



Standard Drawing Report

Date: October 4, 2017

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

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

Drawing Title: Belgian Block Pavement



Expires 06/30/19

Background Information, Including Reference Material:

The Belgian block pavement design was developed by using the concrete pavement design in the WinPAS 12 pavement thickness design of pavement structures developed by the American Concrete Association based on the 1993 AASHTO Guide for Design of Pavement Structures.

American Concrete Pavement Association strength converter using the ACI 330 method to determine flexural strength from compression strength.

Belgian Block came to Portland by way of sailing ships that used large rocks as ballast for the trip from Europe. The rocks were discarded and the ships were filled with goods to be transported by to Europe. This “waste” product was then used to construct hard surface streets near the Willamette River. Stone masons would chip the rock into blocks that could be grouted together to form a pavement surface. Most of the streets constructed with Belgian blocks have been removed on the West side of the Willamette River. However Belgian block was installed around some of the light rail lines in the Central City. In the Central Eastside area of Portland some of the Belgian block streets remain in areas under the approaches to the Morrison bridge. Portland has a code requiring anyone excavating more than 150 blocks from a City street to take them to Pier Park in North Portland for disposal. This stockpile is then available for any public project that receives design approval to use the blocks.

Assumption Made:

Assume that Belgian block reacts like concrete. Assume poor soils, low reliability and poor serviceability to account for soil conditions throughout City. Belgian block is a dense, large, hard rock that will perform much better than 4000psi concrete.

Flexural strength of 580psi from 4000psi compressive strength.

Design Narrative:

The back calculation for the pavement loads shows the Belgian block (concrete) to have capacity of 39,493,200 ESAL's in 20 years. This is more than adequate for any traffic volume. The issue with using the blocks comes from their rough surface. The blocks should not be used if traffic speeds would be above 20 mph.