STATE OF OHIO
DEPARTMENT OF TRANSPORTATION

SUPPLEMENT 1023

MAKING AND TESTING CONCRETE BEAMS

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1023.01 Making and Testing Concrete Beams. The inspector will make and test concrete beams according to this supplement. Report test results on the "Report for Concrete Beams" form TE-38. Forward one copy of the concrete beam report to District Testing for input into the Construction Management System (CMS) at the close of each work week. When beams are made for pavement concrete, also run and report a slump, yield and air test on the concrete from the same batch.

In lieu of forwarding the TE-38 to the District Lab, report the project personnel the test results in the ODOT Construction Management System (CMS) as follows:

A. Enter appropriate information into the Material Sample (SMPL) screen in order to create the sample record.

B. Press F11 in order to bring up the PCC Inspectors Daily Report (TEST) screen. Enter the Job Mix Formula (JMF) and the batch weight information. The JMF number is required in order to enter the batch weights or to continue to the next test screen.

C. From the PCC Inspectors Daily Report screen, press F5 in order to bring up the PCC Air/Slump/Yield/Strength Test (PCTST) screen. Enter the appropriate test data from the TE-38 and indicate that the test results are for a beam by putting an N for Cylinder and Y for Beam. When beams are made for pavement concrete, a slump, yield and air test also shall be made and recorded using the concrete from the same batch.

Where beam tests are made to determine when a section of pavement or base may be opened, make two 6 x 6 x 40 in.(150 x 150 x 1000 mm) concrete beams from the same concrete being placed in the pavement or base.

The inspector will be provided the following equipment by the District Engineer of Tests for making and testing concrete beams:

6 x 6 x 40 in. (150 x 150 x 1000 mm) steel molds
Spading tool

Trowel
Rubber mallet
Beam testing machine

1023.02 Making Beams. After making sure the steel beam molds are free from dirt, hardened concrete or rust, place the beam modes on a smooth, clean, level and unyielding surface and lightly oil them to prevent the concrete from sticking. Also lightly oil the inside of each mold in the same manner. Using a shovel, fill each mold half full (3 in. (75 mm)) of concrete that is representative of the batch. With the blade of the spading tool held at an angle to the ends of the mold, spade the concrete 20 times at equal intervals from one end of the mold to the other. Then, turning the blade of the spading tool, cross-spade 20 times at equal intervals back in the opposite direction to the end of the mold. Spade entirely around the sides and ends of the mold then tap along the long side of the mold 15 times (total of 30 taps per lift) with a rubber mallet while securing the beam mold from movement.

Fill the beam mold to overflowing with concrete and repeat the spading and tapping operations as before. Strike off the excess concrete and trowel the concrete flush with the top of the beam mold. After the concrete is set, scratch the beam numbers into the concrete near one end of the beam for future identification.

Cure beams as nearly as possible in the same manner as the concrete that it represents.

Beams are normally tested at 3, 5 and 7 days of age when possible. If results are not needed before the end of the 7 day curing period, only one beam break is necessary. This break should be made at the end of 7 days. Beams made from high-early-strength cement concrete are normally tested at 1, 2 and 3 days.

Beams made to determine falsework removal will be tested as required by the Project Engineer.

Use the center-loading hydraulic beam breaker to test beams.

1023.03 Testing Beams with Center-Loading Hydraulic Beam Breaker

A General The center-loading hydraulic beam breaker is designed to test 6 x 6 x 40 in.(150 x 150 x 1000 mm) concrete beams twice for flexural strength and to indicate the strength in pounds per square inch(mega pascals) directly on the dial. No calculations are needed to convert the reading on the dial to flexural strength. Only use standard 6 x 6 in.(150 x 150 mm) beams with this breaker.

B Component Parts and Accessories

1. Beam Breaker - (To be provided by the Office of Materials Management) The beam breaker consists of two 7 inch (180mm) channels connected back to back, hydraulic pump and ram, choker valve, dial gage and yoke assembly. Two support pins are connected to the channel and one on the yoke.

2. Accessories - (To be provided by the District) Carrying case

C Method of Operation The flexural strength, which is measured in pounds per square inch (psi) (mega pascal (MPa)), is obtained in the following manner:

1. Prepare the beam for testing by rotating it 90 degrees around the long axis from the position in which it molded. The original top of the beam should now be on the side and the top and bottom of the beam should be sides of the beam that were originally against the mold. Raise the beam at least 2 in.(50 mm) off the ground by supporting at each end. This allows clearance under the beam so that the center pin from the yoke of the beam breaker can be inserted under the beam.

2. Place the breaker on the beam to be tested with one of the two support pins about 1 in (25 mm) From one end.

3. Remove the round pin from the clevises of the yoke by sliding it out. The yoke assembly containing the ram, pressure gage and choker valve can now be pivoted into the vertical (operating) position with the clevises extending below the bottom of the beam. There is a stop on one side of the main frame with which the yoke assembly hinge bracket must be in contact with in order for the yoke assembly to be in the vertical position. Return the pin to the clevises. The yoke pin should now be underneath the beam.

4. Close the choker valve (the valve just below the gage dial), by turning it in a clockwise direction and then open it approximately 1/8 to 1/4 turn. Once the valve is adjusted to the desired position, this procedure does not need to be repeated with each use unless the valve has been inadvertently turned. Do not attempt to operate the beam breaker with the choker valve closed. The purpose of the valve is to dampen the rebound of the needle on the gage upon breaking the beam. If there appears to be not enough dampening, the valve should be readjusted. Some models of the beam breaker do not have a choker valve, in which case the instructions of this paragraph do not apply.

5. Close the pump valve by turning the pinned extension valve stem in a clockwise direction. This valve is located on the right side of the pump and is opened and closed, on some models, by a bar extending through the flange of the aluminum channel forming the top of the main frame. This valve must be closed firmly in order for the pump to operate properly.

6. Adjust the black hand of the gage to the zero point by turning the knob on the side of the gage housing if so equipped. If it is not equipped with an adjusting knob, return to the Central Lab for adjustment if the needle does not return to zero.

7. Set the red hand (maximum indicating hand) near zero by turning the knob in the middle of the plastic dial cover.

8. Operate the pump by using slow steady strokes until the beam breaks or the specified strength is reached. In order to avoid unnecessary damage to the beam breaker, do not continue loading the beam more than 100 psi (1.0 MPa) beyond the specified strength and remark on the report that the test was terminated before failure. The pressure can be released by turning the pump valve stem mentioned in step 5 counterclockwise. Read the flexural strength in pounds per square inch (psi) (mega pascals (MPa)) as indicated by the red hand.

9. Open the pump valve and the pump plunger will retract allowing the yoke pin to be withdrawn and the broken portions of the beam readily removed. If additional tests are to be made immediately, repeat the forgoing procedure beginning with the step 5.

10. If no more tests are to be made immediately, the yoke assembly should be folded down into the horizontal (carrying) position and the yoke pin again inserted through the clevises in the preparation for storage. Then place the beam breaker into the carrying case.