

# DISPLAY THIS CARD ON PRINCIPAL FRONTAGE OF WORK CITY OF PORTLAND

Please Read Application And Notes, if Any, Attached

This is to certify that CITY OF PORTLAND / Rob

has permission to Install Public Restrooms  
AT 0 WELCH ST

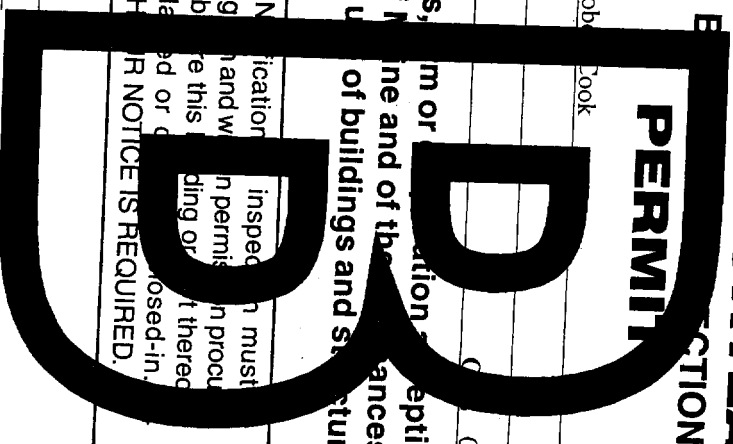
provided that the person or persons, of the provisions of the Statutes of the construction, maintenance and u this department.

Apply to Public Works for street line and grade if nature of work requires such information.

OTHER REQUIRED APPROVALS  
Fire Dept. *Jan Kelly* P.S.D. 5/3/05  
Health Dept.

Appeal Board  
Department Name

## PERMIT



SECTION

PERMIT ISSUED  
Permit Number **00N5248** 2005  
CITY OF PORTLAND

084 R001002

cepting this permit shall comply with all of buildings and structures, and of the application on file in

inspection in process  
NOTICE IS REQUIRED.

A certificate of occupancy must be procured by owner before this building or part thereof is occupied.

PENALTY FOR REMOVING THIS CARD

*[Signature]*  
Director - Building & Inspection Services

**City of Portland, Maine - Building or Use Permit Application**

389 Congress Street, 04101 Tel: (207) 874-8703, Fax: (207) 874-8716

Permit No: 05-0427	Issue Date: <b>PERMIT ISSUED</b> JUN 28 2005	084 R001002
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Location of Construction: 0 WELCH ST	Owner Name: CITY OF PORTLAND	Owner Address: 389 CONGRESS ST	Phone: 207-333-2544
Business Name:	Contractor Name: Robert Cook	Contractor Address: 55 Portland Street Portland	Phone: 207-333-2544
Lessee/Buyer's Name	Phone:	Permit Type: Additions - Commercial	

Past Use: Parking Lot	Proposed Use: Parking Lot/ Install Public Restrooms	Permit Fee: \$471.00	Cost of Work: \$50,000.00	CEO District: 2	IB
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Proposed Project Description: Install Public Restrooms	FIRE DEPT: <input checked="" type="checkbox"/> Approved <input type="checkbox"/> Denied	INSPECTION: Use Group: U Type: JB
	Signature: <i>J.K. P.D. 5-3-05</i>	Signature: <i>[Handwritten Signature]</i>

PEDESTRIAN ACTIVITIES DISTRICT (P.A.D.)		
Action:	<input type="checkbox"/> Approved	<input type="checkbox"/> Approved w/Conditions
	<input type="checkbox"/> Denied	
Signature:	Date:	

Permit Taken By: Idobson	Date Applied For: 04/19/2005	<b>Zoning Approval</b>
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<p>1. This permit application does not preclude the Applicant(s) from meeting applicable State and Federal Rules.</p> <p>2. Building permits do not include plumbing, septic or electrical work.</p> <p>3. Building permits are void if work is not started within six (6) months of the date of issuance. False information may invalidate a building permit and stop all work..</p>	<p>Special Zone or Reviews</p> <p><input type="checkbox"/> Shoreland <i>within but well over 75'</i></p> <p><input type="checkbox"/> Wetland <i>from HUM</i></p> <p><input type="checkbox"/> Flood Zone <i>Panel 15 Zone C</i></p> <p><input type="checkbox"/> Subdivision</p> <p><input checked="" type="checkbox"/> Site Plan <i>exempt</i> <i>Applied for</i></p> <p>Maj <input type="checkbox"/> Minor <input checked="" type="checkbox"/> MM <input type="checkbox"/></p> <p>Date: <i>5/2/05</i></p>	<p>Zoning Appeal</p> <p><input type="checkbox"/> Variance</p> <p><input type="checkbox"/> Miscellaneous</p> <p><input type="checkbox"/> Conditional Use</p> <p><input type="checkbox"/> Interpretation</p> <p><input type="checkbox"/> Approved</p> <p><input type="checkbox"/> Denied</p> <p>Date:</p>	<p>Historic Preservation</p> <p><input checked="" type="checkbox"/> Not in District or Landmark</p> <p><input type="checkbox"/> Does Not Require Review</p> <p><input type="checkbox"/> Requires Review</p> <p><input type="checkbox"/> Approved</p> <p><input type="checkbox"/> Approved w/Conditions</p> <p><input type="checkbox"/> Denied</p> <p>Date: <i>[Handwritten Signature]</i></p>
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**CERTIFICATION**

I hereby certify that I am the owner of record of the named property, or that the proposed work is authorized by the owner of record and that I have been authorized by the owner to make this application as his authorized agent and I agree to conform to all applicable laws of this jurisdiction. In addition, if a permit for work described in the application is issued, I certify that the code official's authorized representative shall have the authority to enter all areas covered by such permit at any reasonable hour to enforce the provision of the code(s) applicable to such permit.

SIGNATURE OF APPLICANT	ADDRESS	DATE	PHONE
RESPONSIBLE PERSON IN CHARGE OF WORK, TITLE		DATE	PHONE

**City of Portland, Maine - Building or Use Permit**

389 Congress Street, 04101 Tel: (207) 874-8703, Fax: (207) 874-8716

<b>Permit No:</b> 05-0427	<b>Date Applied For:</b> 04/19/2005	<b>CBL:</b> 084 R001002
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<b>Location of Construction:</b> 0 WELCH ST	<b>Owner Name:</b> CITY OF PORTLAND	<b>Owner Address:</b> 389 CONGRESS ST	<b>Phone:</b>
<b>Business Name:</b>	<b>Contractor Name:</b> Robert Cook	<b>Contractor Address:</b> 55 Portland Street Portland	<b>Phone</b> (207) 232-2544
<b>Lessee/Buyer's Name</b>	<b>Phone:</b>	<b>Permit Type:</b> Additions - Commercial	

Parking Lot/ Install Public Restrooms	Install Public Restrooms
---------------------------------------	--------------------------

<b>Dept:</b> Zoning	<b>Status:</b> Approved	<b>Reviewer:</b> Marge Schmuckal	<b>Approval Date:</b> 05/02/2005
<b>Note:</b> Tom Fortier applied for the permit - site plan exemption given to planning at same time we got bldg. Permit			<b>Ok to Issue:</b> <input checked="" type="checkbox"/>
<b>Dept:</b> Building	<b>Status:</b> Approved	<b>Reviewer:</b> Mike Nugent	<b>Approval Date:</b> 06/01/2005
<b>Note:</b>			<b>Ok to Issue:</b> <input checked="" type="checkbox"/>
<b>Dept:</b> Fire	<b>Status:</b> Approved	<b>Reviewer:</b> Jay Kelley	<b>Approval Date:</b> 05/03/2005
<b>Note:</b>			<b>Ok to Issue:</b> <input checked="" type="checkbox"/>

**Comments:**  
 5/12/2005-mjn: Need Certification forms, a statement of Special Inspections, geotech info, Stairs and guards have issues. Emailed Architect of these issues.  
 5/27/2005-gg: received site plan exemption on 5/16/05. /gg

**City of Portland, Maine - Building or Use Permit**

389 Congress Street, 04101 Tel: (207) 874-8703, Fax: (207) 874-8716

<b>Permit No:</b> 05-0427	<b>Date Applied For:</b> 04/19/2005	<b>CBL:</b> 084 R001002
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<b>Lessee/Buyer's Name</b>	<b>Phone:</b>	<b>Permit Type:</b> Additions - Commercial	

<b>Proposed Use:</b> Parking Lot/ Install Public Restrooms	<b>Proposed Project Description:</b> Install Public Restrooms
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<b>Dept:</b> Zoning	<b>Status:</b> Approved	<b>Reviewer:</b> Marge Schmuckal	<b>Approval Date:</b> 05/02/2005
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**Mike Nugent - Re: Form Submission/Mike Nugent**

**From:** Mike Nugent  
**To:** William Winkelman  
**Date:** 6/1/2005 7:58 AM  
**Subject:** Re: Form Submission/Mike Nugent  
**CC:** Robert Cook; TOM FORTIER

The page three of the certification forms is incomplete and there is no statement of special inspections or geotechnical report in the attachment I received.

Here is a template for the Statement of S/I

>>> William Winkelman <will@whittenarchitects.com> 5/31/2005 8:41:56 PM >>>

Mike - Attached is a pdf that should address all of the concerns you listed below. I will also have a hard copy dropped off at the inspections desk in the morning. Do let me know if anything here is not in order. Thanks - Will

Will Winkelman Whitten + Winkelman, Architects - 37 Silver St, Portland, ME 04101  
Ph: 207.774.0111x102 fax: 207.774.1668  
[will@ww-architects.com](mailto:will@ww-architects.com) - [www.ww-architects.com](http://www.ww-architects.com)

----- Forwarded Message  
From: [www@host.maineserver.com](mailto:www@host.maineserver.com)  
Date: Thu, 12 May 2005 10:33:04 -0400  
To: [lory@whittenarchitects.com](mailto:lory@whittenarchitects.com)  
Subject: Form Submission

emailaddy: [mjn@portlandmaine.gov](mailto:mjn@portlandmaine.gov)  
name: Mike Nugent  
message: For the Restroom building I need our three cerification form filled out and submitted, A statement of Special Inspections and some geotechnical info that we based our design from.  
Also there is an in correct nbing on the stairs and I need product info with loads for the guard system.

\_ \_ \_ \_ \_ evironmental variables \_ \_ \_ \_ \_  
REMOTE HOST:  
BROWSER: Mozilla/4.0 (compatible;MSIE 6.0; Windows NT 5.1; SV1)

----- End of Forwarded Message

# All Purpose Building Permit Application

Property owner owes real estate or personal property taxes or user charges on any property within the City, payment arrangements must be made before permits of any kind are accepted.

Location/Address of Construction: <u>PEAKS Island - WELCH STREET</u>		
Total Square Footage of Proposed Structure <u>10x14</u>	Square Footage of Lot <u>210x140</u>	
Tax Assessor's Chart, Block & Lot Chart# <u>4</u> Block# <u>R</u> Lot# <u>2</u>	Owner: <u>City of Portland</u>	Telephone: <u>232-2544</u>
Lessee/Buyer's Name (If Applicable)	Applicant name, address & telephone:	cost Of Work: <u>\$50,000</u> Fee: \$
Current use: <u>Packman Lot</u>		
If the location is currently vacant, what was prior use: _____		
Approximately how long has it been vacant: _____		
Proposed use: <u>Public Restroom</u>		
Project description: _____		
Contractor's name, address & telephone:		
Who should we contact when the permit is ready: <u>ROBERT COOK - 232-2544</u>		
Mailing address: <u>55 Portland Street Portland, ME 04101</u>		
We will contact you by phone when the permit is ready. You must come in and pick up the permit and review the requirements before starting any work, with a Plan Reviewer. A stop work order will be issued and a \$100.00 fee if any work starts before the permit is picked up. <b>PHONE:</b>		

**IF THE REQUIRED INFORMATION IS NOT INCLUDED IN THE SUBMISSIONS THE PERMIT WILL BE AUTOMATICALLY DENIED AT THE DISCRETION OF THE BUILDING/PLANNING DEPARTMENT, WE MAY REQUIRE ADDITIONAL INFORMATION IN ORDER TO APPROVE THIS PERMIT.**

*I hereby certify that I am the Owner of record of the named property, or that the owner of record authorizes the proposed work and that I have been authorized by the owner to make this application as his/her authorized agent. I agree to conform to all applicable laws of this jurisdiction. In addition, if a permit for work described in this application is issued I certify that the Code Official's authorized representative shall have the authority to enter all areas covered by this permit at any reasonable hour to enforce the provisions of the codes applicable to this permit.*

Signature of applicant: <u>[Signature]</u>	Date: <u>07/18/2005</u>
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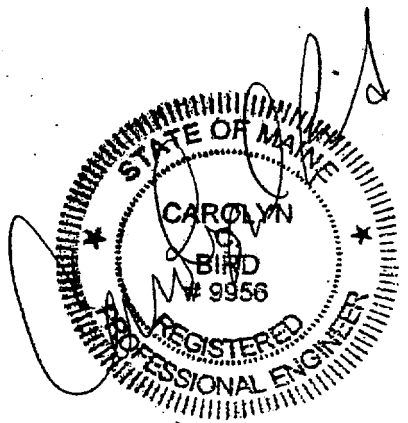
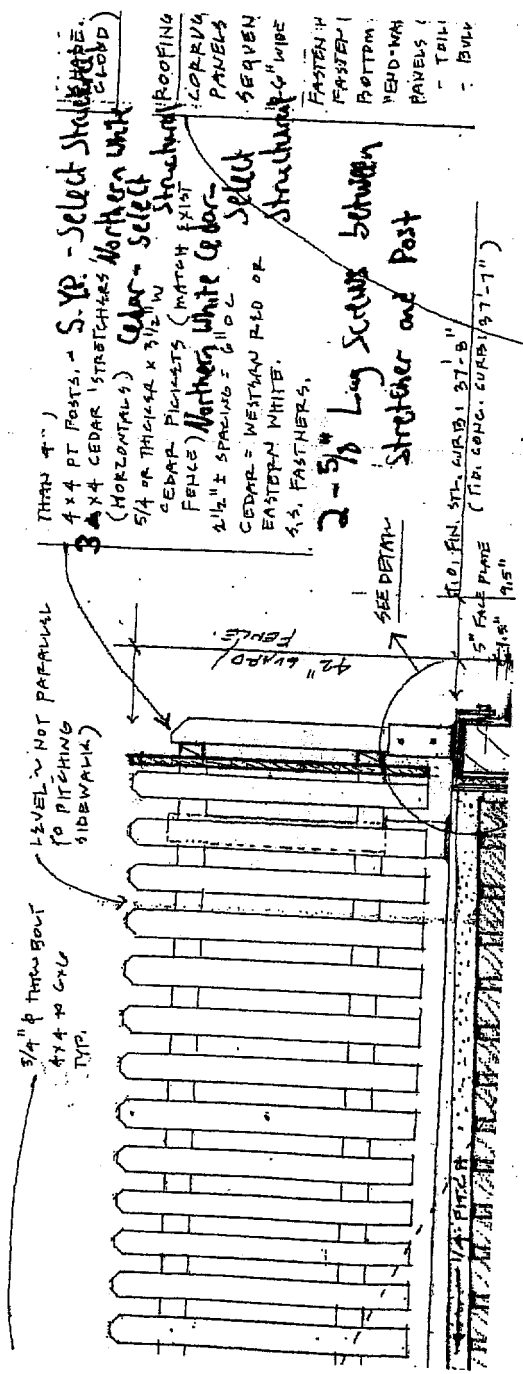
**This is NOT a permit, you may not commence ANY work until the permit is issued.  
If you are in a Historic District you may be subject to additional permitting and fees with the  
Planning Department on the 4<sup>th</sup> floor of City Hall**

GUARD RAIL - STRUCTURAL REVIEW / PEAKS PUBLIC TOILET

5/23/05

REVISED AS NOTED:

WHITTEN + WINKELMAN, ARCHITECTS  
774-0111

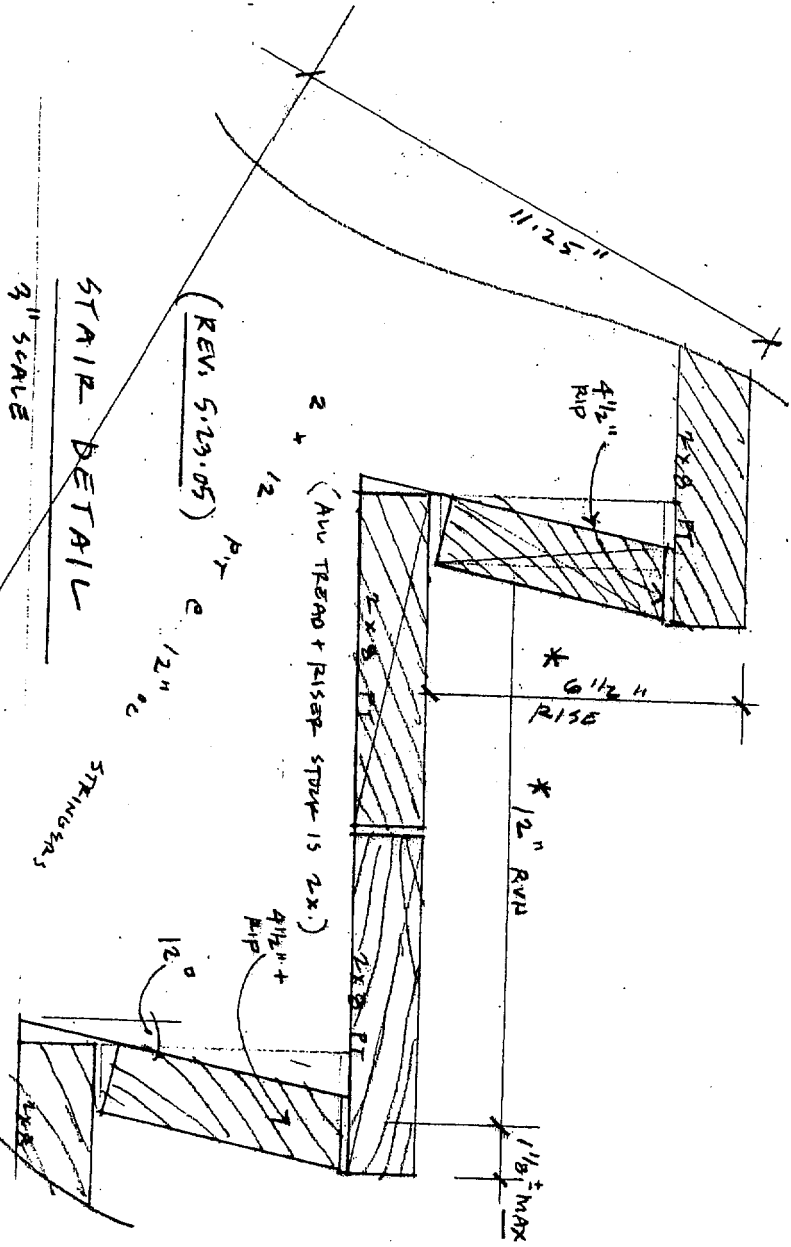


5/24/05  
SEE P. 1 FOR  
NOTE BY C.B.E.  
D.2

5.23.05

REVISED STAIR NOSINGS.

WHITEN + WINFELDMAN, ARCHITECTS.



STAIR DETAIL

3" SCALE

P E A K S P U B L I C T O I L E T





CITY OF PORTLAND  
BUILDING CODE CERTIFICATE  
389 Congress St., Room 315  
Portland, Maine 04101

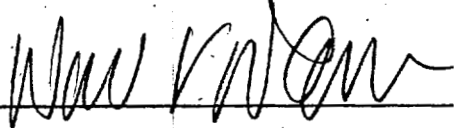
### ACCESSIBILITY CERTIFICATE

Designer: WILL WINKELMAN

Address of Project: WELCH ST., PEAKS ISLAND

Nature of Project: PUBLIC DRIVE (SINGLE ROOM, UNISEX  
RELATED UTILITY.) ~ STAND-ALONE  
17x14 BUILDING, HALF BURIED.

The technical submissions covering the proposed construction work as described above have been designed in compliance with applicable referenced standards found in the Maine Human Rights Law and Federal Americans with Disability Act.

Signature: 

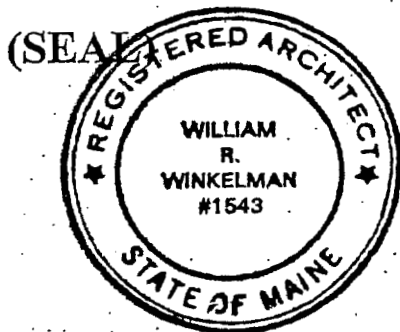
Title: PRINCIPAL

Firm: WHITTEN + WINKELMAN, ARCHITECTS

Address: 37 SILVER ST.

PORTLAND, ME 04101

Phone: 774-0111-X102



**NOTE: If this project is a new Multi Family Structure of 4 units or more, this project must also be designed in compliance with the Federal Fair Housing Act. On a separate submission, please explain in narrative form the method of compliance.**



CITY OF PORTLAND  
BUILDING CODE CERTIFICATE  
389 Congress St., Room 315  
Portland, Maine 04101

TO: Inspector of Buildings City of Portland, Maine  
Department of Planning & Urban Development  
Division of Housing & Community Service

FROM: WILL WINKELMAN OF WHITTEN + WINKELMAN, ARCHITECTS

RE: Certificate of Design

DATE: 5.23.05

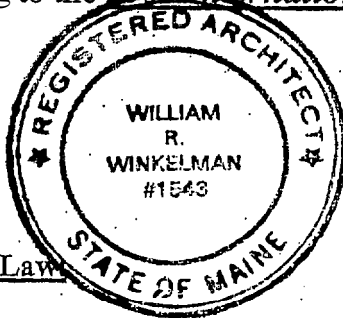
These plans and/ or specifications covering construction work on:

PEAKS ISLAND PUBLIC TOILET: 11x14 SINGLE PARTIAL <sup>UNIVERSAL</sup> UNISEX

TOILET OF PRECAST CONCRETE W/ ADJACENT STAIR + <sup>EXTENSION</sup> COVERED <sup>COMMON</sup> BULLHEAD BOARD

Have been designed and drawn up by the undersigned, a Maine registered Architect/  
Engineer according to the 2003 International Building Code and local amendments.

(SEAL)



Signature: [Handwritten Signature]

Title: PRINCIPAL

Firm: WHITTEN + WINKELMAN ARCHITECTS

Address: 37 SILVER ST  
PORTLAND, MAINE 04101

As per Maine State Law  
\$50,000.00 or more in new construction, repair  
expansion, addition, or modification for  
Building or Structures, shall be prepared by a  
registered design Professional.

FROM DESIGNER: WILL WINKELMAN / WHITTEN + WINKELMAN ARCHITECTS  
 DATE: 5.23.05  
 Job Name: PEAKS ISLAND PUBLIC TOILET  
 Address of Construction: WELCH ST, PEAKS ISLAND

2003 International Building Code

Construction project was designed according to the building code criteria listed below:

Building Code and Year 2003 IBC Use Group Classification(s) STAND-ALONE PUBLIC TOILET: B<sup>3</sup>  
 Type of Construction TYPE I-B (CAND. TO GROUP: U)  
 Will the Structure have a Fire suppression system in Accordance with Section 903.3.1 of the 2003 IRC NO  
 Is the Structure mixed use? NO if yes, separated or non separated (see Section 302.3) ✓  
 Supervisory alarm system? NO Geotechnical/Soils report required? (See Section 1802.2) NO

STRUCTURAL DESIGN CALCULATIONS

✓ Submitted for all structural members (102.1, 102.1.1)

DESIGN LOADS ON CONSTRUCTION DOCUMENTS (1803)

Uniformly distributed floor live loads (7603.11, 1807)

Floor Area Use	Loads Shown
<u>9. Corridors</u>	<u>100psf</u>

Wind loads (1609.1.4, 1609)

1609.6 Design option utilized (1609.1.1, 1609.5)  
110 mph Basic wind speed (1609.3)  
II Building category and wind importance factor,  $I_w$  (Table 1604.5, 1609.5)  
C Wind exposure category (1609.4)  
N/A Internal pressure coefficient (ASCE 7)  
N/A Component and cladding pressures (1609.1.3, 1609.5.2.2)  
N/A Main force wind pressures (7603.1.1, 1609.5.2.1)

Earthquake design data (1609.1.5, 1614-1623)

N/A Design option utilized (1614.1)  
N/A Seismic use group ("Category") (Table 1604.5, 1616.2)  
N/A Spectral response coefficients,  $S_{ps}$  &  $S_{D1}$  (1615.1)  
N/A Site class (1616.1.5)

Live load reduction (1603.1.1, 1607.9, 1607.10)  
100 psf Roof live loads (1603.1.2, 1607.11)  
 Roof snow loads (7603.7.3, 1609)  
50 psf Ground snow load,  $P_g$  (1608.2)  
 If  $P_g > 10$  psf, flat-roof snow load,  $P_f$  (1608.3)  
 If  $P_g > 10$  psf, snow exposure factor,  $C_e$  (Table 1608.3.1)  
 If  $P_g > 10$  psf, snow load importance factor,  $I_s$  (Table 1604.5)  
 Roof thermal factor,  $C_t$  (Table 1608.3.2)  
 Sloped roof snowload,  $P_s$  (1608.4)  
 Seismic design category (1613.8)  
 Basic seismic-force-resisting system (Table 1617.8.2)  
 Response modification coefficient,  $R$ , and deflection amplification factor,  $C_d$  (Table 1617.8.2)  
 Analysis procedure (1618.6, 1617.5)  
 Design base shear (1617A, 1617A.1)

Flood loads (1603.1.4, 1612)  
N/A Flood hazard area (1612.3)  
 Elevation of structure

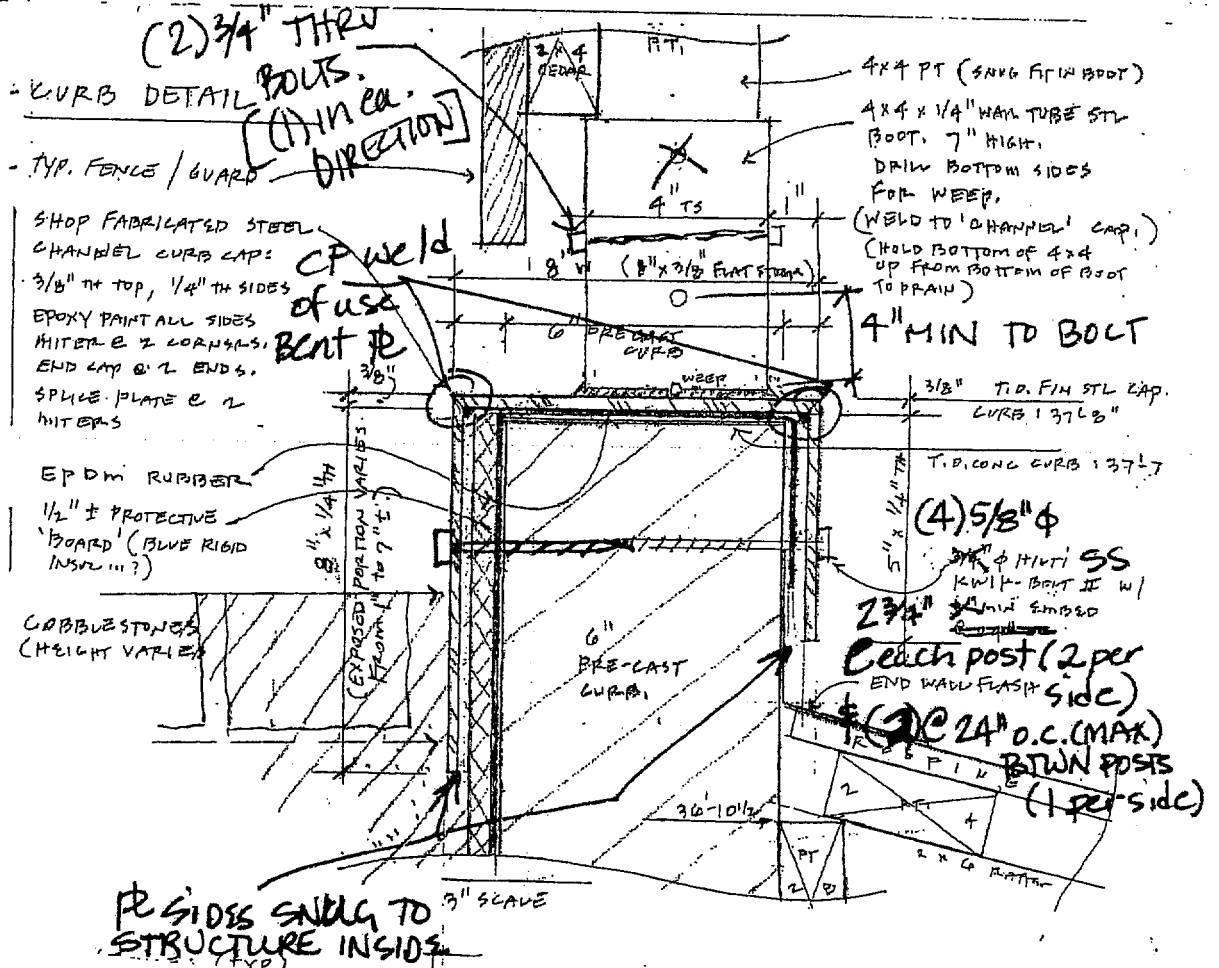
Other loads  
 Concentrated loads (1607A)  
 Partition loads (1607.5)  
 Impact loads (1607.8)  
✓ Misc. loads (Table 1607.5, 1607.8.1, 1607.7, 1607.12, 1607.13, 1610, 1611, 2404)

\* WALLS DESIGN FOR SOIL PRESSURE  $(\gamma_d)(K_a) = 120(0.4) = 48 \text{ psf/ft}$   
 Root designed for 2.1 ft soil cover.

GUARD RAIL / STRUCTURAL REVIEW / PEAKS PUBLIC TRACT 5.23.05

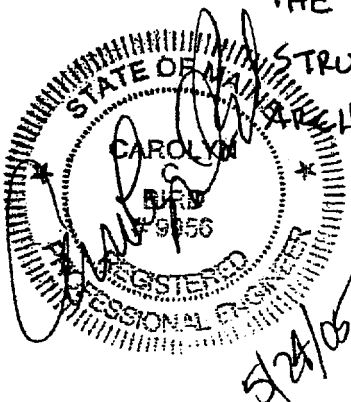
REVISED AS NOTED:

WHITTEN + WINKELMAN, ARCHITECTS  
774-0111



NOTE

CASCO BAY ENGINEERING IS RESPONSIBLE FOR ANALYZING THE STRUCTURAL INTEGRITY OF THE FENCE / HANDRAIL STRUCTURE ONLY. PLEASE REFER TO WHITTEN + WINKELMAN ARCHITECTURAL DRAWINGS FOR OTHER INFORMATION



**ICC Evaluation Service, Inc.**  
www.icc-es.org

**Business/Regional Office** ■ 5360 Workman Mill Road, Whittier, California 90601 • (562) 699-0543  
**Regional Office** ■ 900 Montclair Road, Suite A, Birmingham, Alabama 35213 • (205) 599-9800  
**Regional Office** ■ 4051 West Flossmoor Road, Country Club Hills, Illinois 60478 ■ (708) 7942305

DIVISION: 03—CONCRETE  
Section: 03151—Concrete Anchoring

REPORT HOLDER:

HILTI, INC.  
5400 SOUTH 122<sup>ND</sup> EAST AVENUE  
TULSA, OKLAHOMA 74146  
(800)879-8000  
www.us.hilti.com  
HiltiTechEng@us.hilti.com

EVALUATION SUBJECT:

**KWIK BOLT 3 CONCRETE AND MASONRY ANCHORS**

ADDITIONAL LISTEES:

AMS LLC  
7400 EAST 42<sup>ND</sup> STREET  
TULSA, OKLAHOMA 74145

1.0 EVALUATION SCOPE

Compliance with the following codes:

- \* ■ ~~2000 International Building Code® (IBC)~~
- ~~2000 International Residential Code® (IRC)~~
- ~~2002 Accumulative Supplement to the International Codes™~~
- 1997 Uniform Building Code™ (UBC)

Properties evaluated:

Structural

2.0 USES

The Kwik Bolt 3 (KB3) Concrete and Masonry Anchor is used to resist static and transient seismic and wind tension and shear loads in uncracked, normal-weight concrete, structural lightweight concrete, structural lightweight concrete over metal deck, and grout-filled concrete masonry. The anchor system is an alternative to cast-in-place anchors described in Sections 1912 and 2107 of the IBC and Sections 1923.1 and 2107.1.5 of the UBC. The anchor systems may also be used where an engineered design is submitted in accordance with Section R301.1.2 of the IRC.

3.0 DESCRIPTION

The Kwik Bolt 3 expansion anchors consist of a stud, wedge, nut, and washer. The stud is manufactured from carbon or stainless steel material. The carbon steel Kwik Bolt 3 anchors have a 5 µm (0.00002 inch) zinc plating. The anchor is illustrated in Figure 1 of this report.

The wedges for the carbon steel anchors are made from carbon steel, except for all 1/2-inch (6.4 mm) lengths and the 3/4-inch-by-12-inch, 1-inch-by-6-inch, 1-inch-by-6-inch and 1-inch-by-12-inch (19.1 mm by 305 mm, 25 mm by 152 mm, 25 mm by 229 mm, and 25 mm by 305 mm) sizes, which have AISI 316 stainless steel wedges. All carbon steel components are zinc-plated. The 1/2-, 5/8-, and 3/4-inch-diameter (12.7, 15.9, and 19.1 mm) carbon steel Kwik Bolt 3 anchors are available with a hot-dipped galvanized plating complying with ASTM A 153. The studs, nuts and washers of the 304 and 316 stainless steel Kwik Bolt 3 anchors are also made from stainless steel. All 304 stainless steel, 316 stainless steel, and hot-dipped galvanized Kwik Bolt 3 anchors use 316 stainless steel wedges.

The stud consists of a high-strength rod threaded at one end. The standard Kwik Bolt 3 has a thread length equal to or less than three bolt diameters, while the Long Thread Kwik Bolt 3 has a thread length greater than three bolt diameters. The tapered mandrel has an increasing diameter toward the anchor base, and is enclosed by a three-section wedge that freely moves around the mandrel. In the vertical direction, the wedge movement is restrained by the mandrel taper at the bottom and by a collar at the top of the mandrel. When the anchor nut is tightened, the wedge is forced against the wall of the predrilled hole to provide anchorage.

4.0 DESIGN AND INSTALLATION

4.1 Design:

Minimum embedment depth, edge distance, and spacing requirements are set forth in Tables 1 and 2. Allowable stress design tension and shear loads are as noted in Tables 3 through 11. Allowable loads for Kwik Bolt 3 anchors subjected to combined shear and tension forces are determined by the following equation:

$$(P_s/P_t)^{5/3} + (V_s/V_t)^{5/3} \leq 1$$

where:

- $P_s$  = Applied service tension load (lbf or N).
- $P_t$  = Allowable service tension load (lbf or N).
- $V_s$  = Applied service shear load (lbf or N).
- $V_t$  = Allowable service shear load (lbf or N).

4.2 Installation Requirements:

Kwik Bolt 3 shall be installed in holes drilled into the base material using carbide-tipped masonry drill bits complying with ANSI B212.15-1994. The nominal drill bit diameter shall be equal to that of the anchor. The drilled hole shall exceed the depth of anchor embedment by at least one anchor diameter to permit over-driving of anchors and to provide a dust collection area. The anchor shall be hammered into the predrilled hole until at least six threads are below the fixture surface. The nut shall be tightened against the washer until the torque values specified in Table 1 are attained.

ES REPORTS™ are not to be construed as representing aesthetics or any other attributes nor specifically addressed, nor are they to be construed as an endorsement of the subject of the report or a recommendation for its use. There is no warranty by ICC Evaluation Service, Inc., express or implied, as to any finding or other matter in this report, or as to any product covered by the report.

### 4.3 Special Inspection:

Special inspection shall be provided in accordance with Section 1704 of the IBC or Section 1701 of the UBC when design loads are based on special inspections being provided during anchor installation, as set forth in Tables 3 through 11. Special inspection in accordance with Section 1704 of the IBC shall be provided under the IRC when special inspection is specified in Tables 3 through 11. The code official shall receive a report, from an approved special inspector, that includes the following details:

1. Anchor description, including the anchor product name, nominal anchor and bolt diameters, and anchor length.
2. Hole description, including verification of drill bit compliance with ANSI B212.15-1994, hole depth, and cleanliness.
3. Installation description, including verification of concrete compressive strength by ASTM C 42 methods, and verification of anchor installation and location (spacing and edge distance) in accordance with Hilti's published installation instructions and this report.

### 5.0 CONDITIONS OF USE

The Kwik Bolt 3 Concrete and Masonry Anchors described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

- 5.1 Anchor sizes, dimensions, and installation comply with this report and Hilti's published installation instructions.
- 5.2 Allowable tension and shear loads are as noted in Tables 3 through 11 of this report.
- 5.3 Calculations and details demonstrating compliance with this report are submitted to the code official for approval.
- 5.4 The use of anchors is limited to installation in uncracked, normal-weight concrete, structural lightweight concrete, structural lightweight concrete over steel deck, and uncracked grout filled masonry concrete. Cracking occurs when  $f_t > f_r$  due to service loads or deformations.
- 5.5 When using the basic load combinations in accordance with IBC Section 1605.3.1.1 or UBC Section 1612.3.1, allowable loads are not permitted to be increased for wind or earthquake loading. When using the alternative basic load combinations in IBC Section 1605.3.2 or UBC Section 1612.3.2 that include wind or seismic

loads, the allowable shear and tension loads for anchors are permitted to be increased by 33<sup>1</sup>/<sub>3</sub> percent. Alternatively, the basic load combinations may be reduced by a factor of 0.75 when using IBC Section 1605.3.2.

- 5.6 Anchors are not permitted for use in conjunction with fire-resistance-rated construction. Exceptions would be:
  - Anchors resist wind or seismic loading only.
  - For other than wind or seismic loading, special consideration is given to fire exposure conditions.
- 5.7 Use of carbon steel Kwik Bolt 3 anchors is limited to dry, interior locations. Hot-dipped galvanized and stainless steel Kwik Bolt 3 anchors are permitted in exterior exposure or damp environments.
- 5.8 Since an ICC-ES acceptance criteria for evaluating data to determine the performance of expansion anchors subjected to fatigue or shock loading is unavailable at this time, the use of these anchors under these conditions is beyond the scope of this report.
- 5.9 Special inspection is provided in accordance with Section 4.3 of this report when required by Tables 3 through 11.
- 5.10 Anchors are manufactured by Hilti, Inc., Feldkircherstrasse 100, Schaan, Liechtenstein, and by AMS, 7400 East 42<sup>nd</sup> Place, Tulsa, Oklahoma, under a quality control program with inspections conducted by Underwriters Laboratories Inc. (AA-668).

### 6.0 EVIDENCE SUBMITTED

- 6.1 Data in accordance with the ICC-ES Acceptance Criteria for Expansion Anchors in Concrete and Masonry Elements (AC01), dated April 2002, including seismic tests, reduced spacing tests and reduced edge distance tests.
- 6.2 Quality control manuals.

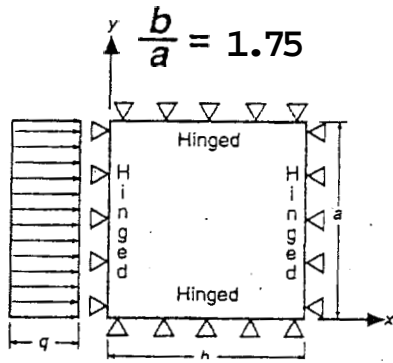
### 7.0 IDENTIFICATION

The anchors shall be identified in the field by dimensional characteristics and packaging. The packaging label indicates the manufacturer's name (Hilti, Inc.) and address, the size and type of anchor, the name of the inspection agency (Underwriters Laboratories Inc.), and the ICC-ES report number (ESR-1385). A length identification code letter is stamped on the threaded end of the bolt. The length identification system is described in Table 12.

TABLE I—INSTALLATION SPECIFICATIONS<sup>1</sup>

SETTING DETAILS		ANCHOR SIZE											
		1/4 inch		3/8 inch		1/2 inch		5/8 inch		3/4 inch		1 inch	
Drill bit size = anchor diameter (inches)		1/4		3/8		1/2		5/8		3/4		1	
Wedge clearance hole (inches)		5/16		7/16		9/16		11/16		13/16		1 1/8	
Anchor length (min./max.) (inches)		1 1/4   4 1/2		2 1/8   7		2 3/4   7		3 1/2   10		6   12		6   12	
Thread length std./long thread length (inches)		3/4   3		7/8   5 5/8		1 1/4   4 3/4		1 1/2   7		1 1/2   6		2 1/4   6	
Installation:	Stainless steel	6		20		40		85		150		200	
Torque guide values <sup>1</sup> (ft-lbf)	Carbon steel: M	4		20		40		85		150		200	
	Carbon steel: Std. embedment	4		20		40		85		150		325	
Min. base material thickness (inches)		3 inches or 1.5 × embedment depth, whichever is greater											

<sup>1</sup>Installation torques are applicable for all anchors installations unless noted otherwise in this report.

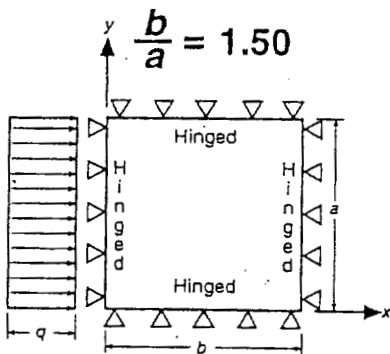


Moment = Coef.  $\times qa^2/1000$

$M_y$	END	0.1b	0.2b	0.3b	0.4b	0.5b
		0.9b	0.8b	0.7b	0.6b	
TOP	0	0	0	0	0	0
0.9a	0	10	13	14	14	14
0.8a	0	18	23	25	25	25
0.7a	0	23	31	33	33	33
0.6a	0	26	36	38	38	38
0.5a	0	27	37	40	40	40
0.4a	0	26	36	38	38	38
0.3a	0	23	31	33	33	33
0.2a	0	18	23	25	25	25
0.1a	0	10	13	14	14	14
BOT.	0	0	0	0	0	0

$M_x$	END	0.1b	0.2b	0.3b	0.4b	0.5b
		0.9b	0.8b	0.7b	0.6b	
TOP	0	0	0	0	0	0
0.9a	0	15	24	30	33	34
0.8a	0	24	41	52	58	60
0.7a	0	30	52	66	75	77
0.6a	0	33	58	75	84	87
0.5a	0	34	60	77	87	91
0.4a	0	33	58	75	84	87
0.3a	0	30	52	66	75	77
0.2a	0	24	41	52	58	60
0.1a	0	15	24	30	33	34
BOT.	0	0	0	0	0	0

$M_{xy}$	END	0.1b	0.2b	0.3b	0.4b	0.5b
		0.9b	0.8b	0.7b	0.6b	
TOP	51	44	33	21	10	0
0.9a	48	42	31	20	10	0
0.8a	39	35	26	17	8	0
0.7a	27	25	19	12	6	0
0.6a	14	13	10	7	3	0
0.5a	0	0	0	0	0	0
0.4a	14	13	10	7	3	0
0.3a	27	25	19	12	6	0
0.2a	39	35	26	17	8	0
0.1a	48	42	31	20	10	0
BOT.	51	44	33	21	10	0



Moment = Coef.  $\times qa^2/1000$

$M_y$	END	0.1b	0.2b	0.3b	0.4b	0.5b
		0.9b	0.8b	0.7b	0.6b	
TOP	0	0	0	0	0	0
0.9a	0	10	13	14	14	14
0.8a	0	17	23	26	26	26
0.7a	0	21	31	34	35	35
0.6a	0	24	35	39	40	41
0.5a	0	25	37	41	42	43
0.4a	0	24	35	39	40	41
0.3a	0	21	31	34	35	35
0.2a	0	17	23	26	26	26
0.1a	0	10	13	14	14	14
BOT.	0	0	0	0	0	0

$M_x$	END	0.1b	0.2b	0.3b	0.4b	0.5b
		0.9b	0.8b	0.7b	0.6b	
TOP	0	0	0	0	0	0
0.9a	0	13	21	27	30	31
0.8a	0	20	35	45	51	53
0.7a	0	25	44	57	65	67
0.6a	0	27	49	64	73	76
0.5a	0	28	50	66	75	78
0.4a	0	27	49	64	73	76
0.3a	0	25	44	57	65	67
0.2a	0	20	35	45	51	53
0.1a	0	13	21	27	30	31
BOT.	0	0	0	0	0	0

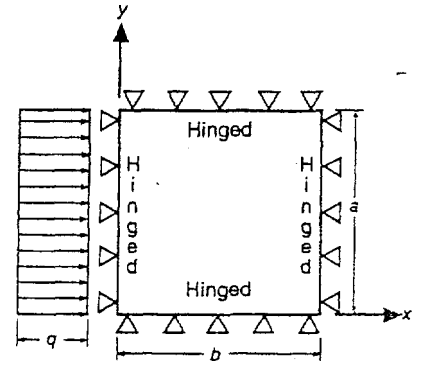
$M_{xy}$	END	0.1b	0.2b	0.3b	0.4b	0.5b
		0.9b	0.8b	0.7b	0.6b	
TOP	49	43	33	22	11	0
0.9a	45	41	31	21	10	0
0.8a	37	34	26	18	9	0
0.7a	26	24	19	13	6	0
0.6a	14	13	10	7	3	0
0.5a	0	0	0	0	0	0
0.4a	14	13	10	7	3	0
0.3a	26	24	19	13	6	0
0.2a	37	34	26	18	9	0
0.1a	45	41	31	21	10	0
BOT.	49	43	33	22	11	0

# CASE 10

$$\text{Shear} = C_s \times q \times a$$

$$\text{Deflection} = \frac{C_d q a^4}{1000D}$$

$$D = \frac{Et^3}{12(1-\mu^2)}$$



## Shear Coefficients, $C_s$

LOCATION	4.0	3.0	2.5	2.0	1.75	1.5	1.25	1.0	0.75	0.5
Bottom edge — midpoint	0.50	0.49	0.48	0.46	0.45	0.42	0.39	0.34	0.27	0.18
Side edge — maximum	0.37	0.37	0.37	0.37	0.37	0.36	0.36	0.34	0.30	0.23
Side edge — midpoint	0.37	0.37	0.37	0.37	0.37	0.36	0.36	0.34	0.30	0.23
Top edge — midpoint	0.50	0.49	0.48	0.46	0.45	0.42	0.39	0.34	0.27	0.18

## Deflection Coefficients, $C_d$

Along Midheight ( $y = a/2$ )

$b/a$	x	END	0.1b	0.2b	0.3b	0.4b	0.5b
			0.9b	0.8b	0.7b	0.6b	
4.0		0	7.00	10.60	12.10	12.70	12.80
3.0		0	5.50	9.10	11.10	12.00	12.20
2.5		0	4.70	8.10	10.10	11.20	11.50
2.0		0	3.80	6.70	8.70	9.80	10.10
1.75		0	3.20	5.80	7.70	8.70	9.10
1.5		0	2.60	4.90	6.50	7.40	7.70
1.25		0	2.00	3.70	5.00	5.80	6.00
1.0		0	1.30	2.50	3.30	3.90	4.10
0.75		0	0.70	1.30	1.70	2.00	2.10
0.5		0	0.20	0.40	0.50	0.60	0.60

Along Midspan ( $x = b/2$ )

$b/a$	y	BOT.	0.1a	0.2a	0.3a	0.4a	0.5a	0.6a	0.7a	0.8a	0.9a	TOP
			0.9a	0.8a	0.7a	0.6a	0.5a	0.4a	0.3a	0.2a	0.1a	
4.0		0	4.00	7.60	10.40	12.20	12.80	12.20	10.40	7.60	4.00	0
3.0		0	3.80	7.30	9.90	11.60	12.20	11.60	9.90	7.30	3.80	0
2.5		0	3.60	6.80	9.40	10.90	11.50	10.90	9.40	6.80	3.60	0
2.0		0	3.20	6.00	8.20	9.60	10.10	9.60	8.20	6.00	3.20	0
1.75		0	2.90	5.40	7.40	8.70	9.10	8.70	7.40	5.40	2.90	0
1.5		0	2.50	4.60	6.30	7.40	7.70	7.40	6.30	4.60	2.50	0
1.25		0	1.90	3.60	4.90	5.70	6.00	5.70	4.90	3.60	1.90	0
1.0		0	1.30	2.50	3.30	3.90	4.10	3.90	3.30	2.50	1.30	0
0.75		0	0.70	1.30	1.70	2.00	2.10	2.00	1.70	1.30	0.70	0
0.5		0	0.20	0.40	0.50	0.60	0.60	0.60	0.50	0.40	0.20	0



**Check combined shear and tension**

$$P_c := \frac{\phi P_c}{\phi_v} \quad P_y := \frac{\phi P_y}{\phi_m} \quad V_c := \frac{\phi V_c}{\phi_v} \quad V_y := \frac{\phi V_y}{\phi_m}$$

$$P_c = 6.649 \times 10^3 \text{ lbf} \quad P_y = 3.927 \times 10^4 \text{ lbf} \quad V_c = 4.27 \times 10^4 \text{ lbf} \quad V_y = 1.767 \times 10^4 \text{ lbf}$$

$$\text{Check}_{\text{conc}} := \text{if} \left[ 1 > \frac{1}{\phi_v} \left[ \left( \frac{P_u}{P_y} \right)^2 + \left( \frac{V_u}{V_c} \right)^2 \right], \text{"okay"}, \text{"not okay"} \right] \quad \text{Check}_{\text{conc}} = \text{"okay"}$$

$$\text{Check}_{\text{steel}} := \text{if} \left[ 1 > \frac{1}{\phi_m} \left[ \left( \frac{P_u}{P_y} \right)^2 + \left( \frac{V_u}{V_y} \right)^2 \right], \text{"okay"}, \text{"not okay"} \right] \quad \text{Check}_{\text{steel}} = \text{"okay"}$$

**Check Weld Design**

$$w := 0.125 \text{ in} \quad F_{EXX} := 70 \quad F_w := 0.6 \cdot F_{EXX} \frac{\text{kip}}{\text{in}^2} \quad F_w = 42 \frac{\text{kip}}{\text{in}^2}$$

$$q_u := \phi_v \cdot F_w \cdot 0.707 \cdot w \quad q_u = 2.784 \frac{\text{kip}}{\text{in}}$$

$$l_h := 2 \text{ in} \quad l_h = 2 \text{ in}$$

$$I_x := \frac{2 \cdot l_h^3}{12} \quad I_x = 1.333 \text{ in}^3 \quad e := \frac{2 \cdot \text{in} - 0.5 \cdot \text{in}}{2} \quad e = 0.75 \text{ in}$$

$$V_v := \frac{V_u}{2 \cdot l_h} \quad V_v = 1.348 \frac{\text{kip}}{\text{in}}$$

$$H_e := \frac{V_u \cdot e \cdot \frac{l_h}{2}}{I_x} \quad H_e = 3.034 \frac{\text{kip}}{\text{in}}$$

$$R_i := \sqrt{V_v^2 + H_e^2} \quad R_i = 3.32 \frac{\text{kip}}{\text{in}}$$

$$D := \frac{R_i}{q_u} \quad D = 1.193 \quad w := \frac{D}{16} \cdot \text{in} \quad w = 0.075 \text{ in}$$

1/8<sup>th</sup> inch fillet weld on each side of angle is acceptable.  
 For top of wall try less connections.

$$V := R_1 \quad V = 964.1 \text{ lbf} \quad \text{Num} := 4$$

$$V_u := L F_H \cdot R_1 \cdot \frac{L}{\text{Num} \cdot \text{ft}} \quad V_u = 5.399 \times 10^3 \text{ lbf} \quad P'' := V_u \cdot \frac{1.25 \cdot \text{in}}{1.5 \cdot \text{in}} \quad P_u = 4.499 \text{ kip}$$

$$\text{Num}_{\text{short}} := \text{Num} \cdot \frac{S_y}{S_x} \quad \text{Num}_{\text{short}} = 2.864$$

Four connections at top slab produces same load as 6 connection at bottom slab.  
 Since other walls have less load than back wall, it is acceptable to base quantity on short walls off of top connections.

**Check Sliding and Overturning of Building Due to Soil Pressure**

$$P_{1a} := k_a \cdot \gamma_d \cdot (H_{cover} + t_{roof}) \quad P_{1a} = 102.96 \frac{\text{lbf}}{\text{ft}^2}$$

$$P_{2a} := k_a \cdot \gamma_d \cdot (H_{cover} + H - t_{floor}) \quad P_{2a} = 409.86 \frac{\text{lbf}}{\text{ft}^2}$$

$$W_a := \frac{P_{1a} + P_{2a}}{2} \cdot S_z \cdot L \quad W_a = 2.782 \times 10^4 \text{ lbf}$$

$$c := \frac{S_z \cdot (2 \cdot P_{2a} + P_{1a})}{3 \cdot (P_{2a} + P_{1a})} \quad c = 4.648 \text{ ft}$$

$$M_o := W_a \cdot c \quad M_o = 129.31 \text{ kip} \cdot \text{ft}$$

$$W_{st} := W_{st} + L \cdot W \cdot t_{floor} \cdot \gamma_c \quad W_{st} = 5.822 \times 10^4 \text{ lbf}$$

$$W_{soil} = 3.927 \times 10^4 \text{ lbf}$$

$$W_{resist} := W_{st} + W_{soil} \quad W_{resist} = 97.495 \text{ kip}$$

$$M_{r1} := \frac{W}{2} \cdot W_{resist} \quad M_{r1} = 528.098 \text{ kip} \cdot \text{ft}$$

$$FS_{over} := \frac{M_{r1}}{M_o} \quad FS_{over} = 4.084$$

Pins, := if( $FS_{over} \geq 1.5$ , "No pins required for overturning", "Pins Required for overturning")

Pins,, = "No pins required for overturning"

$$V_{HILTI} := 4283 \cdot \text{lbf} \quad \text{CIP Concrete } f'_c = 3000 \text{ psi.}$$

$$\text{Num} := \text{ceil} \left( 1.5 \cdot \frac{W_a}{V_{HILTI}} \right) \quad \text{Num} = 10$$

Need (10) ~~3/8"~~<sup>5/8"</sup> diameter x 2 1/2" embedment HILTI Kwik Bolt 3 Stainless Steel Expansion anchors.

Use (4) on each long wall and (1) on each short wall.

This is conservative since as friction between foundation and bottom slab will add additional resistance.

Anchors to have minium edge distance of 8 1/4".

# ***Rectangular Concrete Tanks***

*Revised Fifth Edition*

by Javeed A. Munshi



**PORTLAND CEMENT ASSOCIATION**

**5420 Old Orchard Road, Skokie, Illinois 60077-1083  
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WALLS<sup>1,2,3,5</sup>

ANCHOR DIAMETER (inches)	EMBEDMENT DEPTH <sup>1</sup> (inches)	TENSION			SHEAR			
		UBC With Sp. Insp.	UBC Without Sp. Insp.	IBC/IRC	Perpendicular to wall		Parallel to wall	
					ICC-ES	IBC/IRC	ICC-ES	IBC/IRC
1/2	3	646	323	517	311	249	614	491
5/8	3 1/2	852	426	682	311	249	614	491

For SI: 1 inch = 25.4 mm, 1 lbf = 4.45 N

<sup>1</sup>Values valid for anchors installed in Type 1 Grade N, lightweight, medium-weight, or normal-weight concrete masonry units conforming to ASTM C 90 or UBC Standard 21-4. The masonry units shall be fully grout with coarse grout conforming to IBC 2103.10 and ASTM C 475 or UBC Section 2103.1 and UBC Standard 21-19. Mortar shall comply with IBC Section 2103.7 and ASTM C 270 or UBC Section 2103.3 and UBC Standard 21-15, Type S, N, or M. Masonry prism compressive strength shall be at least 1,500 psi at the time of installation when tested accordance with IBC Section 2105.2.2.2 and ASTM C 1314 or UBC Section 2105.3.2 and UBC Standard 21.17.

<sup>2</sup>Anchors shall be installed a minimum of 1-3/4 inches from edge of the block.

<sup>3</sup>Anchor locations are limited to one per masonry cell with a minimum spacing of 8 inches on center.

<sup>4</sup>Embedment depth is measured from the top edge of the concrete masonry unit.

<sup>5</sup>Allowable loads or applied loads may be modified in accordance with Section 55 of this report due to short-term wind or seismic loads.

<sup>6</sup>These tension values are only applicable when anchors are installed with special inspection in accordance with Section 4.3 of this Report.

TABLE 10—KWIK BOLT 3 CARBON STEEL ALLOWABLE TENSION AND SHEAR VALUES (in pounds), STRUCTURAL LIGHTWEIGHT CONCRETE OVER METAL PROFILE DECK<sup>1,2,3,4,5</sup>

ANCHOR DIAMETER (inches) / Material	MINIMUM EMBEDMENT DEPTH (inches)	f'c = 3,000 psi		
		Tension (lb)		Shear <sup>7</sup>
		With Sp. Insp. <sup>4</sup>	Without Sp. Insp.	
1/4 Carbon Steel	2	619	310	574
3/8 Carbon Steel	2 1/2	1,033	517	813
1/2 Carbon Steel	3 1/2	1,600	863	1,264
5/8 Carbon Steel	4	2,221	1,111	2,118
1/4 Stainless Steel	2	617	308	574
3/8 Stainless Steel	2 1/2	1,015	508	994
1/2 Stainless Steel	3 1/2	1,476	738	1,602
5/8 Stainless Steel	4	2,202	1,101	2,118

For SI: 1 inch = 25.4 mm, 1 lbf = 4.45 N, 1 psi = 6.9 kPa

<sup>1</sup>The tabulated tension or shear values are for anchors installed in structural sand-lightweight concrete having the minimum indicated compressive strength of 3,000 psi at the time of installation. Refer to Figure 3 for minimum dimensions of the composite deck. Concrete aggregate shall comply with ASTM C 330.

<sup>2</sup>The minimum distance from the center of the bolt to the edge of the lower flute is 1 1/4 inches.

<sup>3</sup>Allowable loads or applied loads may be modified in accordance with Section 5.5 of this report due to short-term wind or seismic loads.

<sup>4</sup>Anchors are permitted to be installed in the lower or upper flute of the composite steel deck/concrete fill assembly, provided the installation procedures are maintained.

<sup>5</sup>For anchor spacing, refer to Table 2, footnotes 2, 3, 4, 7 and E.

<sup>6</sup>These tension values are only applicable when anchors are installed with special inspection in accordance with Section 4.3 of this report.

<sup>7</sup>There is no restriction on the direction of shear loading.

TABLE 11 - KWIK BOLT 3 CARBON STEEL AND HOT DIPPED GALVANIZED ALLOWABLE TENSION AND SHEAR VALUES (in pounds), NW CONCRETE, 1-3/4 INCH EDGE DISTANCE<sup>1,2,3</sup>

ANCHOR DIAMETER	ANCHOR EMBED.	f'c ≥ 2000 psi			
		Tension		Shear Perpendicular to Edge	Shear Parallel to Edges
		With Sp. Insp. <sup>3</sup>	Without Sp. Insp.		
3/8	3	956	478	409	916
1/2	3	932	466	376	1001
	4 1/2	1287	643	447	1415

TABLE 12 - LENGTH IDENTIFICATION SYSTEM

STAMP ON ANCHOR	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	
Length of anchor (inches)	From	1 1/4	2	2 1/4	3	3 1/4	4	4 1/4	5	5 1/4	6	6 1/4	7	7 1/4	8	8 1/4	9	9 1/4	10	11	12	13	14	15	16	17	18
	Up to but not including	2	2 1/4	3	3 1/4	4	4 1/4	5	5 1/4	6	6 1/4	7	7 1/4	8	8 1/4	9	9 1/4	10	11	12	13	14	15	16	17	18	18

For SI: 1 inch = 25.4 mm.