Inspector Responsibility Checklist

The inspector has a variety of functions to perform during the shaft construction process. The checklist below covers these responsibilities.

Note that some specifications described in the following content may not be the same as the specifications followed by your agency. Always check with your State agency's standards and specifications when using these guidelines.

Sections

Install a Trial Shaft

- ❑ **The inspector's role is essentially the same as for production shafts**
  - — The only difference is that the trial shaft will be located on project plans a certain distance from production shafts, and the inspector needs to verify that the shaft is performed at the specified location
- ❑ **Upon successful completion of shaft, inspector must verify it is finished per plans**

- **If the contractor fails to install a successful trial shaft:**
  - They must revise drilled shaft plan and attempt another trial shaft until they successfully install a shaft that the engineer accepts

Verify Shaft Location and Alignment

- **The inspector must check the shaft location and alignment**
- **The inspector should ask the following questions:**
  1. Is the shaft being located at the correct design location indicated on the plans? Typically, there will be a plan tolerance which the contractor must achieve.
  2. Is the Kelly bar plumb? This is critical as there are tolerances for axial alignment that the contractor must achieve.

Excavation

- **If the drilled shaft plan specifies the use of casing and/or slurry, the inspector must verify and document its use**
- **On many projects, a "surface casing" will be temporarily installed to stabilize the surface soils during the construction process**
- **In general, the inspector needs to be concerned with the following:**
  - Documenting the type of drilling tool, its diameter, and its condition. Also remember to record its length, as the inspector needs this to add to the Kelly bar to determine depths.
  - Documenting the length, diameter and type of any casing used.
  - If slurry is used, verifying and documenting that the required sampling and testing is performed.
  - Maintaining, in the required format, a log of the material excavated. Typically, there will be forms for rock coring, soil/rock excavation, and possibly others.

- Keep in mind that job site photographs are a very valuable form of documentation

Slurry Testing

- Slurry needs to be maintained properly
- Specifications for a project will specify type and number of tests to be performed on slurry
- Also known as Marsh Funnel Test, the Viscosity Test is the test used to measure the flow rate or consistency of slurry
- Also known as the Mud Density Test, the Mud Balance Test is used to measure the density of the slurry
- The pH Test is used to determine the alkalinity and acidity of the slurry
- The Sand Content Test is used to determine the sand content of the slurry

Shaft Cleaning

- During shaft excavation, the inspector estimates the bottom of the shaft depth by noting the depth marks on the Kelly and adding the length of the particular tool to it, the sum of which provides the total depth
- Upon achieving the desired shaft tip elevation and following cleaning of the shaft bottom, the inspector needs to verify the depth and cleanliness
- Generally, cleanliness requirements will be specified and are typically based upon the amount, or thickness, of sediment permitted at the bottom of the shaft

- **In determining the shaft depth and cleanliness, the inspector uses a weight tape and takes "soundings" at numerous locations (normally 5) around and in the center of the shaft**
  - This should be done as soon as possible, as the longer the hole is open, the greater the potential for problems

Determining Tip Elevation

- **The designer has designed the drilled shaft foundations based upon a variety of factors and their design is based upon a certain shaft diameter and depth of penetration below existing ground surface**
- **Where the bottom of the shaft is to be located is referred to as the "shaft tip elevation"**
- **This elevation is determined from a fixed-point elevation provided by the contractor**
  - Typically, this is the top of casing or some other fixed reference
- **Using this elevation and the depth measured on the Kelly or weighted tape, the inspector calculates the shaft tip elevation, to verify the contractor is at the specified elevation**
- **To determine the shaft tip elevation merely subtract the depth (in feet or meters) of the shaft below the reference elevation from the reference elevation**
  - Remember to watch for + and - elevations

Rebar Cage Fabrication and Positioning

- **Drilled shaft foundations are constructed with an inside rebar cage to provide for strength and stability**

- **The rebar cages are constructed to meet the needs of the design, both in rebar size and required number of rebars**
- **The inspector must verify that the cages are fabricated, lifted, and positioned properly and are within the allowable tolerances for "top of cage elevation" after positioning**
- **Quite often, post-installation integrity testing will be specified**
  - Access tubes for performing these tests are part of the rebar cage assembly
- **Remember, it is imperative that the hole be clean, and this should have been verified by the inspector before the rebar cage was installed**
- **The inspector must verify that the cages are constructed in accordance with the plans and specifications, which includes verification of:**
  - Bar size
  - Number of bars and condition
  - Type and percentage of ties
  - Diameter and length
  - Couplers or splices
  - Spacers and standoff
  - The inspector should also measure the clear distance between vertical and horizontal bars
- **Following fabrication of the cage, the contractor will lift the cage and lower it into the shaft drilled hole**
- **Remember that prior to cage placement, the inspector verified the shaft depth and cleanliness**
- **It is important that the contractor properly support the cage during lifting to avoid bending the cage so much that it is permanently distorted (if the cage is excessively distorted, it won't fit down the shaft without damaging the shaft walls)**

- **Typically, the cage will have standoffs on the bottom to maintain a certain clearance from the bottom of the hole and spacers on the outer edges to maintain a specified distance from the shaft walls**
- **Once positioned in the shaft, the top of the cage is to be within a specified tolerance of the elevations shown in the plans**
- **To summarize, regarding rebar cage positioning, the inspector needs to verify and document:**
  - Lifting of the cage
  - Positioning of the cage
  - Top of cage elevation
  - Couplers or splices

Access Tubes

- **Post-installation integrity testing of drilled shafts has become a requirement in most of the current specifications**
  - Using 3D tomography can provide clear image of shaft in ground
- **To perform these tests, access tubes must be installed on the cage prior to placing the cage in the hole**
- **The inspector must verify and document that tubes are of the length, diameter, and material specified**
  - Verify they are secured to the cage and straight in accordance with project plans

Determine Circumference

- **Determining circumferences is one of the math computations the inspector must be proficient in performing**

- Typically, the number of side spacers that help maintain the proper coverage distance are determined by the cage circumference
- The plans or specifications will typically indicate a certain number of spacers, based upon inches of circumference of the cage, be placed per level
- Circumference is the length of the outer boundary (perimeter) of a circular object
- To determine the circumference of a circular area, such as a drilled shaft or rebar cage, multiply the diameter of the circle by pi