Pulling Iron Installation for In-Building Vaults

1. Scope

This standard covers the installation of pulling irons during construction of in-building vaults to facilitate pulling Seattle City Light (SCL) electrical cable.

The number, location, and height shall be determined for each project by the SCL engineer and confirmed by the reviewer.

Pulling irons are not intended to be used to pull out lodged cable or to move heavy equipment.

Below-grade (wet) vaults are outside the scope of this standard.

2. Application

This standard provides requirements for the installation of pulling irons (also known as pulling eyes, item 1 in the material list).

A form (item 2 in the material list) is used to create the pulling iron recess.

A cover (item 3 in the material list) is used to conceal the floor-mounted pulling irons.

This standard is intended for use by SCL engineers, SCL reviewers, SCL civil crews, and contractors who approve, inspect, build, and construct in-building vaults.

3. Material List

Item	Description	Stock No.	Quantity
1	Pulling iron, stainless steel	720235	Project specific
2	Form for embedded pulling iron	013525	"
3	Pulling iron cover	720236	"

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4. SCL Review Requirements

Pulling iron locations shall be confirmed with SCL reviewers prior to concrete pour.

SCL Civil Engineering shall review the pulling iron design. Design calculations shall be submitted in the following cases:

- Pulling irons are being retrofitted onto an existing wall, ceiling, or floor.
- Pulling irons to be installed are anything other than SCL Stock No. 720235.

5. Installation Notes

5.1 General

The following requirements shall be met when installing pulling irons:

- Pulling irons shall be installed behind concrete reinforcing steel (rebar). See Figure 5b.
- Spacing and size of rebar shall be determined by a licensed civil engineer.
- Pulling irons shall be tied to the rebar.
- Pulling iron installation shall be rated and labeled in the vault as 5000 lb maximum working tension.
- The vault wall, ceiling, and floor shall be designed so that each pulling iron obtains a 10,000-lb ultimate strength.
- Rubber forms shall be used to create the pulling iron recess shown in Figure 5a.
- If a pulling iron is installed in the floor, install a recessed pulling iron cover to avoid a tripping hazard.
- Pulling iron embedment detail is required in the vault layout drawings for new and retrofit installation.
- Pulling irons shall provide a minimum 3-inch diameter round gap for hook used for shackle attachment.

Figures 5a and 5b show a pulling iron embedded in a concrete vault, behind and tied to rebar. Pulling irons are typically opposite the entry or conduit entrance.

Figure 5a. Pulling Iron, Inset View

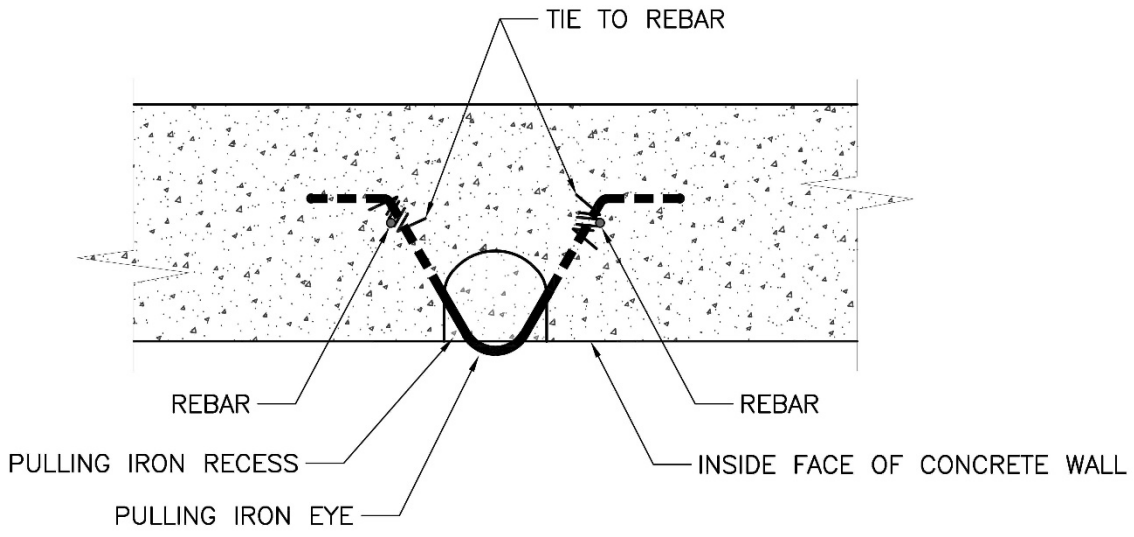


Figure 5b. Pulling Iron, Vault Interior, Front View

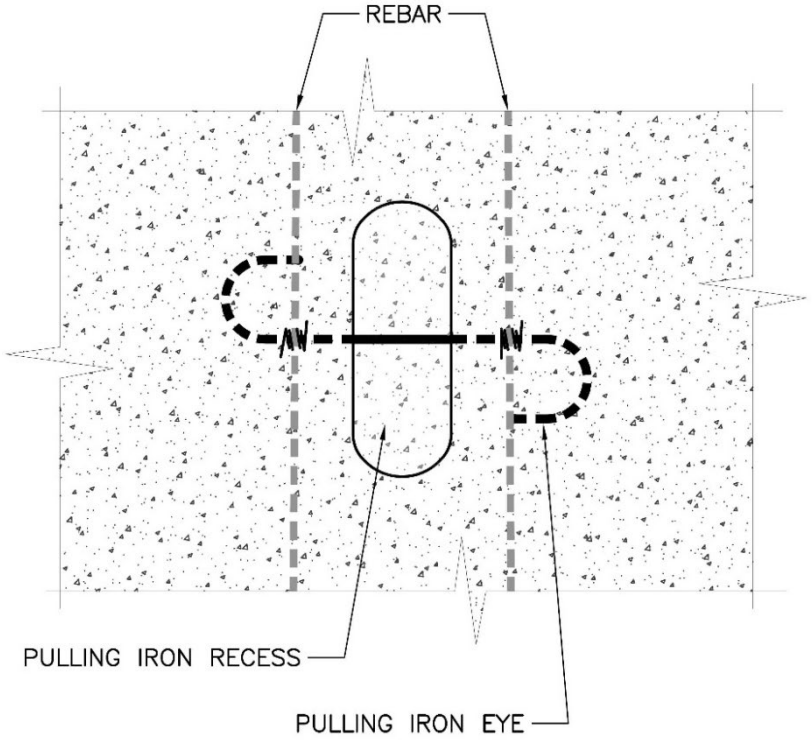
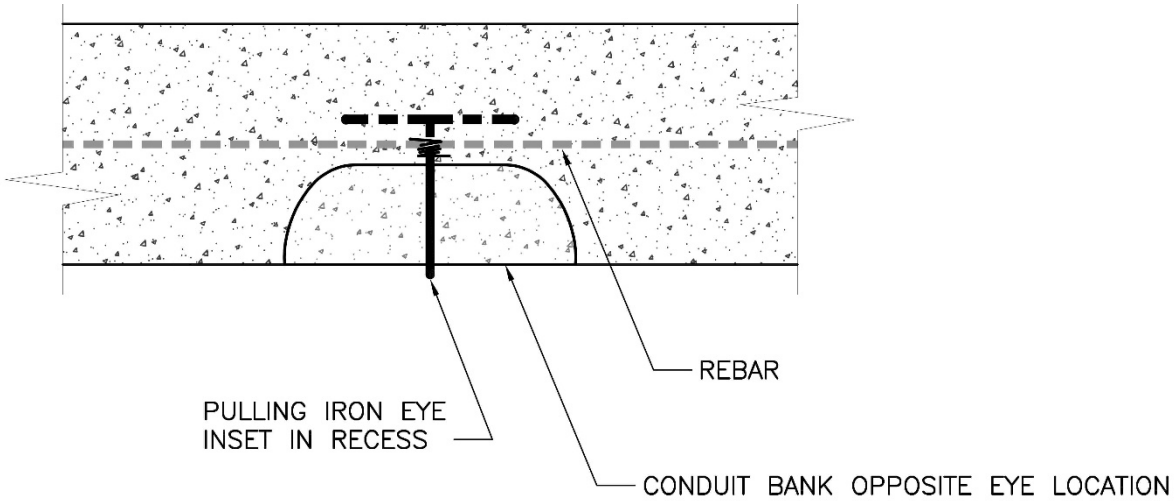


Figure 5c. Pulling Iron, Vault Interior, Side View



5.2 Installation in New Construction

Pulling irons for rigging equipment shall be installed minimally, without duplication, and as follows:

- Opposite each conduit entrance at approximately the same height.
- Inset into a recess in the vault wall so that the eye is exposed and flush with the interior wall. See Figure 5b.

Locations for pulling irons can vary depending on the vault plan and configuration (entry door, conduit entrance, hatch, and transformer locations). SCL requires that pulling irons on walls shall optimally match the height of the conduits, or as the next option, the pulling iron shall be just below the conduit entrance.

If the vault is constructed of concrete blocks, with engineering pre-approval irons may be floor-mounted. One pulling iron cover shall be provided for each pulling iron installed in the vault floor.

5.3 Installation on an Existing Wall (Retrofit)

Pulling iron and wall design calculation and drawings shall be stamped by a licensed Civil Engineering PE. These calculations and drawings shall be submitted to SCL for review and approval.

Drawing detail shall include pulling iron detail, anchor detail, and existing wall details, as well as layout of the pulling iron and the cable entrance.

The concrete masonry unit (CMU) wall that a pulling iron will be anchored to shall be fully grouted.

6. Testing

A tension test shall be required for all pulling irons.

Pulling iron installation shall meet a minimum testing load of 7500 lb for five minutes.

Testing shall be performed by a certified, non-destructive testing company.

A testing report shall be submitted to SCL Civil Engineering.

7. Labeling

Using a stencil, paint 2-inch tall letters near the pulling iron indicating “5000 LB MAX. WORKING.”

8. Sources

Abbott, Jeremy; Electrical Reviewer and subject matter expert for 0257.47

Edwards, Tommy; SCL Electrical Reviewer and subject matter expert for 0257.47

Hanson, Brett; SCL Standards Engineer and originator of 0257.47

Kohashi, Owen; SCL Structural Engineering Supervisor and subject matter for 0257.47

SCL Construction Standard NCI-62; “Pulling Iron Installation for In-Building Vaults, Network System” (canceled)