FishPAC Fact Sheet
Science and Innovation Team

DEPLOYING RESEARCH CAMERAS ON CALTRANS FACILITIES

Cameras help monitor and measure multi-species use and benefits at Caltrans facilities. Consider mounting cameras directly to the Caltrans facility if deploying cameras at locations with limited options, or significant potential for theft. This option requires coordination with District Maintenance, and the Special Crews Superintendent and Bridge Supervisor.

Contact District personal (listed above) and inform them of a) the request to mount a research camera and b) the preferred construction techniques for mounting. The spreadsheet of priority locations documenting where cameras will be installed can be shared with crews for transparency and tracking purposes, and can serve as the sign out sheet for the equipment.

Recommended equipment and procedures for deploying cameras:

Anchor Types

The Red Head® wedge anchor can meet different application requirements. In applications where moisture is present, the **hot-dipped galvanized** should be used. The **304 stainless steel** is likely the best choice when the anchor is in wet environments. For applications where the Red Head® wedge anchor is submerged in water, the **316 stainless steel** Red Head® wedge anchor may be the best.

Wedge Anchor Diameters

The diameter of wedge anchor chosen depends on holding value requirements and the size of the hole in the fixture. If the item being fastened has holes in it for attachment, the wedge anchor chosen must fit through the holes. If the wedge anchor is installed with the fixture in place, the wedge anchor measures larger than the diameter. For example, a 3/8” anchor will require a 7/16” hole in the fixture for it to be inserted through the hole while the fixture is in place. Even though the working part of the wedge anchor is larger, the threaded part of the anchor is equal to the designated diameter, i.e., a 3/8” wedge anchor uses a 3/8” nut.

Depth of Embedment

The diameter of wedge anchor has a specific minimum embedment depth to install in the concrete to meet minimum holding values. **Minimum embedment is the distance the anchor body is installed in the concrete after the wedge anchor has been expanded.** Embedment depth at less than minimum embedment will decrease the holding values, or result in no holding values. **The minimum embedment depths for the wedge anchor:**

Red Head® Wedge Anchor Diameter	Minimum Embedment Depth
1/4”	1-1/8”
3/8”	1-1/4”
1/2”	2-1/4”
5/8”	2-3/4”
3/4”	3-1/4”
7/8”	3-3/4”
1”	4-1/2”

The wedge anchor may be installed at depths deeper than the minimum embedment requirement. Deeper embedments will likely result in greater holding values. Better holding strength will be reached when rebar is present and the embedment of the wedge anchor is past the rebar. **Important:** The wedge anchor should not be embedded within a minimum of 5 anchor diameters from the unsupported edge of the concrete to ensure proper holding values. Deeper embedments require a deeper longer hole to be drilled, which makes it difficult to drill a straight hole. If the hole is not perfectly straight, the wedge anchor, once installed, may not penetrate the hole, and it make be difficult to remove the anchor.

Length of Wedge Anchor

The minimum length of the wedge anchor is determined by adding the thickness of the material being fastened to the minimum embedment plus space for the nut and washer. The space for the nut and washer is equal to the diameter wedge anchor being installed. A length of wedge anchor that is equal to or longer than the minimum length requirement must be selected.

Spacing

For each diameter, the wedge anchor must be installed a specific distance from each other and from an unsupported edge of the concrete. The closer the wedge anchors are to each other, or the closer the anchors are to an unsupported edge, then the less the holding value. The chart can be viewed at Recommended Edge and Spacing Distance Requirements for Shear Loads.

ITW Red Head® Wedge Anchor Installation

1. Select a **carbide drill bit** with a diameter equal to the anchor diameter, and drill hole to any depth exceeding the desired embedment.
2. Clean the hole, or continue drilling additional depth, to accommodate drill fines.
3. Assemble washer and nut, leaving nut flush with the end of the anchor to protect threads. Drive anchor through material to be fastened until the washer is flush with the surface of the material.
4. Expand anchor by tightening nut 3–5 turns past the hand tight position, or to the specified torque requirement.

Concrete Fastening Systems, Inc Installation Instructions

1. Using a **hammer drill** that is set in the hammer and rotation mode, with a carbide tipped bit that meets ANSI standards and is the same diameter as the wedge anchor being installed, drill a hole in the concrete. Drill the hole.
2. Clean the hole out of all dust and debris using a wire brush, vacuum or compressed air.
3. To protect threads during installation, install washer and nut onto the threaded end of the wedge anchor, leaving the nut flush with the top of the anchor body.
4. Insert wedge anchor through the fixture to be fastened and into the hole in the concrete, using a hammer strike the nutted end of the wedge anchor until the washer and nut are tight against the surface of the fixture.
5. Finger tighten the nut and then with a wrench turn the nut clockwise 3 to 5 full turns or until the specified torque values for the diameter of wedge anchor is reached.

Red Head® Wedge Anchor Installation Torque

Diameter	Torque Ft/lbs
1/4”	4
3/8”	25
1/2”	55
5/8”	90
3/4”	110
7/8”	250
1”	300