

PTISlab 3.2

Geostructural Tool Kit, Inc.

Registered To : Mainstream Corporation

Serial Number : 100-320-283

Project Title : Dibble Residence
 Project Engineer : Lisa Farmer

Project Number : 12-117
 Project Date : 1/2/13
 Report Date : 11/27/12
 Report Number : 212315A

Geotechnical Report : Hepworth-Pawlak Geotechnical

RIBBED FOUNDATION - DESIGN SUMMARY

Slab Dimensions : 12.50 FT x 87.00 FT x 5.00 Inches

Material Properties

Concrete Strength, f'_c :	4,500 PSI
Tendon Strength, F_{pu} :	270 KSI
Tendon Diameter :	1 / 2 Inch

Material Quantities

Concrete Volume :	36.8 Cubic Yards
Prestressing Tendon :	1,189 Linear Feet
Number of End Anchorages :	92

In the LONG direction ...

	<u>Type I Beam</u>	<u>Type II Beam</u>
Quantity of Beams :	4	2
Depth of Beams :	17.5 Inches	17.5 Inches
Width of Beams :	6.0 Inches	12.0 Inches
Tendons per Beam :	1	1
Beam Tendon Centroid :	3.25 Inches	3.25 Inches
Beam Spacing :		6.00 Feet O.C.
Number of Slab Tendons :		1
Slab Tendon Spacing :		6.25 Feet O.C.
Slab Tendon Centroid :		2.25 Inches from top of slab

In the SHORT direction ...

	<u>Type I Beam</u>	<u>Type II Beam</u>
Quantity of Beams :	36	2
Depth of Beams :	17.5 Inches	17.5 Inches
Width of Beams :	6.0 Inches	12.0 Inches
Tendons per Beam :	1	1
Beam Tendon Centroid :	3.25 Inches	3.25 Inches
Beam Spacing :		6.00 Feet O.C.
Number of Slab Tendons :		1
Slab Tendon Spacing :		43.50 Feet O.C.
Slab Tendon Centroid :		2.25 Inches from top of slab

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RIBBED FOUNDATION - DESIGN COMPLIANCE SUMMARY

The **RED** values exceed allowable or are less than minimum limits by the percentage indicated:

SOIL BEARING :

SOIL BEARING: -81.8%

CENTER LIFT MODE :

BENDING STRESS IN SHORT DIRECTION (TENSION): -68.8%
BENDING STRESS IN SHORT DIRECTION (COMPRESSION): -69.0%
BENDING STRESS IN LONG DIRECTION (TENSION): -85.3%
BENDING STRESS IN LONG DIRECTION (COMPRESSION): -81.7%
STIFFNESS IN SHORT DIRECTION : -99.4%
STIFFNESS IN LONG DIRECTION : -98.3%
SHEAR STRESS IN SHORT DIRECTION : -99.4%
SHEAR STRESS IN LONG DIRECTION : -99.3%
CRACKED MOMENT CAPACITY IN SHORT DIRECTION : -61.0%
CRACKED MOMENT CAPACITY IN LONG DIRECTION : -94.5%

EDGE LIFT MODE :

BENDING STRESS IN SHORT DIRECTION (COMPRESSION): -97.6%
BENDING STRESS IN SHORT DIRECTION (TENSION): -166.2%
BENDING STRESS IN LONG DIRECTION (COMPRESSION): -96.0%
BENDING STRESS IN LONG DIRECTION (TENSION): -131.6%
STIFFNESS IN SHORT DIRECTION : -88.4%
STIFFNESS IN LONG DIRECTION : -71.8%
SHEAR STRESS IN SHORT DIRECTION : -81.1%
SHEAR STRESS IN LONG DIRECTION : -84.1%
CRACKED MOMENT CAPACITY IN SHORT DIRECTION : -80.1%
CRACKED MOMENT CAPACITY IN LONG DIRECTION : -84.0%

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RIBBED FOUNDATION - RESULTS OF ANALYSIS

Soil Bearing Analysis

Total Applied Load	198,318 LB
Bearing Area	1,088 FT ²
Applied Pressure on Soil	182 PSF
Soil Pressure Safety Factor	5.48

Prestress Summary

Subgrade Friction calculated by method prescribed in PTI Manual

	Short Direction	Long Direction
Number of Slab Tendons	1	1
Number of Beam Tendons	38	6
Spacing of Slab Tendons (Feet)	43.50	6.25
Center of Gravity of Concrete (from top of slab) (Inch)	5.69	6.39
Center of Gravity of Tendons (from top of slab) (Inch)	13.94	12.54
Eccentricity of Prestressing (Inch)	-8.25	-6.15
Minimum Effective Prestress Force (K)	984.3	132.4
Beta Distance Effective Prestress Force (K)	944.0	177.6
Minimum Effective Prestress (PSI)	120	98
Beta Distance Effective Prestress (PSI)	115	132

Moment Analysis - Center Lift Mode

Maximum Moment, Short Direction	0.30 FT-K/FT
Maximum Moment, Long Direction	0.30 FT-K/FT

	Tension in Top Fiber (KSI)			Compression in Bottom Fiber (KSI)	
	Short Direction	Long Direction		Short Direction	Long Direction
Allowable Stress	-0.402	-0.402	Allowable Stress	2.025	2.025
Actual Stress	-0.126	-0.059	Actual Stress	0.628	0.371

Stiffness Analysis - Center Lift Mode

Based on a Stiffness Coefficient of 480

	Short Direction	Long Direction
Available Moment of Inertia (Inch ⁴)	195,797	34,896
Required Moment of Inertia (Inch ⁴)	1,264	608
Required Moment of Inertia controlled by	Width	6*Beta

Shear Analysis - Center Lift Mode

Maximum Shear, Short Direction.	0.05 K/FT
Maximum Shear, Long Direction	0.09 K/FT

	Short Direction	Long Direction
Allowable Shear Stress (PSI)	185	181
Actual Shear Stress (PSI)	1	1

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RIBBED FOUNDATION - SELECTED VARIABLES

	Short Direction	Long Direction
Cross Sectional Area (Inch ²) :	8,220	1,350
Moment of Inertia (Inch ⁴) :	195,797	34,896
Section Modulus, Top (Inch ³) :	34,390	5,462
Section Modulus, Bottom (Inch ³) :	16,584	3,141
Center of Gravity of Concrete - from top (Inch) :	5.69	6.39
Center of Gravity of Prestressing Tendons - from top (Inch) :	13.94	12.54
Eccentricity of Prestress (Inch) :	-8.25	-6.15
Beta Distance (Feet) :	10.91	7.09
 Jacking Force :	 33.05 KIPS	

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SUMMARY OF INPUT DATA

Material Properties

Material Label :	WaffleMat
Concrete Strength, f'_C :	4,500.0 PSI
Concrete Creep Modulus, E_C :	1,500,000.0 PSI
Concrete Unit Weight :	145.0 PCF
Tendon Strength, F_{pu} :	270.0 KSI
Tendon Diameter :	1 / 2 Inch

Slab Properties

Rectangle Label :	equivalent rectangle	
Rectangle Geometry :	12.50 FT x 87.00 FT x 5.00 Inches	
	<u>Short Direction</u>	<u>Long Direction</u>
Number of Slab Tendons :	1	1
Slab Tendon Cover :	2.00 Inches	2.00 Inches

Beam Properties

	Short Direction		Long Direction		
	Type I	Type II	Type I	Type II	
Quantity :	36	2	4	2	
Depth :	17.5	17.5	17.5	17.5	Inches
Width :	6.0	12.0	6.0	12.0	Inches
Tendons :	1	1	1	1	
Cover :	3.00	3.00	3.00	3.00	Inches

Average beam spacing used in analysis

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SUMMARY OF INPUT DATA - Continued

Soil Properties

Soil Label :	Clay (CL), with sand	
Allowable Bearing Pressure :	1,000.0 PSF	
	<u>Center Lift</u>	<u>Edge Lift</u>
Edge Moisture Variation Distance, e_m :	3.00 Feet	5.00 Feet
Differential Soil Movement, y_m :	3.000 Inches	1.000 Inches

Load, Deflection and Subgrade Properties

Slab Loading

Uniform Superimposed Total Load :	50.00 PSF
Total Perimeter Load :	10.00 PLF

Stiffness Coefficients

Center Lift :	480
Edge Lift :	480

Prestress Calculation

Subgrade Friction calculated by method prescribed in PTI Manual

Prestress Loss :	15.0 KSI
Subgrade Friction Coefficient :	0.75

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PTI EXCEPTION SUMMARY

**The following elements of the design are not in strict compliance with the
Design of Post-Tensioned Slabs-On-Ground 3rd Edition manual
published by the Post-Tensioning Institute.**

NO PTI EXCEPTIONS EXIST