



Calculation Book Report

Date: October 4, 2017

Technical Owner: Civil – Brett I. Kesterson, P.E.

Calculation Book No. 510 **Standard Drawing No.** P-510

Drawing Title: Belgian Block Pavement



Expires 06/30/2019

The following is the equivalent single axle load (ESAL) calculation for the 13.5 inches Belgian block pavement.



20171003093131109
.pdf

The following is the flexural strength calculation for concrete that is designed for 4000psi compressive strength in 28 days using the ACPA recommended conversion.



20170901132018091
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WinPAS

Pavement Thickness Design According to
1993 AASHTO Guide for Design of Pavements Structures
American Concrete Pavement Association

Rigid Design Inputs

Project Name: Belgian Block Pavement
Route: Anywhere
Location: City of Portland
Owner/Agency: Transportation
Design Engineer: Brett Kesterson

Rigid Pavement Design/Evaluation

Concrete Thickness	13.50 inches	Load Transfer Coefficient	4.30
Total Rigid ESALs	20,052,700	Modulus of Subgrade Reaction	162 psi/in.
Reliability	80.00 percent	Drainage Coefficient	0.90
Overall Standard Deviation	0.35	Initial Serviceability	4.50
Flexural Strength	580 psi	Terminal Serviceability	2.00
Modulus of Elasticity	3,940,000 psi		

Modulus of Subgrade Reaction (k-value) Determination

Resilient Modulus of the Subgrade	3,000.0 psi
Unadjusted Modulus of Subgrade Reaction	1 psi/in
Depth to Rigid Foundation	0.00 feet
Loss of Support Value (0,1,2,3)	0.0

Modulus of Subgrade Reaction	162 psi/in.
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/// STRENGTH CONVERTER ///

Strength (psi): [English / Metric](#)

Convert From:

Convert To:

CALCULATED RESULTS

English (psi)	Source
601	MEPDG
580	Mindess, Young, and Darwin; Raphael
474	ACI 318
580	ACI 330 *
506 to 632	Yoder and Witczak; Huang

*ACPA recommended conversion.

REFERENCES

- MEPDG, 'Guide for Mechanistic-Empirical Design of New and Rehabilitated Pavement Structures: Final Report - Part 2. Design Inputs - Part 2. Material Characterization,' NCHRP 1-37A, Mar 2004.
- Mindess, S., Young, J.F., and Darwin, D., 'Concrete,' 2nd Ed., 2003.
- ACI 318, 'Building Code Requirements for Structural Concrete and Commentary.'
- ACI 330, 'Guide for the Design and Construction of Concrete Parking Lots.'
- Yoder, E.J. and Witczak, M.W., 'Principles of Pavement Design,' 2nd Ed., 1975.

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