Department staff regularly inspects and/or perform maintenance and repair work in culverts or other subsurface structures as part of the state transportation infrastructure. While size, configuration, and conditions vary widely, this document reinforces minimum requirements for entry into any culvert/subsurface structure that constitutes a “confined space” (refer to Safety Bulletin and Policy below), or requires conformity to other applicable OSHA standards or Department policies. It also establishes additional guidelines to maximize the safety of Department staff performing such work.

POLICY

While OSHA is silent on “culvert entry”, there are relevant OSHA standards and Department policies which apply to work activity within culverts/subsurface structures. They include, but are not limited to, “Confined Space Entry”, “Working In Proximity to Water”, “Respiratory Protection”, and “Work Clothing Guidelines”. Most culverts/subsurface structures do not meet the OSHA definition of a confined space, nor necessitate most of the precautions below. Culverts/structures with unrestricted entry/exit, short in length, dry, having ample daylight and draft, structurally sound, and otherwise free from recognized hazards, may not require special precautions. Common sense and good judgment dictate appropriate action.

CULVERTS/SUBSURFACE STRUCTURES THAT MEET ANY OF THE FOLLOWING REQUIRE CONFORMITY WITH “CONFINED SPACE ENTRY” SAFETY BULLETIN.

- Part of a sanitary sewer system.

- Diameter/opening size requiring entrant(s) to crawl. Entry will not be made into culverts/structures with a diameter/opening size of 24” or less.

- So lengthy that a co-worker outside is unable to see the entrant(s) or maintain unassisted voice contact.
- Contain hazardous materials or substantial quantities of decaying organic material.
- Require work which could create an atmospheric hazard, i.e., fumes from welding, painting, relining with resins or other curing material.

**ENTRY IS PROHIBITED INTO CULVERTS/SUBSURFACE STRUCTURES WHICH ARE:**

- Twenty-four (24) inches or less in diameter/opening size. For systems that increasingly narrow, entry is prohibited beyond the point where diameter/opening size is 24” or less. In elliptical structures, entry should not be made where the mid-vertical height is 24” or less.
- Plugged by debris snares or other obstructions which could release substantial water into the structure if the obstruction is removed or loosens; or in cases where the force of running water is strong enough; or where combination of water depth, current and incline hinders or prevents stable footing.
- In culverts where the entry is being performed because of a suspected failure in the integrity of the structure, a Licensed Engineer (Transportation Maintenance or Structures), will verify that the culvert is safe for entry.
- Deemed by Regional Program Management or Regional Safety and Health Representative to be unsafe to enter.

Portable generators or other power equipment which emit carbon monoxide or diesel exhaust shall not be operated within the culvert or structure, or in any areas adjacent to the structure where air movement could cause fumes to enter.

Hard hats, eye/face protection, and appropriate safety footwear shall be worn. Gloves may also be required. Department Work Clothing Guidelines shall be followed.

Training shall be conducted for entry into “confined spaces” and/or any other work aspect governed by Department safety policy.

**GUIDELINES**

Regional Program Managers and the Regional Safety Representative should identify and categorize all culverts/subsurface structures in the Region by degree of risk, and based on this document, establish appropriate precautions for each category, as necessary. Categories might include: those where entry is prohibited; those considered confined spaces; those which are not confined spaces, but present other potential hazards; and those which require no special precaution. The categories should be reviewed and updated periodically. A checklist for each category containing appropriate precautions would simplify implementation.
The following should be considered prior to entry into a culvert or subsurface structure not classified as a confined space, but with known or potential hazards such as harmful fumes, potential for drowning, contact with energized electrical equipment; or physical hazards due to structural deficiencies, sharp objects, scour, etc.

- Entry should not be made without on-site presence of at least one co-worker outside the culvert.

- Available blueprints or other schematics should be reviewed prior to entry to learn about layout and potential hazards.

- Where work is to be done inside (vs. inspection only), debris should be removed.

- Portable lighting systems, helmet lamp and/or flashlight should be provided. Redundant systems are preferred, in case of failure.

- For some structures, air quality should be monitored for oxygen deficiency or presence of harmful contaminants prior to and during entry. The Regional Safety Representative should be consulted for testing criteria and for assistance in conducting air quality monitoring.

- Voice and/or assisted communication should exist among entrant(s) and co-worker(s) outside. Cell phones and radios are options. At least one entrant should have available an audible signal/alarm device in case of emergency, for example, canned compressed air alarm.

- If structure failure is known or suspected, extreme caution should be exercised regarding decisions to enter. Alternate methods, such as use of consultants or remote cameras, should be considered.

- All terminal ends should be checked for obstruction, and determined to be passable for safe exit/entry at each in an emergency.

- When water is above ankle height, boots or waders should be worn. Waders and boots with toe protection may be required. Water depth and current should be considered for applicability of Safety Bulletin “Working in Proximity to Water”. Additional dry clothing is desirable.

- Ice poses special hazards of slippery conditions and/or falling objects, and should be considered an important risk factor.

- Culverts sometimes terminate at a known “drop-off”, or otherwise present fall hazards. Entrants should carefully approach known “drop-offs”. Probes can help detect scour and other elevation changes, and facilitate balance. Rigging a safety line as a handhold or tie-off point can minimize fall hazards, and be used to attach and pull along portable lighting and/or air monitoring equipment.
- When conditions warrant and culvert length is short enough to assure retrieval, entrants may “tether” by safety rope to an area outside the culvert/structure.

- Where a structure has never been entered by current DOT forces, and no blueprints, schematics exist; or there is concern for physical integrity of the structure, and therefore the need to inspect; consideration should be given to use of consultant services or remote camera before entry by Department forces. Consultants should be asked to submit an entry safety plan prior to work beginning.

- Time of year is critical for water level and soil stability, and entry should be postponed until adverse effects of spring melt/runoff have subsided. Water levels and soil water content should be as low as possible.

- Where feasible, notify local emergency services of intent to enter high risk structures.

- Employees should be trained appropriately, based on known or suspected conditions prior to entry.

**RELATED DEPARTMENT POLICY**

The following documents should be considered for application prior to entry of any culvert/subsurface structure; and incorporated into entry safety plans, as appropriate.

- Confined Space Entry
- Working In Proximity to Water
- Respiratory Protection
- Working Near Energized Electrical Lines & Equipment
- Work Clothing Guidelines
- Appropriate Program Safety Manuals