GUIDELINES FOR DETERMINING LIVE LOADS SURCHARGE FROM SIDEWALK PEDESTRIAN TRAFFIC AND STREET TRAFFIC

Introduction

This Information Bulletin provides guidelines for determining live loads due to sidewalk pedestrian traffic and street traffic for temporary shoring design adjacent to the public way. Surcharge loads shall be applied where vehicular load or pedestrian loads are expected to act on the surface behind a shored excavation or retaining wall within a distance equal to the height of the excavation or wall.

Based on the study performed by Kim and Barker (2002), the American Association of State Highway and Transportation Officials (AASHTO) provided a guideline for determining the equivalent height of soil for vehicular loading on retaining wall and shoring parallel to traffic (AASHTO 3.11.6). AASHTO Article 3.11.6.2 also provides surcharge pressures on retaining walls and shoring due to point, line, and strip loads based on elasticity solution (Boussinesq, 1876). Based on AASHTO recommendations, the following three methods for determining surcharge pressure on retaining walls and temporary shoring are generally acceptable to the Department. **Note: Regardless of the method used, in no case shall the traffic surcharge pressure be less than 60 psf for cantilever condition and 90 psf for braced condition. This pressure shall be considered with rectangular distribution applied horizontally on the face of the shoring.**

I. Simple Method Using Equivalent Soil Heights for Live Loads (Method A)

Method A is applicable where no specific recommendations for traffic surcharge are provided in the Soils Report. Method A uses the following equation to determine the lateral surcharge pressure on retaining wall and shoring.

$$q = \gamma_{EFP} \times H_{eq}$$

Where: q = lateral surcharge pressure (psf) in rectangular distribution
γ_{EFP} = equivalent fluid pressure (pcf) for shoring design
H_{eq} = equivalent height of soil from “Table 1” below

Table 1*

Equivalent Height of Soil for Vehicular Loading on Retaining Wall and Shoring Parallel to Traffic

Excavation/Wall Height (ft)	Distance from the edge of excavation (ft)	
	0.0 ft	1.0 ft or further
5.0	5.0	2.0
10.0	3.5	2.0
≥20.0	2.0	2.0

* From Table 3.11.6.4-2 of the AASHTO document referenced above.

Example:

Given: Active equivalent fluid pressure γ_{EFP} is 30 pcf
Surcharge location is 0 feet from shoring/retaining wall
Height of retaining wall/shoring is 10 feet

Traffic Surcharge $q = \gamma_{EFP} \times H_{eq}$= 30 pcf (Given in this example) x 3.5 ft (From Table 1) = 105 psf. This surcharge shall apply as a rectangular distribution to the full height of shoring.

II. Site-Specific Calculation Using Equivalent Soil Heights for Live Loads (Method B)

Method B is applicable where site-specific lateral earth pressure coefficients are provided in the Soils Report approved by the Grading Division. Method B uses the following equation to determine the lateral surcharge pressure on retaining wall and shoring.

$$q = k \times \gamma_s \times H_{eq}$$

Where:
q = lateral surcharge pressure (psf) in rectangular distribution
k = active or at-rest earth pressure coefficient from Soils Report
γ_s = total unit weight of soil (pcf)
H_{eq} = equivalent height of soil from “Table 1” above

III. Site-Specific Calculation Using Elasticity Solutions (Method C)

As discussed above, elasticity solutions included in AASHTO LRFD 2012 Bridge Design Specifications, 6th Edition (Article 3.11.6.2) are acceptable to the Department. Method C is used for more complex conditions, such as when heavy construction equipment (crane, etc.) will surcharge a shored excavation. Specific calculations for this method shall be determined by either the soils engineer of record or the project shoring engineer.

If the specific calculations are provided by the soils engineer in the soils report, such report shall be approved by the Grading Division.