AAA VILLA PTY LTD.
CONSULTING CIVIL AND STRUCTURAL ENGINEERS.

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COMPUTATION SHEET.

PROJECT: **PROPOSED AUSWIDE CONCRETE SLEEPERS AT :**

DESIGNER **Kumar P Chelva**
DATE : **24-Aug-21**

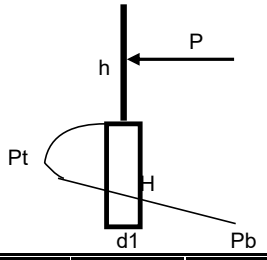
CLIENT : **AUSWIDE CONCRETE SLEEPERS PTY LTD**

1800 mm LONG CONCRETE SLEEPER.

DESIGN OF A CONCRETE SLEEPER RETAINING WALL. (H = 2800 mm , MAX. L = 1800 mm)

DATA

Ka	gama KN/ m^3	Po KN/ m^2	h (/ m)	L (/ m)
0.4	18	5	2.8	1.8



F'c (Mpa)	bar size (mm)	d / mm	Bar at (Mpa)	fsy (Mpa)	ϕ	b (mm)	H	d1
32	12	40	100	500	0.8	200	2	0.6

CALCULATION
FOR SLEEPER STABILITY.

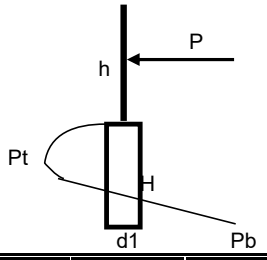
Load on bottom panel depth D = 200 mm (Assume 0.2 m panel)
Bending Moment M sleeper = (Ka x gama x h + Ka x Po) D L^2/8
(Load to bottom sleepe = 1.74 KN m x 1.5 = 2.60 KN m
A st = 226.28 mm^2
ϕ Mb = ϕ fsy Ast d (1 - 0.6 fsy/ f'c. Ast/bd)
= 2.66 KN m
Therefore ϕ Mb > M stem condition is satisfied.
Required minimum R/F = 0.0015 b d
12 mm^2 (Horizontal reinforcement)
Horizontal bar spacing = 9425 mm

ADOPT :
80 mm THICK x 200 mm HIGH PRECAST CONCRETE PANELS 32 Mpa CONCRETE
2/ N12 BAR AT 100 mm CENTRES CENTRALLY HORIZONTAL & 1800 mm LONG.

DESIGN OF A CONCRETE SLEEPER RETAINING WALL. (H = 3800 mm , MAX. L = 1800 mm)

DATA

Ka	gama KN/ m^3	Po KN/ m^2	h (/ m)	L (/ m)
0.4	18	5	3.8	1.8



F'c (Mpa)	bar size (mm)	d / mm	Bar at (Mpa)	fsy (Mpa)	ϕ	b (mm)	H	d1
32	12	50	100	500	0.8	200	2	0.6

CALCULATION
FOR SLEEPER STABILITY.

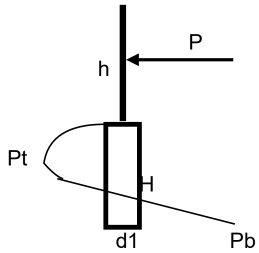
Load on bottom panel depth D = 200 mm (Assume 0.2 m panel)
Bending Moment M sleeper = (Ka x gama x h + Ka x Po) D L^2/8
(Load to bottom sleepe = 2.32 KN m x 1.5 = 3.48 KN m
A st = 226.28 mm^2
ϕ Mb = ϕ fsy Ast d (1 - 0.6 fsy/ f'c. Ast/bd)
= 3.57 KN m
Therefore ϕ Mb > M stem condition is satisfied.
Required minimum R/F = 0.0015 b d
15 mm^2 (Horizontal reinforcement)
Horizontal bar spacing = 7540 mm

ADOPT :
100 mm THICK x 200 mm HIGH PRECAST CONCRETE PANELS 32 Mpa CONCRETE
2/ N12 BAR AT 100 mm CENTRES CENTRALLY HORIZONTAL & 1800 mm LONG.

DESIGN OF A CONCRETE SLEEPER RETAINING WALL. (H = 4900 mm , MAX. L = 1800 mm)

DATA

Ka	gama KN/ m^3	Po KN/ m^2	h (/ m)	L (/ m)
0.4	18	5	4.9	1.8



F'c (Mpa)	bar size (mm)	d / mm	Bar at (Mpa)	fsy (Mpa)	ϕ	b (mm)	H	d1
32	12	60	100	500	0.8	200	2	0.6

CALCULATION
FOR SLEEPER STABILITY.

Load on bottom panel depth D = 200 mm (Assume 0.2 m panel)
Bending Moment M sleeper = (Ka x gama x h + Ka x Po) D L^2/8
(Load to bottom sleepe = 2.96 KN m x 1.5 = 4.44 KN m
A st = 226.28 mm^2
ϕ Mb = ϕ fsy Ast d (1 - 0.6 fsy/ f'c. Ast/bd)
= 4.47 KN m
Therefore ϕ Mb > M stem condition is satisfied.
Required minimum R/F = 0.0015 b d
18 mm^2 (Horizontal reinforcement)
Horizontal bar spacing = 6283 mm

ADOPT :
120 mm THICK x 200 mm HIGH PRECAST CONCRETE PANELS 32 Mpa CONCRETE
2/ N12 BAR AT 100 mm CENTRES CENTRALLY HORIZONTAL & 1800 mm LONG.

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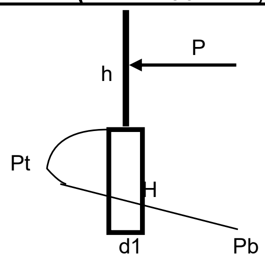
2000 mm LONG CONCRETE SLEEPER.

DESIGN OF A CONCRETE SLEEPER RETAINING WALL. (H = 2200 mm , MAX. L = 2000 mm)

DATA

Ka	gama KN/ m^3	Po KN/ m^2	h (/ m)	L (/ m)
0.4	18	5	2.2	2



F'c (Mpa)	bar size (mm)	d / mm	Bar at (Mpa)	fsy (Mpa)	ϕ	b (mm)	H	d1
32	12	40	100	500	0.8	200	2	0.6

CALCULATION
FOR SLEEPER STABILITY.

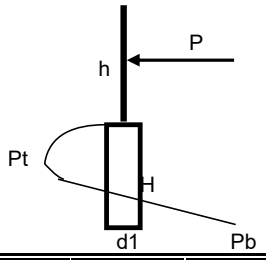
Load on bottom panel depth D = 200 mm (Assume 0.2 m panel)
Bending Moment M sleeper = (Ka x gama x h + Ka x Po) D L^2/8
(Load to bottom sleepe = 1.71 KN m x 1.5 = 2.57 KN m
A st = 226.28 mm^2
ϕ Mb = ϕ fsy Ast d (1 - 0.6 fsy/ f'c. Ast/bd)
= 2.66 KN m
Therefore ϕ Mb > M stem condition is satisfied.
Required minimum R/F = 0.0015 b d
12 mm^2 (Horizontal reinforcement)
Horizontal bar spacing = 9425 mm

ADOPT :
80 mm THICK x 200 mm HIGH PRECAST CONCRETE PANELS 32 Mpa CONCRETE
2/ N12 BAR AT 100 mm CENTRES CENTRALLY HORIZONTAL & 2000 mm LONG.

DESIGN OF A CONCRETE SLEEPER RETAINING WALL. (H = 3100 mm , MAX. L = 2000 mm)

DATA

Ka	gama KN/ m^3	Po KN/ m^2	h (/ m)	L (/ m)
0.4	18	5	3.1	2



F'c (Mpa)	bar size (mm)	d / mm	Bar at (Mpa)	fsy (Mpa)	ϕ	b (mm)	H	d1
32	12	50	100	500	0.8	200	2	0.6

CALCULATION
FOR SLEEPER STABILITY.

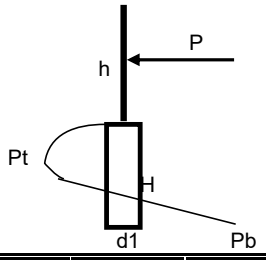
Load on bottom panel depth D = 200 mm (Assume 0.2 m panel)
Bending Moment M sleeper = (Ka x gama x h + Ka x Po) D L^2/8
(Load to bottom sleepe = 2.36 KN m x 1.5 = 3.54 KN m
A st = 226.28 mm^2
ϕ Mb = ϕ fsy Ast d (1 - 0.6 fsy/ f'c. Ast/bd)
= 3.57 KN m
Therefore ϕ Mb > M stem condition is satisfied.
Required minimum R/F = 0.0015 b d
15 mm^2 (Horizontal reinforcement)
Horizontal bar spacing = 7540 mm

ADOPT :
80 mm THICK x 200 mm HIGH PRECAST CONCRETE PANELS 32 Mpa CONCRETE
2/ N12 BAR AT 100 mm CENTRES CENTRALLY HORIZONTAL & 2000 mm LONG.

DESIGN OF A CONCRETE SLEEPER RETAINING WALL. (H = 3900 mm , MAX. L = 2000 mm)

DATA

Ka	gama KN/ m^3	Po KN/ m^2	h (/ m)	L (/ m)
0.4	18	5	3.9	2



F'c (Mpa)	bar size (mm)	d / mm	Bar at (Mpa)	fsy (Mpa)	ϕ	b (mm)	H	d1
32	12	60	100	500	0.8	200	2	0.6

CALCULATION
FOR SLEEPER STABILITY.

Load on bottom panel depth D = 200 mm (Assume 0.2 m panel)
Bending Moment M sleeper = (Ka x gama x h + Ka x Po) D L^2/8
(Load to bottom sleepe = 2.94 KN m x 1.5 = 4.40 KN m
A st = 226.28 mm^2
ϕ Mb = ϕ fsy Ast d (1 - 0.6 fsy/ f'c. Ast/bd)
= 4.47 KN m
Therefore ϕ Mb > M stem condition is satisfied.
Required minimum R/F = 0.0015 b d
18 mm^2 (Horizontal reinforcement)
Horizontal bar spacing = 6283 mm

ADOPT :
80 mm THICK x 200 mm HIGH PRECAST CONCRETE PANELS 32 Mpa CONCRETE
2/ N12 BAR AT 100 mm CENTRES CENTRALLY HORIZONTAL & 2000 mm LONG.

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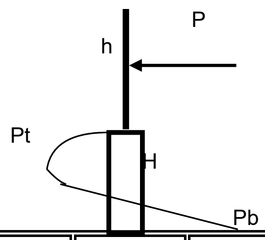
2400 mm LONG CONCRETE SLEEPER.

DESIGN OF A CONCRETE SLEEPER RETAINING WALL. (H = 1500 mm , MAX. L = 2400 mm)



DATA

Ka	gama KN/ m^3	Po KN/ m^2	h (/ m)	L (/ m)
0.4	18	5	1.5	2.4

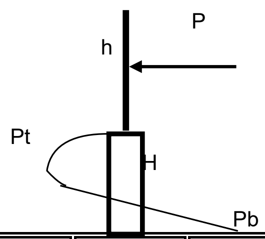
F'c (Mpa)	bar size (mm)	d / mm	Bar at (Mpa)	fsy (Mpa)	ϕ	b (mm)	H	d1
32	12	40	100	500	0.8	200	2	0.6

CALCULATION
FOR SLEEPER STABILITY.

Load on bottom panel depth D = 200 mm (Assume 0.2 m panel)
Bending Moment M sleeper = (Ka x gama x h + Ka x Po) D $L^2/8$
(Load to bottom sleepe = 1.74 KN m x 1.5 = 2.61 KN m
A st = 226.28 mm^2
ϕ Mb = ϕ fsy Ast d (1 - 0.6 fsy/ f'c. Ast/bd)
= 2.66 KN m
Therefore ϕ Mb > M stem condition is satisfied.
Required minimum R/F = 0.0015 b d
12 mm^2 (Horizontal reinforcement)
Horizontal bar spacing = 9425 mm

ADOPT :
80 mm THICK x 200 mm HIGH PRECAST CONCRETE PANELS 32 Mpa CONCRETE
2/ N12 BAR AT 100 mm CENTRES CENTRALLY HORIZONTAL & 2400 mm LONG.

DESIGN OF A CONCRETE SLEEPER RETAINING WALL. (H = 2100 mm , MAX. L = 2400 mm)



DATA

Ka	gama KN/ m^3	Po KN/ m^2	h (/ m)	L (/ m)
0.4	18	5	2.1	2.4

F'c (Mpa)	bar size (mm)	d / mm	Bar at (Mpa)	fsy (Mpa)	ϕ	b (mm)	H	d1
32	12	50	100	500	0.8	200	2	0.6

CALCULATION
FOR SLEEPER STABILITY.

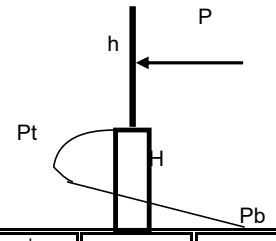
Load on bottom panel depth D = 200 mm (Assume 0.2 m panel)
Bending Moment M sleeper = (Ka x gama x h + Ka x Po) D L^2/8
(Load to bottom sleeper = 2.36 KN m x 1.5 = 3.54 KN m
A st = 226.28 mm^2
ϕ Mb = ϕ fsy Ast d (1 - 0.6 fsy/ f'c. Ast/bd)
= 3.57 KN m
Therefore ϕ Mb > M stem condition is satisfied.
Required minimum R/F = 0.0015 b d
15 mm^2 (Horizontal reinforcement)
Horizontal bar spacing = 7540 mm

ADOPT :
100 mm THICK x 200 mm HIGH PRECAST CONCRETE PANELS 32 Mpa CONCRETE
2/ N12 BAR AT 100 mm CENTRES CENTRALLY HORIZONTAL & 2400 mm LONG.

DESIGN OF A CONCRETE SLEEPER RETAINING WALL. (H = 2600 mm , MAX. L = 2400 mm)

DATA

Ka	gama KN/ m^3	Po KN/ m^2	h (/ m)	L (/ m)
0.4	18	5	2.6	2.4



F'c (Mpa)	bar size (mm)	d / mm	Bar at (Mpa)	fsy (Mpa)	ϕ	b (mm)	H	d1
32	12	60	100	500	0.8	200	2	0.6

CALCULATION
FOR SLEEPER STABILITY.

Load on bottom panel depth D = 200 mm (Assume 0.2 m panel)
Bending Moment M sleeper = (Ka x gama x h + Ka x Po) D L^2/8
(Load to bottom sleeper = 2.88 KN m x 1.5 = 4.32 KN m
A st = 226.28 mm^2
ϕ Mb = ϕ fsy Ast d (1 - 0.6 fsy/ f'c. Ast/bd)
= 4.47 KN m
Therefore ϕ Mb > M stem condition is satisfied.
Required minimum R/F = 0.0015 b d
18 mm^2 (Horizontal reinforcement)
Horizontal bar spacing = 6283 mm

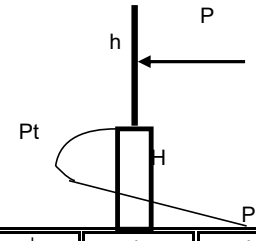
ADOPT :
120 mm THICK x 200 mm HIGH PRECAST CONCRETE PANELS 32 Mpa CONCRETE
2/ N12 BAR AT 100 mm CENTRES CENTRALLY HORIZONTAL & 2400 mm LONG.

3000 mm LONG CONCRETE SLEEPER.

DESIGN OF A CONCRETE SLEEPER RETAINING WALL. (H = 900 mm , MAX. L = 3000 mm)

DATA

Ka	gama KN/ m^3	Po KN/ m^2	h (/ m)	L (/ m)
0.4	18	5	0.9	3



F'c (Mpa)	bar size (mm)	d / mm	Bar at (Mpa)	fsy (Mpa)	ϕ	b (mm)	H	d1
32	12	40	100	500	0.8	200	2	0.6

CALCULATION
FOR SLEEPER STABILITY.

Load on bottom panel depth D = 200 mm (Assume 0.2 m panel)

Bending Moment M sleeper = (Ka x gama x h + Ka x Po) D L^2/8

(Load to bottom sleepe = 1.75 KN m x 1.5 = 2.62 KN m

A st = 226.28 mm^2

ϕ Mb = ϕ fsy Ast d (1 - 0.6 fsy/ f'c. Ast/bd)

= 2.66 KN m

Therefore ϕ Mb > M stem condition is satisfied.

Required minimum R/F = 0.0015 b d

12 mm^2 (Horizontal reinforcement)

Horizontal bar spacing = 9425 mm

ADOPT :
80 mm THICK x 200 mm HIGH PRECAST CONCRETE PANELS 32 Mpa CONCRETE
3/ N12 BAR AT 50 mm CENTRES CENTRALLY HORIZONTAL & 3000 mm LONG.