

#### VALUES OF PRESSURE COEFFICIENTS:

Active Pressure coefficient Ka :0.25 Passive Pressure coefficient Kp :5.76 Seismic Active Pressure coefficient Kas :0.33 Seismic Passive Pressure coefficient Kps :2.58 Base frictional constant µ :0.70

#### FORCES ACTING ON THE WALL:

<b>-</b>	FORCES			(m) Lever arm
Description	F Horizontal left (+)	rever arm	down (+)	DEACT GIW
Destabilizing forces:				
Total Active pressure Pa	29.875	1.196	6.185	1.300
Siesmic component of Pa	7.046	1.800	1.498	1.300
As a result of surcharge w	1.843	1,500	0.392	1.300
Siesmic wall inertia	4.400	1.500		
Stabilizing forces:	C 685	0.167		
Passive pressure on base Pp	-6.445			· ·
Siesmic component of Pp	7.953	0.300		
Weight of the wall + base			30.875	0.950
Weight of soil on the base			1.900	0.500
Line load of 38.60 kN/m on	backfill		38,600	1.150
UDL of 2.0 kN/m2			0.000	1.300



#### FORCES ACTING ON THE WALL:

Description	FORCES F Horizontal left (+)	• •	ir LEVER ARMS F Vertical down (+)	(m) Lever arm
Destabilizing forces:	00 0 <b>0</b> 5	1 100	C 105	1 000
Total Active pressure Pa	29.875	1.196	6.185	1.300
Siesmic component of Pa	7.046	1.800	1.498	1.300
As a result of surcharge w	1.843	1.500	0.392	1.300
Siesmic wall inertia	4.400	1.500		
Stabilizing forces:				
Passive pressure on base Pp	-6.445	0.167		
Siesmic component of Pp	7.953	0.300		
Weight of the wall + base			30.875	0.950
Weight of soil on the base			1,900	0,500
Line load of 38.60 kN/m on	hackfill		38,600	1.150
UDL of 2.0 kN/m2	and the set of a set of the		0.000	1.300
ODI OF STO VN/MS			0.000	T.000

#### EQUILIBRIUM CALCULATIONS AT SLS

1.Force Equilibrium

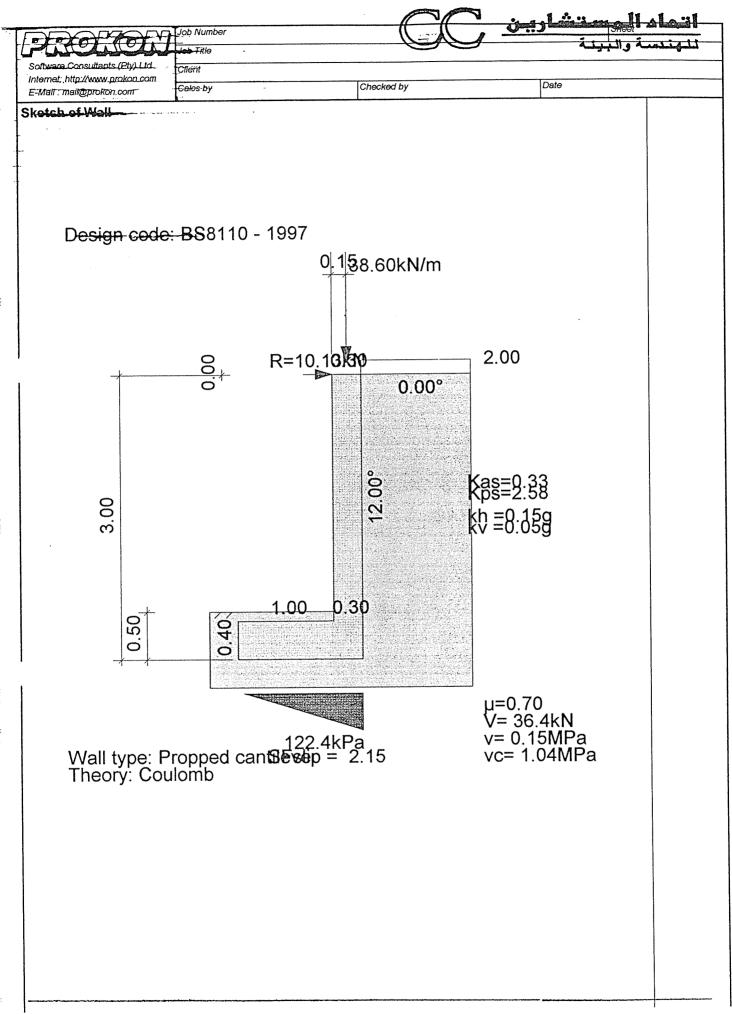
Sum of Vertical forces Pv	:	76.0 kN
Frictional resistance Pfric	:	53.2 kN
Passive Pressure on shear key	:	0.0 kN
Passive pressure on base	:	6.4 kN
Horizontal reaction at top	:	10.1 kN
=> Horizontal resistance Fr	:	77.8 kN

هاتف: ٦٢٢٨٨، ٦١٢٣٧٧ فاكس: ٦١٢٢٨٠ ص.ب ٨٣٠٧٤٦ عمان - الأودن

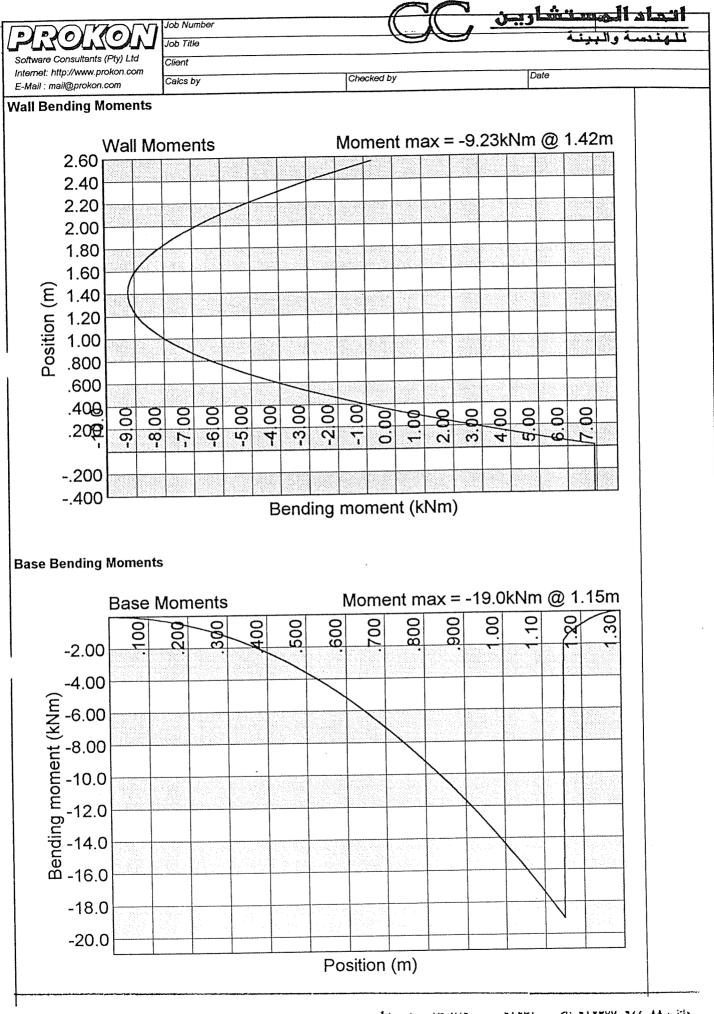
») »XnY'An	Y . Y / L	ımbər			inthe densis 1
mene	Job Ti	le			
Software Consultants (Pty)					
nternet: http://www.prokon. E-Mail : mail@prokon.com	com Calcs	by	Checked by	Date	······································
Horizontal sli	ding forc	e Fh : 36.1 kN			
	-	rall sliding = F	r/Fh = 2.15		
		-	1/111 2.10		
Reaction at ba esistance at ba afety factor ag	.se: 59.	0 KN 7 kN e sliding = Fr(b	ase)/R(base) = 2	.60	
OIL PRESSURES	UNDER E	ASE			
	: O kPa	Pa at 0.1 m from l t right hand sid		base.	
ALL MOMENTS (	ULS) AND	REINFORCEMENT	TO BS8110 - 1	997	
osition from M	loment F			g Nominal (0.13%)	
ase top (m)	(kNm)	(nm²/m)	(nun²/m)	(mm²/m)	
0.00	6.92	0.00	77.13	390.00	
0.05	5.67	0.00	63.23	390.00	
0.10	4.47	0.00	49.87	390.00	
0.16	3.33	0.00	37.11	390.00	
0.21	2.24	0.00	24.96 13.41	390.00 390.00	
0.26	1.20	0.00	2.46	390.00	
0.31 0.36	0.22 -0.71	0.00 7.91	0.00	390.00	
0.42	-1.59	17,69	0.00	390.00	
0.42	-2.41	26.91	0.00	390.00	
0.52	-3.19	35.55	0.00	390.00	
0.57	-3.91	43.64	0.00	390.00	
0.62	-4.59	51.18	0.00	390.00	
0.68	-5.22	58.17	0.00	390.00	
0.73	-5.80	64.62	0.00	390.00	
0.78	-6.33	70.55	0.00	390.00	
0.83	-6.81	75.95	0.00	390.00	
0.88	-7.25	80.84	0.00	390.00	
0.94	-7.64	85.22	0.00	390.00	
0.99	-7.99	89.10	0.00	390.00	
1.04	-8.29	92.48	0.00	390.00	
1.09	-8.55	95.38	0.00	390.00	
1.14	-8.77	97.79	0.00	390.00	
1.20	-8.94	99.74	0.00	390.00	
1.25	-9.08	101.22	0.00	390.00	
1.30	-9.17	102.24	0.00	390.00	
1.35	-9.22	102.81	0.00	390.00	
1.40	-9.23	102.94	0.00	390.00	
1.46	-9.20	102.63	0.00	390.00	
1.51	-9.14	101.89	0.00	390.00	
1.56	-9.03	100.73	0.00	390.00	
1.61	-8.89	99.16	0.00	390.00	
1.66	-8.71	97.18	0.00	390.00	
1.72	-8.50	94.79	0.00	390.00	
1.77	-8.25	92.02	0.00	390.00	
1.82	-7.97	88.86	0.00	390.00 390.00	
1.87	-7.65	85.31	0.00 0.00	390.00	
1.92 1.98	-7.30 -6.92	81.40	0.00	390.00	
2.03	-6.92	77.13	0.00	390.00	
2.03	-6.05	72.49	0.00	390.00	
		67.51	0.00	390.00	
2.13	-5.58	62.18	0.00	390.00	
2.18	-5.07	56.52	0.00	390.00	
2.24	-4.53	50.53	0.00	390.00	
2.29 2.34	-3.96 -3.37	44.22 37.59	0.00	390.00	
2.34	-3.37	37.59	0.00	390.00	
4 · · · · ·					
2.44	-2.10	23.42	0.00	390.00	

ماتف: ۸۸، ۱۵۲۲، ۱۱۲۲۷۷ فاکس: ۱۱۲۳۸۰ مر.ب ۸۳۰۷۶ عمان - الأردن

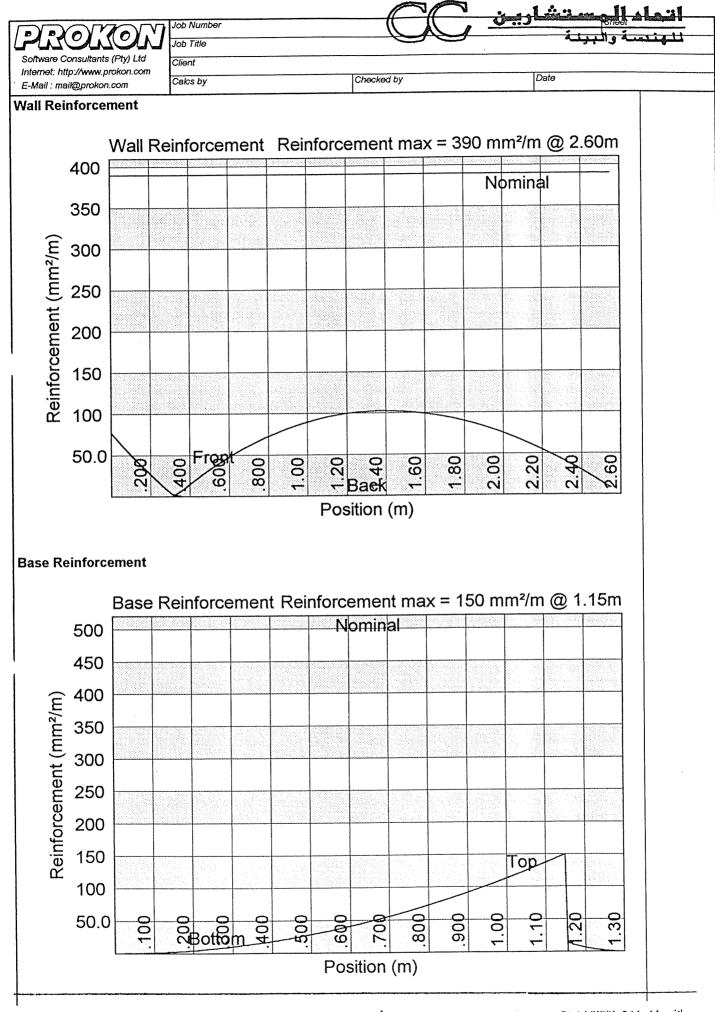
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oftware Consultants (Pt		lient	<u></u>			
ternet: http://www.proko	n.com		Checked by		Date	
-Mail : mail@prokon.cor	n C	alcs by			Dale	
2.60	0.00	0.00	0.00	390.00		
ASE MOMENTS	(ULS) A	AND REINFORCEMENT	TO BS8110 - 1	1997		
osition from	Moment	Top Reinforcing	Bot Reinforcing	y Nominal (0.	.13%)	
eft (m)	(kNm)	$(mm^2/m)$	$(mm^2/m)$	(mm²/m)		
0.03	-0.00	0.00	0.00	520.00		
0.05	-0.01	0.00	0.08	520.00		
0.08	-0.04	0.00	0.31	520.00		
0.10	-0.09	0.00	0.69	520.00		
0.13	-0.16	0.00	1.22	520.00		
0.16	-0.24	0.00	1.91	520.00		
0.18	-0.35	0.00	2.76	520.00		
0.21	-0.48	0.00	3.75	520.00		
0.23	-0.62	0.00	4.90	520.00		
0.26	-0.79	0.00	6.20	520.00		
0.29	-0.97	0.00	7.66	520.00		
0.31	-1.18	0.00	9.26	520.00		
	-1.18 -1.40	0.00	11.02	520.00		
0.34			12.94	520.00		
0.36	-1.64	0.00				
0.39	-1.91	0.00	15.01	520.00		
0.42	-2.19	0.00	17.23	520.00		1
0.44	-2.49	0.00	19.60	520.00		
0.47	-2.81	0.00	22.12	520.00		
0.49	-3.15	0.00	24.80	520.00		
0.52	-3.51	0.00	27.64	520.00		
0.55	-3.89	0.00	30.62	520.00		
0.57	-4.29	0.00	33.76	520.00		
0.60	-4.71	0.00	37.05	520.00		
0.62	-5.14	0.00	40.50	520.00		
0.65	-5.60	0.00	44.10	520.00		
0.68	-6.08	0.00	47.85	520.00		
0.70	-6.57	0.00	51.75	520.00		
0.73	-7.09	0.00	55.81	520.00		
0.75	-7.62	0.00	60.02	520.00		
0.78	-8.18	0.00	64.38	520.00		
			68.90	520.00		
0.81	-8.75 -9.35	0.00	73.57	520.00		
0.83			78.39	520.00		
0.86	-9.96	0.00				
0.88	-10.59	0.00	83.37	520.00		
0.91	-11.24	0.00	88.50	520.00		
0.94	-11.91	0.00	93.78	520.00		
0.96	-12.60	0.00	99.22	520.00		
0.99	-13.31	0.00	104.81	520.00		
1.01	-14.04	0.00	110.55	520.00		1
1.04	-14.79	0.00	116.44	520.00		
1.07	-15.56	0.00	122.49	520.00		
1.09	-16.35	0.00	128.69	520.00		
1.12	-17.16	0.00	135.05	520.00		
1.14	-17.98	0.00	141.55	520.00		
1.17	-18.83	0.00	148.21	520.00		
1.20	-19.03	0.00	149.77	520.00		
1.22	-1.79	14.12	0.00	520.00		
1.25	-1.35	10.61	0.00	520.00		
1.27	-0.86	6.79	0.00	520.00		
1.30	-0.49	3.82	0.00	520.00		
Shear force a	t bottom	-BASE JUNCTION TO to of wall $V = 36.4$	kN	7		
		n of wall v = 0.15 M s stress vc = 1.04 M		ll tensile re	inf.)	
						,



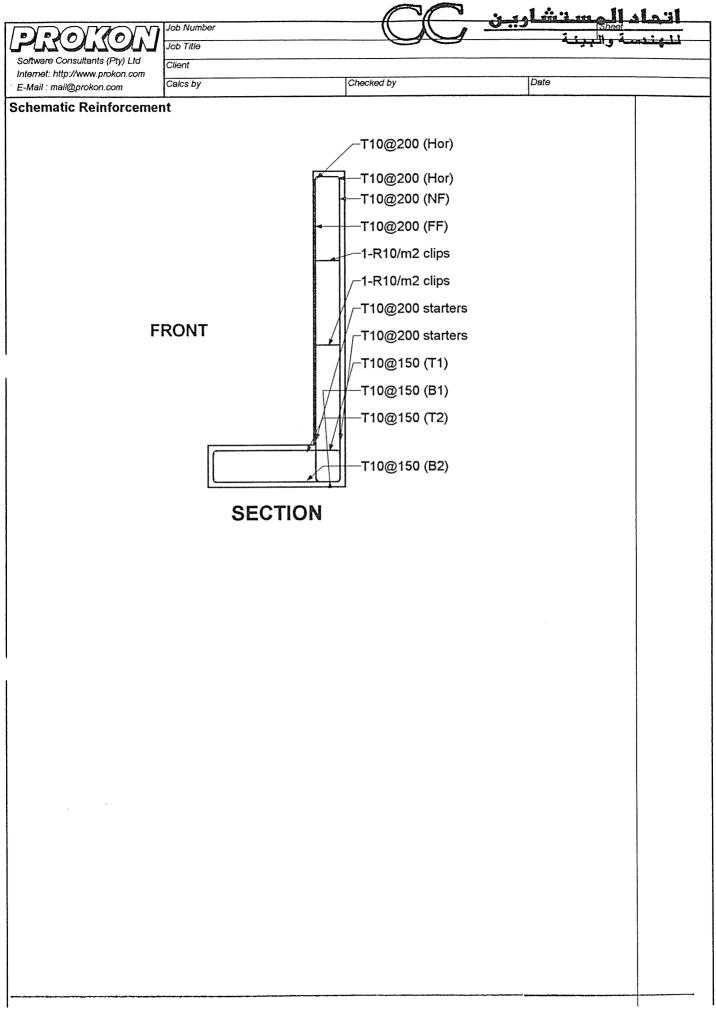
مانف: ٦٢٢٢٧٩، ٦٢٢٢٧٧ فاكس: ٦١٢٣٨٠ ص.ب ٨٣٠٧٤٦ عمان - الأردن



هاتف: ٦٤٢٠٨٨، ٦٢٢٢٧٧ فاكس: ٦١٢٢٨٠ ص.ب ٨٣٠٧٤٦ عمان - الأردن



هاتف: ٨٨ - ٦٢٢، ٦١٢٢٧٧ فاكس: - ٦١٢٢٨ ص.ب ٨٣ · ٧٢٦ عمان - الأردن





DROMON	Job Number			Sheet
	Job Tikk			
Software Consultants (Pty) Ltd Internet: http://www.prokon.com	Client			
E-Nivil: maik@proton.com	Cales by	Checked by	Dote	

Retaining Wall Design : Propped cantilever exam

#### Imput Data

	Wall D	limensions		Live L	oads	General Pa	rameters	Design Pa	rameters
H1 (m)	5.2	C (m)	0.4	₩ (k N/m*)		Soil Frict (")	35	SF Overt.	1.5
H2 (m)	.5	F (m)		P (kN)	100	Fill slope (*)		SF Slip	1.5
H3 (m)	4.7	xf (m)		xp (m)	.15	Wall Frict (*)	12	DL Factor	1.4
Hw (m)		At (m)	.3	L(kN/m)		Conc Densit	25	LL Factor	1.6
Hr (m)		Ab (m)	.3	xl (m)		Soil Density	20	Pmax (kPa)	250
B (m)	.5	Cover: wall	50	Lh (kN/m)		fcu (MPa)	25	[	
D (m)	.5	Cover: base	50	х (тт)		fy (MPa)	414	T	[ ]

Seepage allowed

Theory : Coulomb Wall type : Propped cantilever

#### SEISMIC ANALYSIS SETTINGS:

Seismic Analysis ON/OFF:ON

Hor Accel. (g)	.15
Vert Accel. (g)	.05
Include LL's	Ŷ

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#### VALUES OF PRESSURE COEFFICIENTS:

Active Pressure coefficient Ka :0.25 Passive Pressure coefficient Kp :5.76 Seismic Active Pressure coefficient Kas :0.33 Seismic Passive Pressure coefficient Kps :2.58 Base frictional constant µ :0.70

#### FORCES ACTING ON THE WALL:

Description	FORCES F Horizontal left (+)	• •	ir LEVER ARMS F Vertical down (+)	(m) Lever arm
Destabilizing forces:				
Total Active pressure Pa	0.938	0.282	0.172	0.800
Siesmic component of Pa	0.196	0.300	0.042	0.800
Siesmic wall inertia	6.633	2.600		
Stabilizing forces:				
Passive pressure on base Pp	-6.445	0.167		
Siesmic component of Pp	7.953	0.300		
Weight of the wall + base			46.550	0.650
Weight of soil on the base			1.900	0.650
Point load of 100.00 kN on 3	backfill		100.000	0.650

#### EQUILIBRIUM CALCULATIONS AT SLS

#### 1. Force Equilibrium

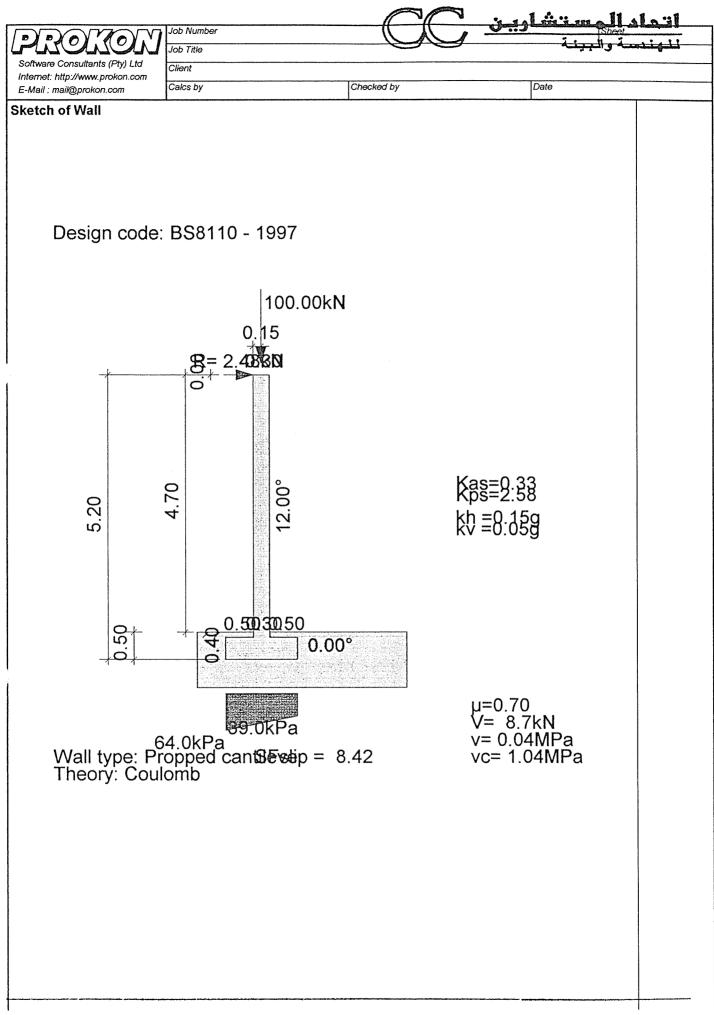
Sum of Vertical forces Pv	:	66.9 kN
Frictional resistance Pfric	:	46.8 kN
Passive Pressure on shear key	:	0.0 kN
Passive pressure on base	:	6.4 kN
Horizontal reaction at top	:	2.5 kN
=> Horizontal resistance Fr	:	63.7 kN
Horizontal sliding force Fh	:	7.6 kN

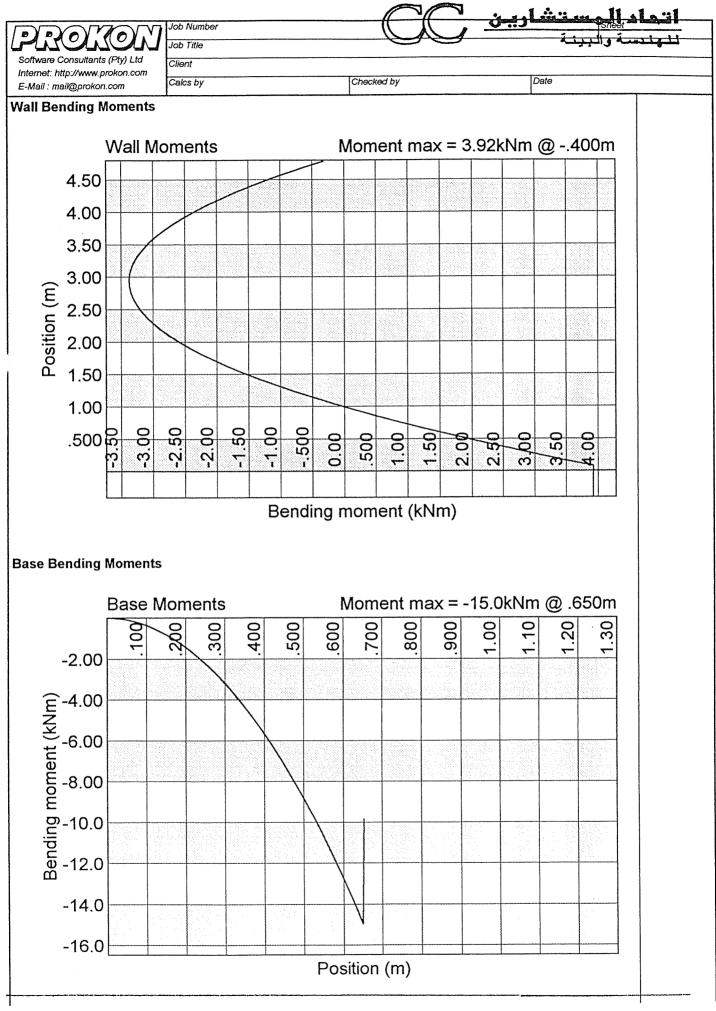
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	Job Tit	le			
Software Consultants (Pt nternet: http://www.proko					····
E-Mail : mail@prokon.coi	Outro I	<i>by</i>	Checked by		Date
		rall sliding = Fr	$\frac{1}{1}$		L
arecy factor a	igarnst ove	Lair Siluing - Fr	/		
Reaction at 1	base: 5.	1 kN			
Resistance at 1			· · · · · · · · · · · · · · · · · · ·	10.00	
Safety factor a	against bas	e sliding = Fr(ba	se)/R(base) =	12.02	
SOIL PRESSURE	S INDER B	AGF			
		ADD .			
Maximum pressu:	re : 64.0 k	Pa			
linimum pressu:			<b>c</b> .		
faximum pressu:	ce occurs a	t left hand side	of base		
WALL MOMENTS	(ULS) AND	REINFORCEMENT	TO BS8110 -	1997	
Position from		ront Reinforcing			13%)
pase top (m)	(kNm)	(mm²/m)	(mm²/m)	(mm²/m)	
0.00	3.92	0.00	43.71	390.00	
0.10	3.43	0.00	38.24	390.00	
0.19	2.96	0.00	33.06	390.00	
0.29	2.52	0.00	28.06	390.00	
0.38	2.08	0.00	23.24	390.00	
0.48 0.58	1.67 1.27	0.00 0.00	18.60 14.15	390.00 390.00	
0.58	0.89	0.00	9.88	390.00	
0.77	0.52	0.00	5.80	390.00	
0.86	0.17	0.00	1.90	390.00	
0.96	-0.16	1.82	0.00	390.00	
1.06	-0.48	5.35	0.00	390.00	
1.15 1.25	-0.78 -1.06	8.70 11.87	0.00 0.00	390.00 390.00	
1.34	-1.33	14.85	0.00	390.00	
1.44	-1.58	17.65	0.00	390.00	
1.54	-1.82	20.27	0.00	390.00	
1.63	-2.04	22.70	0.00	390.00	
1.73 1.82	-2.24 -2.42	24.95 27.01	0.00 0.00	390.00 390.00	
1.92	-2.59	28.90	0.00	390.00	
2.02	-2.74	30.59	0.00	390.00	
2.11	-2.88	32.11	0.00	390.00	
2.21	-3.00	33.44	0.00	390.00	
2.30	-3.10	34.59	0.00	390.00	
2.40 2.50	-3.19 -3.26	35.55 36.33	0.00 0.00	390.00 390.00	
2.59	-3.31	36.93	0.00	390.00	
2.69	-3.35	37.34	0.00	390.00	
2.78	-3.37	37.57	0.00	390.00	
2.88	-3.37	37.62	0.00	390.00	
2.98 3.07	-3.36 -3.33	37.48 37.16	0.00 0.00	390.00 390.00	
3.17	-3.33	36.66	0.00	390.00	
3.26	-3.23	35.97	0.00	390.00	
3.36	-3.15	35.10	0.00	390.00	
3.46	-3.05	34.04	0.00	390.00	
3.55	-2.94	32.80	0.00	390.00 390.00	
3.65 3.74	-2.81 -2.67	31.38 29.78	0.00 0.00	390.00	
3.84	-2.51	27.99	0.00	390.00	
3.94	-2.33	26.01	0.00	390.00	
4.03	-2.14	23.86	0.00	390.00	
4.13	-1.93	21.52	0.00	390.00	
4.22	-1.70	18.99	0.00 0.00	390.00 390.00	
4.32	-1.46 -1.20	16.29 13.40	0.00	390.00	
	1.20				
4.42	-0.93	10.32	0.00	390.00	
	-0.93 -0.63	10.32 7.07	0.00 0.00	390.00	

هاتف: ٨٨، ٦٤٢، ٦١٢٢٧٧ قاكس: ٦١٢٣٨٠ ص.ب ٨٢٠٧٤٦ عمان - الأردن

Contents (170) (JJ)         Content (170) (JJ)         Content (170) (JJ)         Content (170) (JJ)           AMAL "matiggoridon com         Content (IA)         Content (IA)         Content (IA)         Content (IA)           ADAL "matiggoridon com         Content (IA)         Content (IA)         Content (IA)         Content (IA)           Adat "matiggoridon com         Content (IA)         Content (IA)         Content (IA)         Content (IA)           Adat "matiggoridon com         Content (IA)         Content (IA)         Content (IA)         Content (IA)           Adat "matiggoridon com         Content (IA)         Content (IA)         Content (IA)         Content (IA)           0.03         -0.00         0.00         0.19         S20.00         Content (IA)         Content (IA)           0.10         -0.22         0.00         1.70         S20.00         Content (IA)         Content (IA)         Content (IA)           0.11         -0.22         0.00         12.06         S20.00         Content (IA)         Content (IA) <th>9:20).((</th> <th><b>n V . V /</b>  </th> <th>Job Number Job Title</th> <th></th> <th>البيلة</th> <th>للهندسة و</th>	9:20).((	<b>n V . V /</b>	Job Number Job Title		البيلة	للهندسة و
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Abs.         Abs. <th< th=""><th>ternet: http://www.prok</th><th>on.com</th><th></th><th>Checkerthy</th><th></th><th>······································</th></th<>	ternet: http://www.prok	on.com		Checkerthy		······································
Presidion from Adment (kbms)         Top Reinforcing (mm*/m)         Bot Reinforcing (mm*/m)         Nominal (0.13%) (mm*/m)           0.03         -0.00         0.00         0.00         520.00           0.06         -0.10         0.00         0.75         520.00           0.13         -0.38         0.00         3.02         520.00           0.16         -0.66         0.00         4.71         520.00           0.18         -0.66         0.00         4.71         520.00           0.22         -1.17         0.00         9.24         520.00           0.23         -1.53         0.00         18.65         520.00           0.24         -1.17         0.00         18.65         520.00           0.25         -1.33         0.00         18.65         520.00           0.31         -2.90         0.00         31.85         520.00           0.34         -3.45         0.00         42.41         520.00           0.44         -6.13         0.00         42.41         520.00           0.47         -6.92         0.00         52.20         520.00           0.55         -9.56         0.00         52.20         520.00		l	-	I	l	
eft (m) (kRm) (mm <sup>4</sup> /m) (mm <sup>4</sup> /m) (mm <sup>4</sup> /m) 0,03 -0,00 0.00 0.00 520.00 0,06 -0.10 0.00 0.19 520.00 0,10 -0.22 0.00 1.70 520.00 0,13 -0.38 0.00 3.02 520.00 0,15 -0.66 0.00 6.79 520.00 0,16 -0.56 0.00 12.06 520.00 0,22 -1.17 0.00 9.24 520.00 0,23 -1.53 0.00 12.06 520.00 0,25 -1.94 0.00 15.27 520.00 0,26 -1.94 0.00 15.27 520.00 0,31 -2.90 0.00 13.85 520.00 0,33 -3.45 0.00 27.14 520.00 0,34 -3.45 0.00 35.94 520.00 0,35 -4.05 0.00 35.94 520.00 0,44 -5.13 0.00 44.25 520.00 0.44 -6.13 0.00 44.25 520.00 0.44 -6.13 0.00 44.24 155 520.00 0.45 -4.05 0.00 61.07 520.00 0.45 -4.05 0.00 61.07 520.00 0.44 -6.13 0.00 48.25 520.00 0.55 -8.64 0.00 75.39 520.00 0.55 -8.64 0.00 75.39 520.00 0.55 -8.68 0.00 75.39 520.00 0.56 -11.79 0.00 81.12 520.00 0.66 -14.36 17.80 0.00 520.00 0.70 -8.86 77.58 0.00 520.00 0.71 -10.55 0.00 99.70 520.00 0.68 -14.36 17.80 0.00 520.00 0.73 -10.55 11.78 0.00 520.00 0.68 -7.6.3 60.00 0.00 520.00 0.73 -14.36 17.78 0.00 520.00 0.74 -5.95 54.74 0.00 520.00 0.75 -10.55 14.74 0.00 520.00 0.75 -10.55 14.74 0.00 520.00 0.76 -7.53 60.00 0.00 520.00 0.76 -7.53 60.00 0.00 520.00 0.76 -7.53 60.00 520.00 0.76 -7.53 60.00 520.00 0.76 -7.54 44.81 0.00 520.00 0.88 -6.55 54.74 0.00 520.00 0.99 -4.55 35.474 0.00 520.00 0.99	BASE MOMENTS	(ULS)	AND REINFORCEMENT	TO BS8110 - 19	97	
0.05         -0.02         0.00         0.19         520.00           0.10         -0.02         0.00         1.70         520.00           0.11         -0.32         0.00         1.70         520.00           0.13         -0.60         0.00         4.71         520.00           0.14         -0.76         0.00         5.72         520.00           0.21         -1.17         0.00         12.06         520.00           0.23         -1.53         0.00         12.06         520.00           0.24         -2.39         0.00         18.85         520.00           0.31         -2.90         0.00         22.81         520.00           0.34         -3.45         0.00         31.85         520.00           0.34         -4.05         0.00         34.94         520.00           0.44         -6.13         0.00         42.41         520.00           0.44         -6.13         0.00         42.25         520.00           0.55         -9.58         0.00         75.39         520.00           0.55         -9.58         0.00         75.39         520.00           0.56         -13.79						
0.08 -0.10 0.00 0.75 520.00 0.11 -0.22 0.00 1.70 520.00 0.13 -0.38 0.00 3.02 520.00 0.14 -0.66 0.00 4.71 520.00 0.21 -1.17 0.00 9.24 520.00 0.22 -1.53 0.00 12.06 520.00 0.22 -1.94 0.00 15.27 520.00 0.24 -1.94 0.00 22.81 520.00 0.33 -2.90 0.00 31.85 520.00 0.34 -3.45 0.00 22.81 520.00 0.35 -4.69 0.00 34.25 520.00 0.44 -6.13 0.00 42.41 520.00 0.55 -9.58 0.00 54.47 520.00 0.55 -9.58 0.00 75.39 520.00 0.55 -9.58 0.00 75.39 520.00 0.66 -11.59 0.00 83.12 520.00 0.66 -11.59 0.00 83.12 520.00 0.66 -14.96 117.80 0.00 520.00 0.67 -10.56 0.00 520.00 0.73 -14.96 117.80 0.00 520.00 0.73 -14.96 117.80 0.00 520.00 0.73 -14.96 17.80 0.00 520.00 0.73 -14.96 17.80 0.00 520.00 0.73 -14.96 17.80 0.00 520.00 0.75 -14.96 17.80 0.00 520.00 0.77 -9.86 77.58 0.00 520.00 0.78 -9.59 4.00 75.39 520.00 0.68 -14.96 17.80 0.00 520.00 0.79 -9.66 77.58 0.00 520.00 0.71 -19.06 71.50 0.00 520.00 0.72 -9.66 77.58 0.00 520.00 0.73 -14.96 117.80 0.00 520.00 0.74 -9.08 71.50 0.00 520.00 0.75 -14.96 117.80 0.00 520.00 0.77 -9.66 77.58 0.00 520.00 0.78 -9.55 54.74 0.00 520.00 0.79 -9.66 77.81 0.00 520.00 0.71 -9.08 71.50 0.00 520.00 0.72 -9.06 77.81 0.00 520.00 0.73 -14.96 117.80 0.00 520.00 0.74 -9.08 71.50 0.00 520.00 0.75 -14.96 17.80 0.00 520.00 0.77 -9.05 74.4 56 0.00 520.00 0.78 -9.14 96 0.00 520.00 0.99 -6.31 49.65 0.00 520.00 0.99 -7.63 50.00 520.00 0.99 -7.63 50.00 520.00 0.99 -7.63 50.00 520.00 0.99 -7.64 70.90 520.00 1.01 -4.04 33.78 0.00 520.00 1.02 -7.65 74.4 0.00 520.00 1.02 -7.67 4.47 0.00 520.00 1.02 -7.67 4.47 0.00 520.00 1.22 -0.77 6.08 0.00 520.00 1.22 -0.77 6.08 0.00 520.00 1.22 -0.77 6.08 0.00 520.00 1.22 -0.77 6.07 4.47 0.00 520.00 1.22 -0.77 6.08 0.00 520.00 1.22 -0.77 6.07 4.47 0.00 520.00 1.23 -0.77 6.07 4.47 0.00 520.00 1.24 -0.39	0.03	-0.00	0.00			
0.10         -0.22         0.00         1.70         520.00           0.13         -0.38         0.00         3.72         520.00           0.14         -0.60         0.00         4.71         520.00           0.13         -0.86         0.00         5.77         520.00           0.23         -1.17         0.00         12.06         520.00           0.24         520.00         0.26         -1.94         0.00         12.06         520.00           0.25         -2.39         0.00         12.81         520.00         0.31         -2.90         0.00         22.81         520.00           0.34         -3.45         0.00         31.85         520.00         0.42         -5.39         0.00         42.41         520.00           0.42         -5.39         0.00         42.41         520.00         520.00         520.00           0.47         -6.92         0.00         54.47         520.00         520.00         55           0.55         -9.58         0.00         73.39         520.00         55         -9.58         520.00         55           0.55         -9.58         0.00         99.70         520.00         <						
0         13         -0.38         0.00         3.02         520.00           0.16         -0.60         0.00         4.71         520.00           0.21         -1.17         0.00         9.24         520.00           0.22         -1.53         0.00         12.06         520.00           0.22         -1.53         0.00         15.27         520.00           0.24         -3.45         0.00         22.61         520.00           0.34         -3.45         0.00         31.65         520.00           0.34         -4.69         0.00         31.65         520.00           0.34         -4.69         0.00         31.45         520.00           0.44         -6.13         0.00         42.41         520.00           0.44         -6.13         0.00         54.47         520.00           0.55         -9.58         0.00         75.39         520.00           0.55         -9.58         0.00         75.39         520.00           0.55         -9.58         0.00         75.39         520.00           0.57         -10.56         0.00         82.0         00           0.60						
0.16         -0.60         0.00         4.71         520.00           0.18         -0.66         0.00         6.79         520.00           0.21         -1.17         0.00         9.24         520.00           0.223         -1.33         0.00         12.06         520.00           0.226         -1.94         0.00         15.27         520.00           0.31         -2.90         0.00         22.61         520.00           0.34         -3.45         0.00         31.85         520.00           0.39         -4.69         0.00         34.85         520.00           0.42         -5.39         0.00         42.41         520.00           0.44         -6.13         0.00         44.71         520.00           0.55         -9.58         0.00         75.39         520.00           0.55         -9.58         0.00         91.22         520.00           0.60         -11.59         0.00         91.22         520.00           0.62         -12.67         0.00         92.00         520.00           0.65         -13.79         0.00         520.00         520.00           0.66         -14						
0.18         -0.86         0.00         6.79         520.00           0.21         -1.17         0.00         9.24         520.00           0.22         -1.53         0.00         12.06         520.00           0.26         -1.94         0.00         15.27         520.00           0.31         -2.90         0.00         22.81         520.00           0.34         -3.45         0.00         31.85         520.00           0.36         -4.05         0.00         31.85         520.00           0.36         -4.05         0.00         36.94         520.00           0.44         -6.13         0.00         48.25         520.00           0.42         -5.39         0.00         75.39         520.00           0.49         -7.76         0.00         68.04         520.00           0.55         -9.59         0.00         75.39         520.00           0.55         -9.59         0.00         77.39         520.00           0.56         -13.79         0.00         108.56         520.00           0.56         -13.79         0.00         108.56         520.00           0.70         -9.8						
0.21         -1.17         0.00         9.24         520.00           0.23         -1.53         0.00         12.06         520.00           0.29         -2.39         0.00         18.05         520.00           0.31         -2.90         0.00         22.61         520.00           0.34         -3.45         0.00         27.14         520.00           0.34         -3.45         0.00         31.65         520.00           0.39         -4.69         0.00         36.94         520.00           0.42         -5.33         0.00         42.41         520.00           0.44         -6.13         0.00         48.25         520.00           0.44         -6.13         0.00         48.25         520.00           0.55         -9.58         0.00         75.39         520.00           0.57         -10.56         0.00         91.22         520.00           0.60         -11.59         0.00         92.00         520.00           0.61         -14.96         117.80         0.00         520.00           0.62         -12.67         0.00         520.00         520.00           0.73         -						
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0.26         -1.64         0.00         15.27         520.00           0.29         -2.39         0.00         18.65         520.00           0.34         -3.45         0.00         22.81         520.00           0.34         -3.45         0.00         31.65         520.00           0.36         -4.05         0.00         36.94         520.00           0.42         -5.39         0.00         42.41         520.00           0.44         -6.13         0.00         48.25         520.00           0.49         -7.76         0.00         68.04         520.00           0.55         -9.58         0.00         75.39         520.00           0.55         -9.58         0.00         75.39         520.00           0.62         -12.67         0.00         99.70         520.00           0.68         -14.96         117.80         0.00         520.00           0.75         -14.96         117.80         0.00         520.00           0.75         -14.96         117.80         0.00         520.00           0.75         -14.96         117.80         0.00         520.00           0.75         <						
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0.33         -3.45         0.00         27.14         520.00           0.36         -4.05         0.00         31.85         520.00           0.39         -4.69         0.00         36.94         520.00           0.42         -5.39         0.00         42.41         520.00           0.44         -6.13         0.00         42.41         520.00           0.47         -6.92         0.00         54.47         520.00           0.49         -7.76         0.00         61.07         520.00           0.55         -9.58         0.00         75.39         520.00           0.60         -11.59         0.00         91.22         520.00           0.65         -13.79         0.00         108.56         520.00           0.65         -13.79         0.00         108.56         520.00           0.73         -14.96         117.80         0.00         520.00           0.73         -14.96         117.80         0.00         520.00           0.78         -9.86         77.58         0.00         520.00           0.81         -9.00         71.50         0.00         520.00           0.82         <						
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0.86 -7.63 60.08 0.00 520.00 0.88 -6.95 54.74 0.00 520.00 0.91 -6.31 49.65 0.00 520.00 0.94 -5.69 44.81 0.00 520.00 0.96 -5.11 40.22 0.00 520.00 1.01 -4.04 31.78 0.00 520.00 1.04 -3.55 27.93 0.00 520.00 1.07 -3.09 24.33 0.00 520.00 1.09 -2.66 20.98 0.00 520.00 1.12 -2.27 17.87 0.00 520.00 1.14 -1.91 15.02 0.00 520.00 1.17 -1.58 12.41 0.00 520.00 1.20 -1.28 10.05 0.00 520.00 1.22 -1.01 7.94 0.00 520.00 1.25 -0.77 6.08 0.00 520.00 1.27 -0.57 4.47 0.00 520.00 1.30 -0.39 3.10 0.00 520.00 SHEAR CHECK AT WALL-BASE JUNCTION TO BS8110 - 1997 Shear force at bottom of wall V = 8.7 kN Shear stress at bottom of wall V = 8.7 kN						
0.88       -6.95       54.74       0.00       520.00         0.91       -6.31       49.65       0.00       520.00         0.94       -5.69       44.81       0.00       520.00         0.96       -5.11       40.22       0.00       520.00         0.99       -4.56       35.87       0.00       520.00         1.01       -4.04       31.78       0.00       520.00         1.04       -3.55       27.93       0.00       520.00         1.07       -3.09       24.33       0.00       520.00         1.09       -2.66       20.98       0.00       520.00         1.12       -2.27       17.87       0.00       520.00         1.14       -1.91       15.02       0.00       520.00         1.20       -1.28       10.05       0.00       520.00         1.22       -0.77       6.08       0.00       520.00         1.25       -0.77       6.08       0.00       520.00         1.27       -0.57       4.47       0.00       520.00         1.28       JUNCTION TO BS8110 - 1997       Shear force at bottom of wall V = 8.7 kN         Shear force at bottom of wall V = 8.7						
0.91 -6.31 49.65 0.00 520.00 0.94 -5.69 44.81 0.00 520.00 0.96 -5.11 40.22 0.00 520.00 1.01 -4.04 31.78 0.00 520.00 1.04 -3.55 27.93 0.00 520.00 1.07 -3.09 24.33 0.00 520.00 1.12 -2.27 17.87 0.00 520.00 1.14 -1.91 15.02 0.00 520.00 1.17 -1.58 12.41 0.00 520.00 1.20 -1.28 10.05 0.00 520.00 1.22 -1.01 7.94 0.00 520.00 1.25 -0.77 6.08 0.00 520.00 1.27 -0.57 4.47 0.00 520.00 1.30 -0.39 3.10 0.00 520.00 SHEAR CHECK AT WALL-BASE JUNCTION TO BS8110 - 1997 Shear force at bottom of wall V = 8.7 kN Shear stress at bottom of wall V = 8.7 kN						
0.94 -5.69 44.81 0.00 520.00 0.96 -5.11 40.22 0.00 520.00 1.099 -4.56 35.87 0.00 520.00 1.01 -4.04 31.78 0.00 520.00 1.04 -3.55 27.93 0.00 520.00 1.07 -3.09 24.33 0.00 520.00 1.12 -2.66 20.98 0.00 520.00 1.12 -2.27 17.87 0.00 520.00 1.14 -1.91 15.02 0.00 520.00 1.17 -1.58 12.41 0.00 520.00 1.22 -1.01 7.94 0.00 520.00 1.25 -0.77 6.08 0.00 520.00 1.25 -0.77 6.08 0.00 520.00 1.27 -0.57 4.47 0.00 520.00 1.30 -0.39 3.10 0.00 520.00 SHEAR CHECK AT WALL-BASE JUNCTION TO BS8110 - 1997 Shear force at bottom of wall V = 8.7 kN Shear stress at bottom of wall V = 0.04 MPa OK						
0.96 -5.11 40.22 0.00 520.00 0.99 -4.56 35.87 0.00 520.00 1.01 -4.04 31.78 0.00 520.00 1.04 -3.55 27.93 0.00 520.00 1.07 -3.09 24.33 0.00 520.00 1.09 -2.66 20.98 0.00 520.00 1.12 -2.27 17.87 0.00 520.00 1.14 -1.91 15.02 0.00 520.00 1.17 -1.58 12.41 0.00 520.00 1.20 -1.28 10.05 0.00 520.00 1.22 -1.01 7.94 0.00 520.00 1.25 -0.77 6.08 0.00 520.00 1.27 -0.57 4.47 0.00 520.00 1.30 -0.39 3.10 0.00 520.00 SHEAR CHECK AT WALL-BASE JUNCTION TO BS8110 - 1997 Shear force at bottom of wall V = $8.7$ kN Shear stress at bottom of wall V = $8.7$ kN				0.00	520.00	
1.01-4.0431.780.00 $520.00$ 1.04-3.5527.930.00 $520.00$ 1.07-3.0924.330.00 $520.00$ 1.09-2.6620.980.00 $520.00$ 1.12-2.2717.870.00 $520.00$ 1.14-1.9115.020.00 $520.00$ 1.17-1.5812.410.00 $520.00$ 1.20-1.2810.050.00 $520.00$ 1.22-1.017.940.00 $520.00$ 1.25-0.776.080.00 $520.00$ 1.27-0.574.470.00 $520.00$ 1.30-0.393.100.00 $520.00$ Shear force at bottom of wall V = $8.7$ kNShear stress at bottom of wall V = $8.7$ kN				0.00	520.00	
1.04-3.5527.930.00520.001.07-3.0924.330.00520.001.09-2.6620.980.00520.001.12-2.2717.870.00520.001.14-1.9115.020.00520.001.17-1.5812.410.00520.001.20-1.2810.050.00520.001.22-1.017.940.00520.001.25-0.776.080.00520.001.30-0.393.100.00520.00Shear force at bottom of wall V = $8.7 \text{ kN}$ Shear stress at bottom of wall V = $8.7 \text{ kN}$	0.99	-4.56	35.87	0.00		
1.07       -3.09       24.33       0.00       520.00         1.09       -2.66       20.98       0.00       520.00         1.12       -2.27       17.87       0.00       520.00         1.14       -1.91       15.02       0.00       520.00         1.17       -1.58       12.41       0.00       520.00         1.20       -1.28       10.05       0.00       520.00         1.22       -1.01       7.94       0.00       520.00         1.25       -0.77       6.08       0.00       520.00         1.27       -0.57       4.47       0.00       520.00         1.30       -0.39       3.10       0.00       520.00         Shear force at bottom of wall V = 8.7 kN       Shear stress at bottom of wall V = 0.04 MPa OK	1.01					
1.09       -2.66       20.98       0.00       520.00         1.12       -2.27       17.87       0.00       520.00         1.14       -1.91       15.02       0.00       520.00         1.17       -1.58       12.41       0.00       520.00         1.20       -1.28       10.05       0.00       520.00         1.22       -1.01       7.94       0.00       520.00         1.25       -0.77       6.08       0.00       520.00         1.27       -0.57       4.47       0.00       520.00         1.30       -0.39       3.10       0.00       520.00         Shear force at bottom of wall V = 8.7 kN         Shear force at bottom of wall V = 8.7 kN         Shear stress at bottom of wall v = 0.04 MPa OK	1.04					
1.12-2.2717.870.00520.001.14-1.9115.020.00520.001.17-1.5812.410.00520.001.20-1.2810.050.00520.001.22-1.017.940.00520.001.25-0.776.080.00520.001.27-0.574.470.00520.001.30-0.393.100.00520.00Shear force at bottom of wall V = $8.7 \text{ kN}$ Shear stress at bottom of wall V = $8.7 \text{ kN}$						
1.14 $-1.91$ $15.02$ $0.00$ $520.00$ $1.17$ $-1.58$ $12.41$ $0.00$ $520.00$ $1.20$ $-1.28$ $10.05$ $0.00$ $520.00$ $1.22$ $-1.01$ $7.94$ $0.00$ $520.00$ $1.25$ $-0.77$ $6.08$ $0.00$ $520.00$ $1.27$ $-0.57$ $4.47$ $0.00$ $520.00$ $1.30$ $-0.39$ $3.10$ $0.00$ $520.00$ Shear force at bottom of wall V = $8.7$ kNShear force at bottom of wall V = $8.7$ kNShear stress at bottom of wall v = $0.04$ MPa OK						
1.17 $-1.58$ $12.41$ $0.00$ $520.00$ $1.20$ $-1.28$ $10.05$ $0.00$ $520.00$ $1.22$ $-1.01$ $7.94$ $0.00$ $520.00$ $1.25$ $-0.77$ $6.08$ $0.00$ $520.00$ $1.27$ $-0.57$ $4.47$ $0.00$ $520.00$ $1.30$ $-0.39$ $3.10$ $0.00$ $520.00$ Shear CHECK AT WALL-BASE JUNCTION TO BS8110 - 1997Shear force at bottom of wall V = $8.7$ kNShear stress at bottom of wall v = $0.04$ MPa OK						
1.20-1.2810.050.00520.001.22-1.017.940.00520.001.25-0.776.080.00520.001.27-0.574.470.00520.001.30-0.393.100.00520.00SHEAR CHECK AT WALL-BASE JUNCTION TO BS8110 - 1997Shear force at bottom of wall V = $8.7 \text{ kN}$ Shear stress at bottom of wall v = $0.04 \text{ MPa OK}$						
1.22 $-1.01$ $7.94$ $0.00$ $520.00$ $1.25$ $-0.77$ $6.08$ $0.00$ $520.00$ $1.27$ $-0.57$ $4.47$ $0.00$ $520.00$ $1.30$ $-0.39$ $3.10$ $0.00$ $520.00$ SHEAR CHECK AT WALL-BASE JUNCTION TO BS8110 - 1997Shear force at bottom of wall V = $8.7$ kNShear stress at bottom of wall v = $0.04$ MPa OK						
1.25 $-0.77$ 6.08 $0.00$ $520.00$ 1.27 $-0.57$ $4.47$ $0.00$ $520.00$ 1.30 $-0.39$ $3.10$ $0.00$ $520.00$ SHEAR CHECK AT WALL-BASE JUNCTION TO BS8110 - 1997         Shear force at bottom of wall V = $8.7 \text{ kN}$ Shear stress at bottom of wall V = $0.04 \text{ MPa OK}$						
1.27 $-0.57$ $4.47$ $0.00$ $520.00$ 1.30 $-0.39$ $3.10$ $0.00$ $520.00$ SHEAR CHECK AT WALL-BASE JUNCTION TO BS8110 - 1997         Shear force at bottom of wall V = $8.7 \text{ kN}$ Shear stress at bottom of wall v = $0.04 \text{ MPa OK}$						
1.30 -0.39 3.10 0.00 520.00 SHEAR CHECK AT WALL-BASE JUNCTION TO BS8110 - 1997 Shear force at bottom of wall V = $8.7 \text{ kN}$ Shear stress at bottom of wall v = 0.04 MPa OK						
SHEAR CHECK AT WALL-BASE JUNCTION TO BS8110 - 1997 Shear force at bottom of wall V = $8.7 \text{ kN}$ Shear stress at bottom of wall v = $0.04 \text{ MPa OK}$						
Shear force at bottom of wall $V = 8.7 \text{ kN}$ Shear stress at bottom of wall $v = 0.04$ MPa OK						
Shear stress at bottom of wall $v = 0.04$ MPa OK						
					l tensile reinf.)	

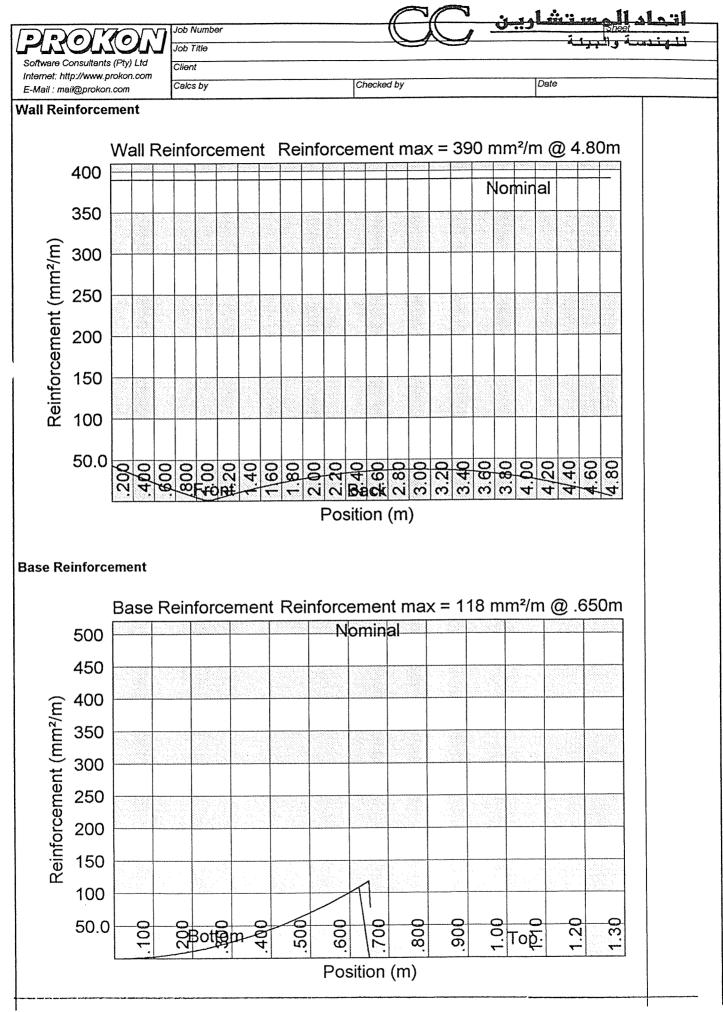
هاتف: ٨٨. ١٤٢٢، ٦١٢٢٧٧ فاكس: ٦١٢٢٨٠ ص.ب ٨٣٠٧٤٦ عمان - الأردن



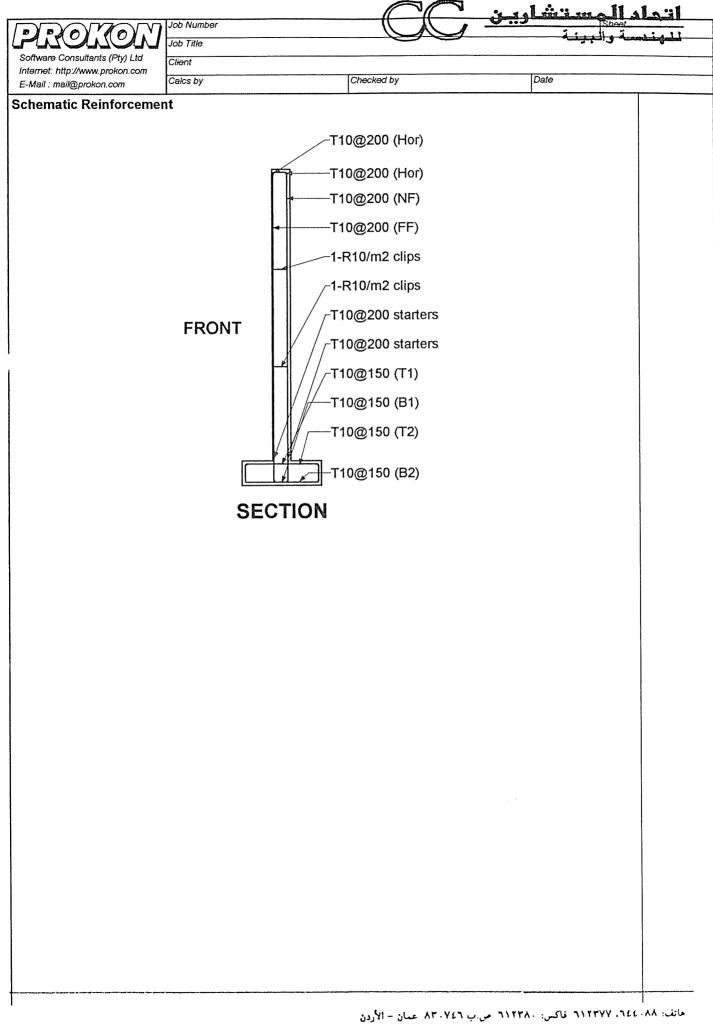


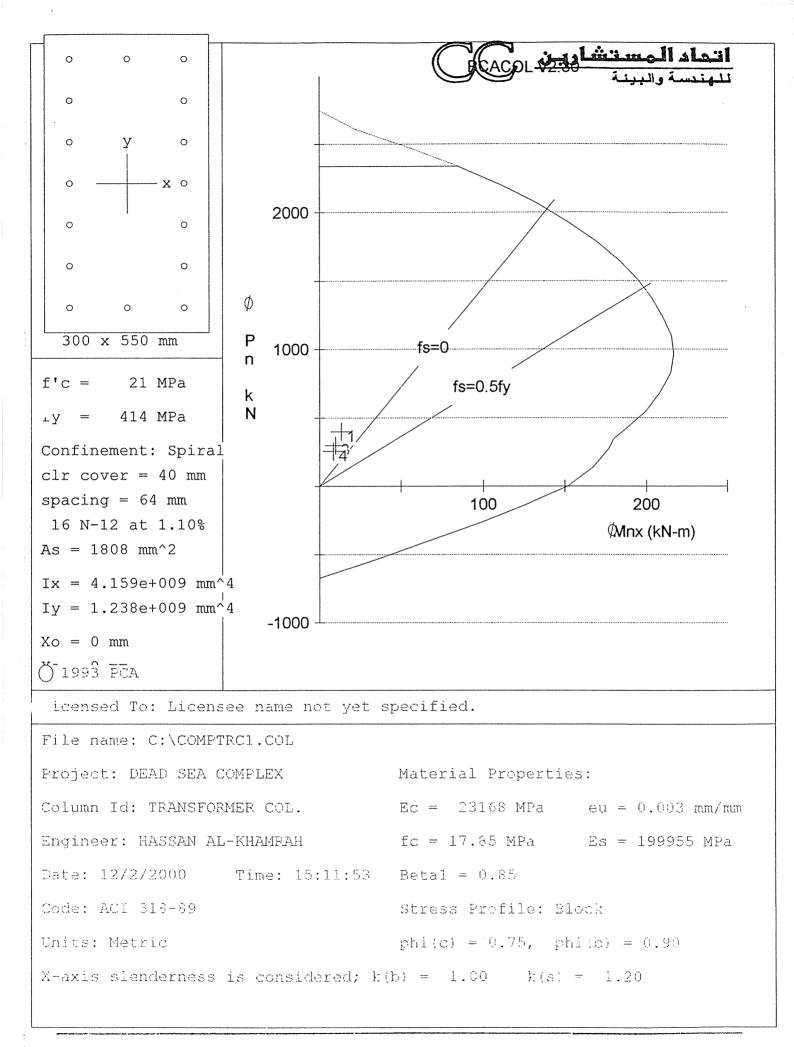
ماتف: ٨٨. ١٢٢٢٧ ، ٦١٢٣٨٠ فاكس: ٦١٢٣٨٠ ص.ب ٨٣.٧٤٦ عمان - الأدون -----

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ماتف: ٨٨. ١٢٢٢، ٦١٢٣٧٧ فاكس: ٦١٢٣٨٠ ص.ب ٨٣٠٧٤٦ عمان - الأردن





هاتف: ٨٨- ١٢٢، ٦١٢٣٧٧ فاكس: - ٦١٢٢٨ ص.ب ٨٣٠٧٤٦ عمان - الأردن

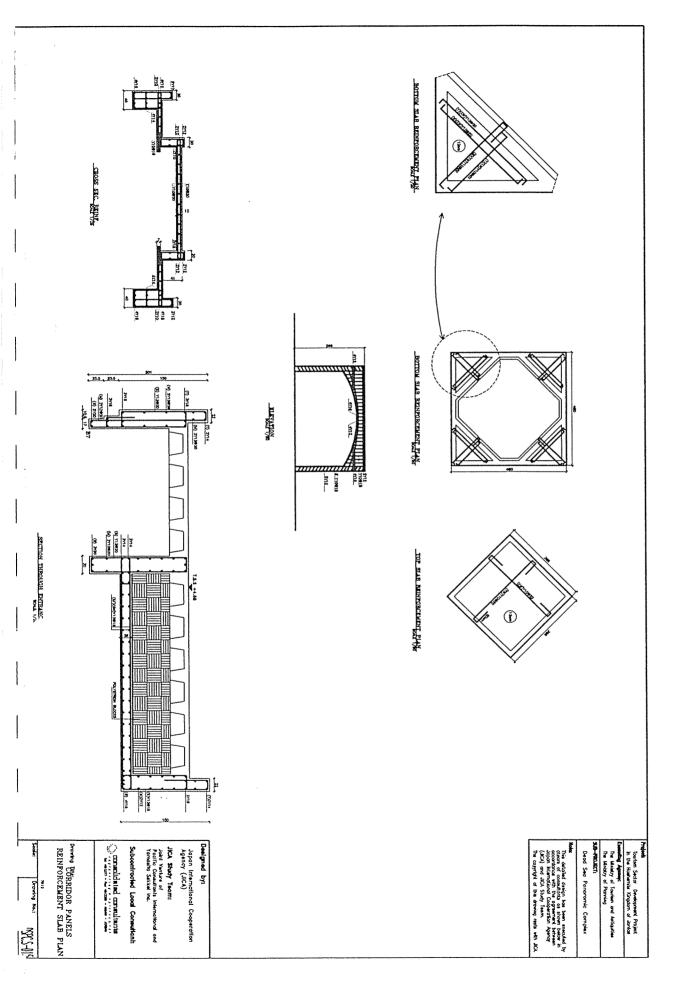
اتحاد المستشاريين للمندسة والبينة

# Structural Calculations

# OF

# CORRIDOR PANELS

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اتماد المستشاريين بيينيسة والبينية Design of Exterior Interance Panels:-weight/m<sup>2</sup>= 0.12 × 25×1.4=4.2 KN/m<sup>2</sup> Finishing = 0.03X22X1.4= 0.924KN/m2 Live Load = 2×1.6 = 3.2 KN/m2 Total Load = 4,2 to. 924+3.2=8.325 KN/m2 Total hoad of Panel= 2.4x2.4x8.325 = 47.95 KN/. weight on Beam from slab = 47.95/(4x2.4) ~ 5KNs/mR weight of Beams/mg=0.2(0.18+0.12+0.28+0.12) X25X1.4. = 4.9 KN/mp Zhoad /Interior Bean = 4.9+5 = 9.9 KN/mR Design of Top Beun :-Joad from Bottom 5126= 1/3×1.8×0.8 (25×0.12)×1.4/1.8 = 1.12 KN/m R+LL=1.972 1.975 KN/mg 9.9 KN/m R K- 1.7 K---714.8k 3.4 Bottom SIAb Bean design of 11.03KN/mR 17.8KN 4.6 1 34.3 24.3 KN

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<u>ادالمستشارين</u>

0.w(Bean) = 0.6X0.3X25X1.4 = 6.3KN/mR $weight from slab = <math>\frac{2}{3}X1.8X0.8(0.12X25)X1.4/(1.2X2)$  + 0.2X0.12X25X1.4 = 2.52KN/mRFinishing =  $0.6X0.03X22X1.4 + \frac{2}{3}(1.8X0.8)X22X(1.4/2.4)X0.03$  = 0.924 KN/mRTotal/mR = 9.45 KN/mR + 1.28 = 11.03 KN/mRLive Load =  $2_{3}X1.8X0.6X2X1.6/2.4$  $= 1.28 KN/m^{2}$ 

		RECTANG	ULAR	PANELS	SUPPOI	RTED O	N FOU	R SIDES		
fcu = 2	5 M.	Pa							Ly	+
fy = 4	14 MI	Pa	11	SIDE 1 SIDE 2					2	
Lx = 2	.4 me	etres	11	SIDE 3					2	
Ly = 2	.4 me	etres	5	SIDE 4	Free			1		3 L>
	.325 kl	•							4	
h = 1	20 mm						l			
		М	d	R	x/d	р	p'	As	As'	
SIDE	1	+0.0	90	0.00	0.00	0.00	0.00	0	0	
SIDE	2	+0.0	90	0.00	0.00	0.00	0.00	0	0	
SIDE	3	+0.0	90	0.00	0.00	0.00	0.00	0	0	
SIDE	4	+0.0	90	0.00	0.00	0.00	0.00	0	0	
SPAN	x	+2.6	90	0.33	0.03	0.09	0.00	83	0	
SPAN	У	+2.7	90	0.33	0.03	0.09	0.00	84	0	

اتعاد المستشاريين للهندسة والبينة

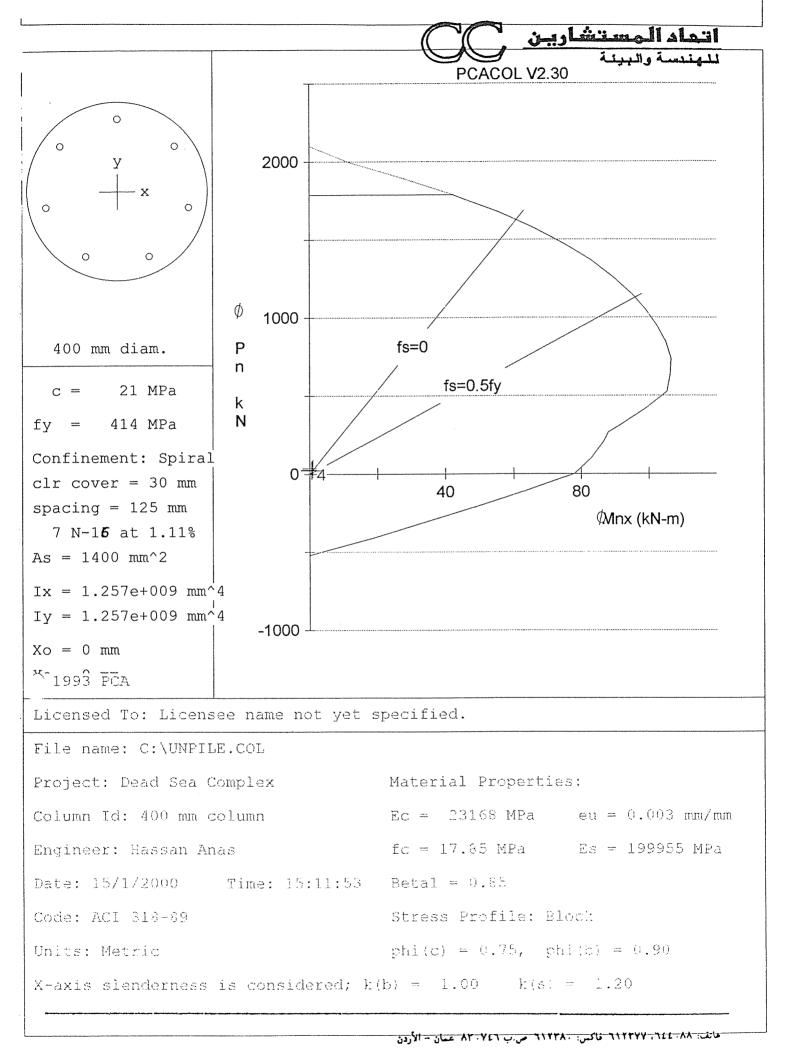
SPANS Bent and Be SPANS Prepared by				SPANS SPANS	
coordor-top beam					
Number of spans =	1	Number	f of load o	cases =	1
Span Length	Width	Depth	Flange thickness		
1 3.400	0.200	0.700	0.000	0.200	
Load case number :		1			
Span UDL Load Val	Dis Val	Dis	Load 3 Val Dis	Val	Dis Val Dis
1 9.90 0.0	0.0 0.0	0.0	0.0 0.0	0.0	0.0 0.0 0.0
Span Line Loa 1 1	ad Fro 0.8		ngth Intens L.70	sity 1.98	0.00
1 0	idth Redi .000 .000	(	lon ) % ) %		
Envelope					
-	BM spa 0.0 1	an BM L6.4	rgt BM 0.0	lft SF 18.5	2
Required Steel A:	reas (mm so	quare)			
Span Top L Bo 1 202	ot L Top 0	M Bot 0 20	M Top R 02 202	Bot R 0	
Maximum Spacing Span leg L-zon 1 2 0.5	ne spacing		-zone space		. Rest-spc dia. 3 437 8
Span Span/Depth 5. Allowable 42.					
$\begin{array}{cccccccccccccccccccccccccccccccccccc$		Requ. 1	_		
226 226	402	Prov. 5	rop		
0 202 0 0 0 2 0 16		Requ. 1	Bot		
	0	Prov. 1	Bot		

ماتف: ٦٢٢٢٢٧ ، ٦١٢٣٧٧ فاكس: ٦١٢٣٨٠ ص.ب ٨٣٠٧٤٦ عسان - الأردن

اتحاد المستشاريين للهندسة والبينة

SPANS SPANS	Bent and Prepared -top beam	by H. Sa	alysis Pr affarini	ogram V4 2/2/93		ANS ANS		
	of spans		Nu	mber of	load ca	ses =	1	
Span	Length	Width	Dept		inge .ckness			
1	4.600	0.600	0.30		000			
Load ca	ise number	:	1					
Sp.n 1 11	UDL Lo Val 03 17.8	Dis	Load 2 Val Di 0.0 0.	s Val	nd 3 Dis 0.0	Load Val 0.0	Dis Val	Dis
Span	Line	Load	From	Length	Intensi	ty		
Support 1 2	:	Width 0.000 0.000	Redistri	bution 0 % 0 %				
Envelop	be							
	Span l 1	ft BM -0.0	span BM 49.6	i rgt -(	BM ).0	lft SF 34.3	rgt SF -34.3	
Requi	red Steel	Areas (	mm square	:)				
Span 1	Top L 242	Bot L O	Тор М 0	Bot M 555	Top R 242	Bot R 0		
Span		zone spa	cing dia	. R-zone	e spacin		. Rest-spc 8 146	
Span Span/De Allowab		1 7.4 3.2						
242 0Φ1 0Φ1 452	12 4 Φ 16 0 Φ	12 0 0 4	Φ 0 Φ 12	u. Top				
492 - 1			452 Pro	vv. rob				
ן כ 0 ס 0 ס	spa ) 55 0 4 0 0 0	5 14 0	Φ 14	u. Bot				
				ov. Bot	****			

هاتف: ٦٢٢٠٨٨، ٦١٢٣٧٧ فاكس: ٦١٢٣٨٠ ص.ب ٨٣٠٧٤٦ عمان - الأردن





## Concrete Base Design :

## Input Data

Base Length A (m)	1					
Base Width B (m)						
Column(s)	Col 1	Col 2				
C (m)	0.4					
D (m)						
E (m)						
F (m)						
Stub column height )	( (m)	1				
Base Depth Y (m)		.4				
Soil Cover Z (m)	Soil Cover Z (m)					
Concrete Density (kl	V/m3)	25				
Soil Density (kN/m3)		20				
Soil friction angle (*)		35				
Base friction consta	nt	1.4				
Reinf. depth top X (n	50					
Reinf. depth top Y (r	50					
Reinf. depth bottom	50					
Reinf. depth bottom	Y (mm)	50				
Min Load Factor: sel	f weight	1.5				

n	
Allow Bearing Press. (kN/m²)	250 J
S.F. Overturning (ULS)	1
S.F. Slip (ULS)	1.5
fcu base (MPa)	25
fcu columns (MPa)	25
fy (MPa)	414

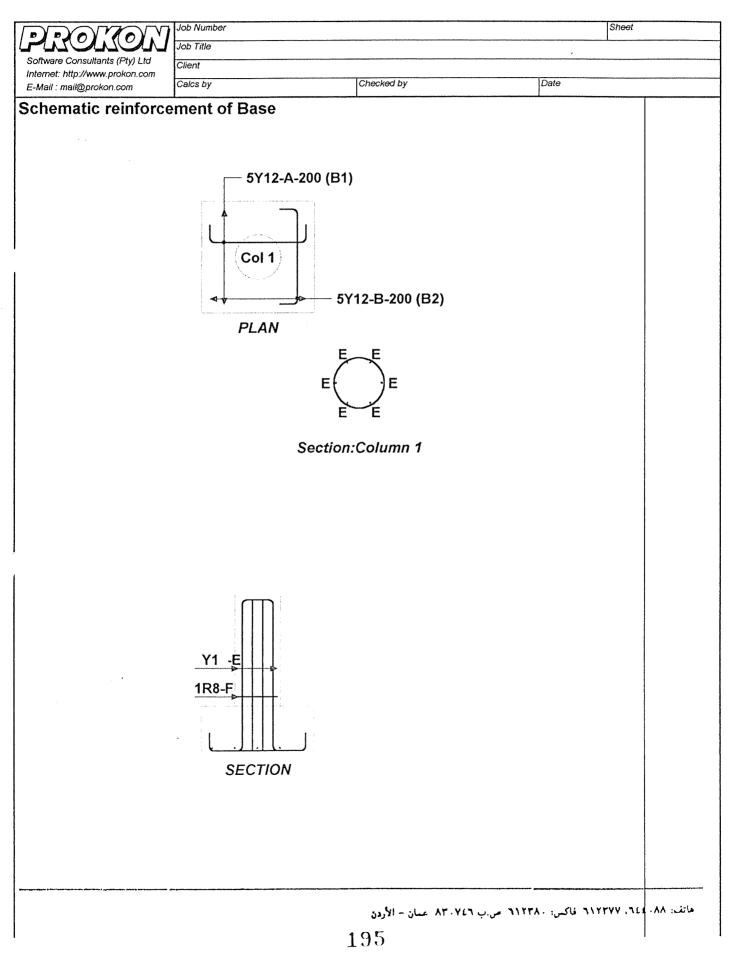
		Loads						
Load Case	Column no.		LF max	P (kN)	Hx r( <sup>kN</sup> )	Hy (kN)	M× (kNm)	₩ (kľ
1	1	1	1	35				

### Output for Load Case in

OUTPUT FOR LOAD CA	SE 1
Max. soil pressure (kPa)	62.44
SF overturning (SLS)	>100
SF overturning (ULS)	>100
Safety Factor slip (ULS)	>100
Safety Factor uplift (ULS)	>100
BOTTOM:	
Design moment X (kNm)	1.67
Reinforcement X (mm²/m)	13
Design moment Y (kNm)	1.67
Reinforcement Y (mm²/m)	13
TOP:	
Design moment X (kNm)	0.00
Reinforcement X (mm <sup>2</sup> /m)	0
Design moment Y (kNm)	0.00
Reinforcement Y (mm²/m)	0
Linear shear X (kN)	0.000
vc X (MPa)	0.347
Linear shear Y (kN)	0.000
vc Y (MPa)	0.347
Linear shear other (kN)	0.000
Punching shear (kN)	0.000
vc Punch	0.347

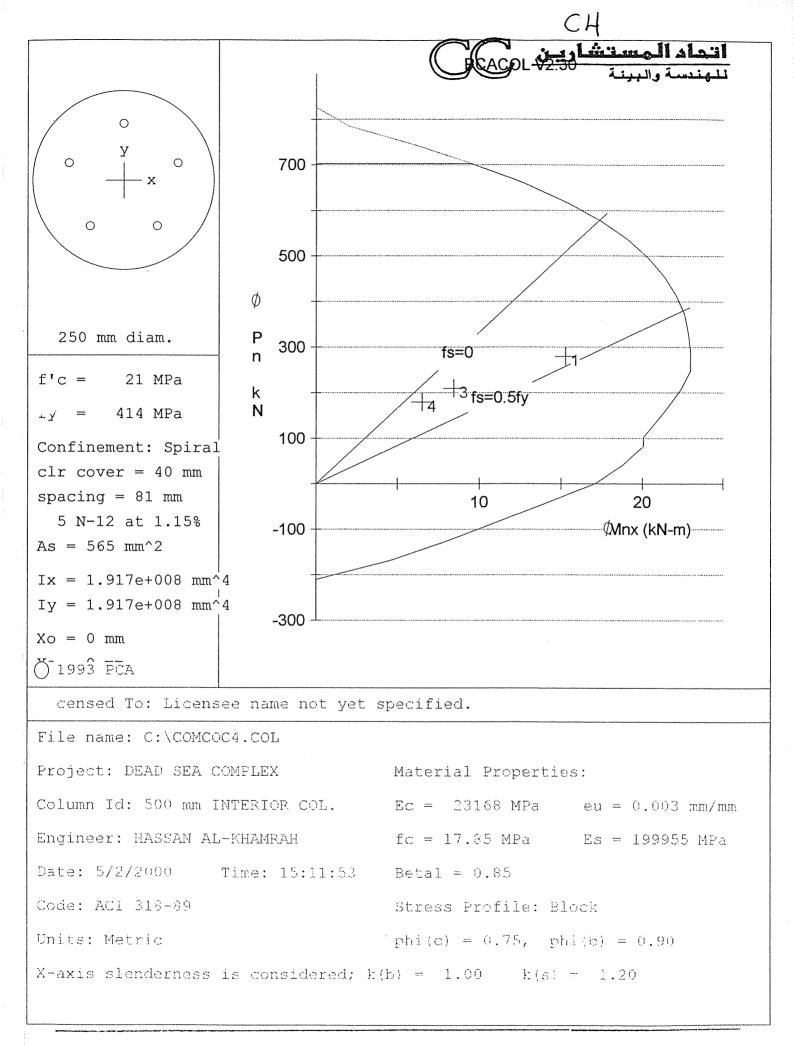
هاتف: ٨٨. ٦٤٢، ٦١٢٣٧٧ فاكس: ٦١٢٣٨٠ ص.ب ٨٣٠٧٤٦ عمان – الأردن





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Wu= 8.325 KN/m2 lx/ly=1.7/0.85=2.0  $M_{\chi} = \chi_{\chi} P \longrightarrow \chi_{\chi} = 0.0324$  $M_{\chi} = \chi_{\chi} P \longrightarrow \chi_{\chi} = 0.0377$  $P = \frac{1}{2}P lx ly = \frac{1}{2} \times 8.325 \times 1.7 \times 0.85 = 6.0148$ · Mx = 0.0324 × 6.0148 = 0.195 KN-m  $M_{y} = 0.0377 \times 6.0148 = 0.2267 \text{ KN-m}$ USE Min Reinf = 0.002 × 100 × 10 = 2 Cm<sup>2</sup>/m USE \$10220



هاتف: ٨٨- ١٢٢، ٦١٢٣٧٧ فاكس: ٦١٢٣٨٠ ص.ب ٨٣٠٧٤٦ عمان - الأردن