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Date	Sheet No.
Eng. PS	PC-20
Job No. 16.440	

28 CANFIELD GARDENS NW6.

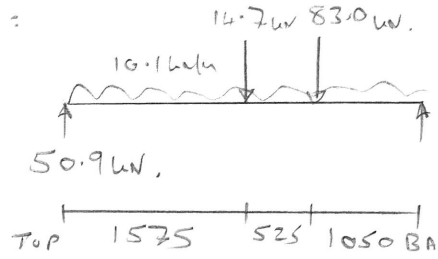
TOP BEAM :

ASSESS FORCES ON BACK OF WALL AS BEAM BEARING ONTO TOP BEAM AS

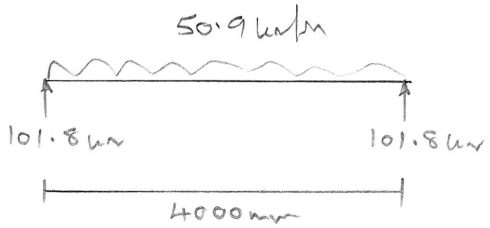
		FACTORED
SELFWEIGHT: (UDL)	$0.3 \times 24 = 7.2$ kN/m PER M WIDTH.	10.1 kN/m
SURCHARGE	$\frac{1}{3} \times 10 \times 3.15 = 10.5$ kN	14.7 kN.
SOIL	$\frac{1}{3} \times \frac{1}{2} \times 18 \times 3.15^2 = 59.3$ kN.	83.0 kN.

(BS 8110 GENERAL SAFETY FACTOR = 1.4)

WALL AS BEAM



MAX SPAN BETWEEN RESTRAINTS = 4.10M. (INCLUDING BEARINGS)



$M = \frac{wl^2}{12} = 67.9$ kNm.

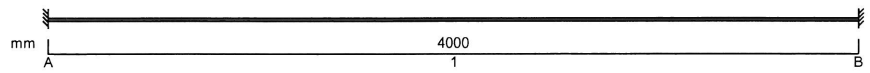
BEAM TO BE FORMED WITHIN RETAINING WALL DEPTH (PROVISIONAL SIZE 300 x 300 mm)

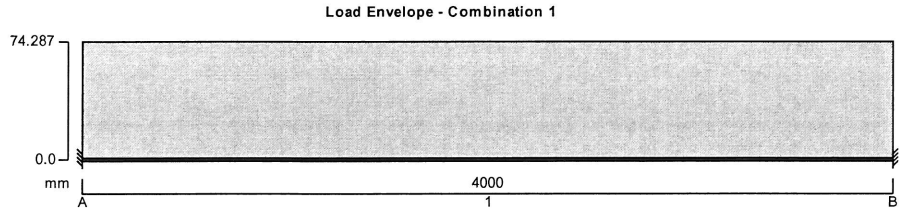
ASSUMING 2NO H20 BARS TO "TOP & BOTTOM" & H10 LINKS AT REQUIRED CENTRES.

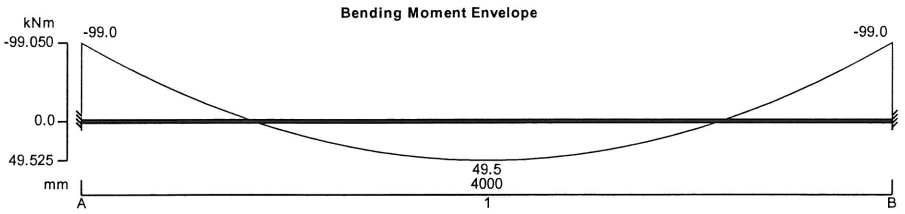
Tedds Martin Redston Associates 4 Edward Square London N1 0SP	Project 28 CANFIELD GARDENS, NW6				Job no. 16-440	
	Calcs for LIGHTWELL TOP BEAM				Start page no./Revision Pc-21	
	Calcs by PS	Calcs date 22/12/2016	Checked by	Checked date	Approved by	Approved date

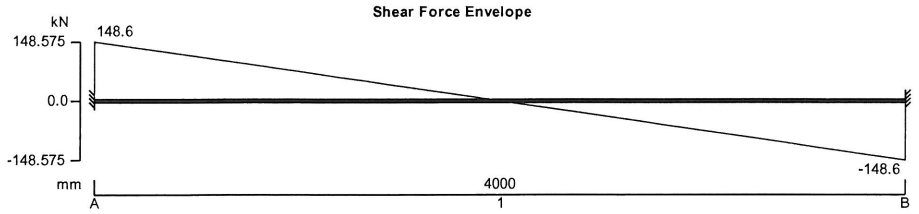
RC BEAM ANALYSIS & DESIGN BS8110

TEDDS calculation version 2.1.12









Support conditions

Support A	Vertically restrained
	Rotationally restrained
Support B	Vertically restrained
	Rotationally restrained

Applied loading

Dead self weight of beam × 1

Dead full UDL 50.9 kN/m

Load combinations

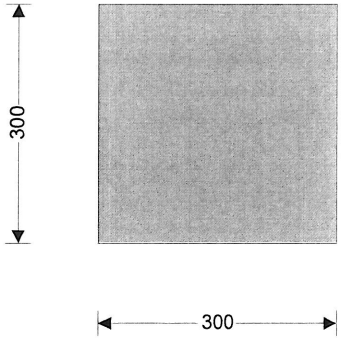
Load combination 1	Support A	Dead × 1.40
		Imposed × 1.60
	Span 1	Dead × 1.40
		Imposed × 1.60
	Support B	Dead × 1.40
		Imposed × 1.60

Analysis results

Maximum moment support A	M_{A_max} = **-99** kNm	M_{A_red} = **-99** kNm
Maximum moment span 1 at 2000 mm	M_{s1_max} = **50** kNm	M_{s1_red} = **50** kNm
Maximum moment support B	M_{B_max} = **-99** kNm	M_{B_red} = **-99** kNm
Maximum shear support A	V_{A_max} = **149** kN	V_{A_red} = **149** kN
Maximum shear support A span 1 at 250 mm	$V_{A\_s1\_max}$ = **130** kN	$V_{A\_s1\_red}$ = **130** kN
Maximum shear support B	V_{B_max} = **-149** kN	V_{B_red} = **-149** kN
Maximum shear support B span 1 at 3750 mm	$V_{B\_s1\_max}$ = **-130** kN	$V_{B\_s1\_red}$ = **-130** kN
Maximum reaction at support A	R_A = **149** kN	
Maximum reaction at support B	R_B = **149** kN	

Rectangular section details

Section width b = **300** mm Section depth h = **300** mm



Material details

Concrete strength class	**C35/45**	Char comp cube strength	f_{cu} = **45** N/mm²
Modulus of elasticity of conc	E_c = **29000** N/mm²	Maximum aggregate size	h_{agg} = **20** mm
Char yield strength of reinf	f_y = **500** N/mm²	Char yield str of shear reinf	f_{yv} = **500** N/mm²
Nominal cover to top reinf	c_{nom_t} = **35** mm	Nominal cover to bottom reinf	c_{nom_b} = **35** mm
Nominal cover to side reinf	c_{nom_s} = **35** mm		

Mid span 1

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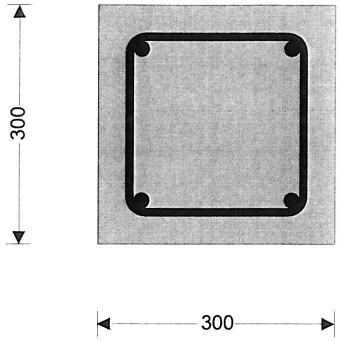

2 x 20ϕ bars

2 x 10ϕ shear legs at 150 c/c

2 x 20ϕ bars

Design moment resistance of rectangular section (cl. 3.4.4)

Design bending moment	M = **50** kNm	Depth to tension reinf.	d = **245** mm
	K = **0.061**		K' = **0.156**
			K' > K - No compression reinforcement is required
Lever arm	z = **227** mm	Depth of neutral axis	x = **40** mm
Area of tension reinf req'd	$A_{s,req}$ = **501** mm^2	Tension reinf provided	2 × 20ϕ bars
Area of tension reinf prov	$A_{s,prov}$ = **628** mm^2	Minimum area of reinf	$A_{s,min}$ = **117** mm^2
Maximum area of reinf	$A_{s,max}$ = **3600** mm^2		
	PASS - Area of reinforcement provided is greater than area of reinforcement required		

Rectangular section in shear

Shear reinforcement provided	2 × 10ϕ legs at 150 c/c		
Area of shear reinf provided	$A_{sv,prov}$ = **1047** mm^2/m	Minimum area of shear reinf	$A_{sv,min}$ = **276** mm^2/m
	PASS - Area of shear reinforcement provided exceeds minimum required		
Max longitudinal spacing	$s_{vl,max}$ = **184** mm		
	PASS - Longitudinal spacing of shear reinforcement provided is less than maximum		

Spacing of reinforcement (cl 3.12.11)

Actual dist between bars	s = **170** mm	Min dist between bars	s_{min} = **25** mm
			PASS - Satisfies the minimum spacing criteria
Design service stress	f_s = **266.0** N/mm^2	Max distance between bars	s_{max} = **177** mm
			PASS - Satisfies the maximum spacing criteria

Span to depth ratio (cl. 3.4.6)

Span to depth ratio (T.3.9)	$span\_to\_depth_{basic}$ = **20.0**	Service stress in tension rein	f_s = **266.0** N/mm^2
Modification for tension reinf	f_{tens} = **1.032**	Modification for comp reinf	f_{comp} = **1.222**
Modification for span > 10m	f_{long} = **1.000**	Allowable span to depth ratio	$span\_to\_depth_{allow}$ = **25.2**
Actual span to depth ratio	$span\_to\_depth_{actual}$ = **16.3**		
			PASS - Actual span to depth ratio is within the allowable limit