02.25

product manual

H-3030A, H-3032A, H-3033A

Concrete Beam Tester

Introduction

These self-contained portable concrete beam testers accurately and easily determine flexural strengths of 6 x 6" cross-section test beams. Hydraulically-driven, these Beam Breakers use a center-point loading method with continuous readings to the break. The gauge resets to zero (0) for repeat tests. These lightweight aluminum units have dual registration of modulus of rupture between 10,000 lbf. and 0–4,500 kgf. Shipping weight of each is 65 lbs. (29kg)

Product Description— H-3030A

The Humboldt Manufacturing Co Model H-3030, Concrete Beam Tester, is a lightweight portable unit to easily determine the flexural strength of up to 6x6x30" test beams. Hydraulically driven, it uses the center-point loading method.

Physical Specifications:

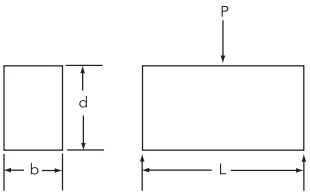
Function	Modulus of rupture of concrete beams using center point loading
Range	0 - 1,666 lbf/in^2 0 - 15,000 lbf
Shipping weight:	lb
Overall height:	"
Base dimension:	"

Theory Of Operation

The modulus of rupture[1] is defined as:

$$R = \frac{3PL}{2bd^2} \quad (1)$$

where:



R = modulus of rupture in lbf/in^2
b = average specimen width in inches
P = maximum applied load in lbf d = average specimen depth in inches
L = span length in inches

[1] R is actually the stress in lbf/in^2 of the outer fibers of the beam (in compression at the top, in tension at the bottom).

$$S = \frac{Mc}{I}$$

Where: S = stress at top or bottom of the beam in lbf/in^2
M = bending moment (P/2 x L/2)
c = distance from centroid to top of beam (d/2)
I = Inertia about the centroid (bd^3/12)

The most common usage of this unit will be to test 6x6" beams over a 16" span. For this geometry:

$$R = \frac{3 \times P \times 16}{2 \times 6 \times 6^2} = \frac{P}{9} \quad \text{or} \quad P = 9R \qquad (2)$$

The gauge measures in pounds force. It must be corrected for calibration error and beam dimensions.

When beam and span dimensions vary from those in equation (2), the calibration correction may be obtained from:

$$R = \frac{3PL}{2bd^2} \times (1.00 + \text{error}) \qquad (3)$$ Where P is the gauge reading

Operation[2]

1. Center the test beam on the rollers.
2. Close the Flow Control Valve on the top of the cylinder.
3. Actuate the pump in a manner to achieve a smooth rate of applied load.
4. Record the gauge reading at break.
5. Measure the beam dimensions at the section of failure.
6. Calculate the modulus of rupture using equations (2) and (1) or (3).

Example: The gauge reads 5,400 lbf at break.
This corresponds to a modulus of rupture of 5,400/9 = 600 lbf/in^2
Per the calibration, the meter error at 5,400 is +0.5%.
The corrected load is 5,427 lbf.
The beam calipers as 6.1" deep, and 5.95" wide.
The modulus of rupture is:

$$R = \frac{3 \times 5{,}427 \times 16}{2 \times 5.95 \times 6.1 \times 6.1} = 588.3 \text{ lbf/in}^2$$

Calibration

The unit is calibrated by measuring the load applied on a calibrated load cell. The factory calibration is supplied at gauge readings of 10% FS, FS and 3 readings in between. Three load cell readings are averaged at each point to establish the correction for each point.

[2]Specific operation should follow the applicable specifications.
These operation procedures are supplied as a guideline.

Testing Equipment for Construction Materials

HUMBOLDT

www.humboldtmfg.com

CONCRETE BEAM TESTER CALIBRATION REPORT

CUSTOMER:

INSP. DATE5/6/2009 TEMP.68

TESTER I.D.: B. LEATHERMAN

B. Leatherman

MODEL: H-3030 SERIAL NUMBER:376

TESTER READING	LOAD CELL READING			AVERAGE READING	ERROR (%+/-)
	1	2	3		
1500	1498.3	1498.3	1498.3	1498.3	-.1
4500	4505.1	4513.6	4496.6	4505.1	+.1
7500	7542.5	7559.5	7542.5	7548.2	+.6
11000	11025.5	11017.0	11017.0	11019.8	+.2
15000	14966.0	14957.5	14949.0	14957.5	-.3

CALIBRATION EQUIPMENT USED
HUMBOLDT H-4454.200 SER. #708 0-15000 LBF.
CALIBRATED BY: HUMBOLDT DATE: 2 FEB. 2009

DIRECT READING GAUGE READS POUNDS FORCE
DIVIDE BY 9 TO GET FLEXURAL PSI.

Humboldt Mfg. Co., 875 Tollgate Rd, Elgin, IL 60123
P: 1.708.468.6300 F: 1.708.456.0137

Product Description— H-3032A

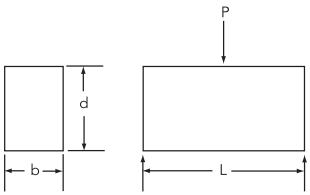
The Humboldt Manufacturing Co Model H-3032A, Concrete Beam Tester, is a lightweight portable unit to easily determine the flexural strength of up to 6 x 6 x 30" test beams. Hydraulically driven, it uses the center-point loading method.

Physical Specifications:

Function	Modulus of rupture of concrete beams using center point loading
Range	0 - 1,875 lbf/in^2 0 - 15,000 lbf
Shipping weight:	lb
Overall height:	"
Base dimension:	"

Theory Of Operation

The modulus of rupture[1] is defined as:



$$R = \frac{3PL}{2bd^2} \quad (1)$$

where:

R = modulus of rupture in lbf/in^2
b = average specimen width in inches
P = maximum applied load in lbf d = average specimen depth in inches
L = span length in inches

[1] R is actually the stress in lbf/in^2 of the outer fibers of the beam (in compression at the top, in tension at the bottom).

$$S = \frac{Mc}{I}$$

Where: S = stress at top or bottom of the beam in lbf/in^2
M = bending moment (P/2 x L/2)
c = distance from centroid to top of beam (d/2)
I = Inertia about the centroid (bd^3/12)

The most common usage of this unit will be to test 6x6" beams over a 18" span. For this geometry:

$$R = \frac{3 \times P \times 18}{2 \times 6 \times 6^2} = \frac{P}{8} \quad \text{or} \quad P = 8R \qquad (2)$$

The gauge measures in pounds force. It must be corrected for calibration error and beam dimensions.

When beam and span dimensions vary from those in equation (2), the calibration correction may be obtained from:

$$R = \frac{3PL}{2bd^2} \times (1.00 + \text{error}) \qquad (3)$$ Where P is the gauge reading

Operation[2]

1. Center the test beam on the rollers.
2. Close the Flow Control Valve on the top of the cylinder.
3. Actuate the pump in a manner to achieve a smooth rate of applied load.
4. Record the gauge reading at break.
5. Measure the beam dimensions at the section of failure.
6. Calculate the modulus of rupture using equations (2) and (1) or (3).

Example: The gauge reads 5,400 lbf at break.
This corresponds to a modulus of rupture of 5,400/8 = 675 lbf/in^2
Per the calibration, the meter error at 5,400 is +0.5%.
The corrected load is 5,427 lbf.
The beam calipers as 6.1" deep, and 5.95" wide.
The modulus of rupture is:

$$R = \frac{3 \times 5.427 \times 18}{2 \times 5.95 \times 6.1 \times 6.1} = 661.8 \text{ lbf/in}^2$$

Calibration

The unit is calibrated by measuring the load applied on a calibrated load cell. The factory calibration is supplied at gauge readings of 10% FS, FS and 3 readings in between. Three load cell readings are averaged at each point to establish the correction for each point.

[2]Specific operation should follow the applicable specifications.
These operation procedures are supplied as a guideline.

Testing Equipment for Construction Materials

HUMBOLDT

www.humboldtmfg.com

CONCRETE BEAM TESTER CALIBRATION REPORT

CUSTOMER:

INSP. DATE:08/25/2008 TEMP.75

TESTER I.D.: B. LEATHERMAN

B. Leatherman

MODEL: H-3032 SERIAL NUMBER:370

TESTER READING	LOAD CELL READING 1	2	3	AVERAGE READING	ERROR (%+/-)
1500	1501.7	1501.7	1501.7	1501.7	+.1
4500	4494.9	4494.9	4494.9	4494.9	-.1
7500	7496.6	7496.6	7496.6	7496.6	-.05
11000	10979.6	10979.6	10979.6	10979.6	-.2
15000	15018.7	15018.7	15010.2	15015.9	+.1

CALIBRATION EQUIPMENT USED
HUMBOLDT H-4454.200 SER. #708 0-15000 LBF.
CALIBRATED BY: HUMBOLDT DATE: 18 APR. 2008

DIRECT READING GAUGE READS POUNDS FORCE
DIVIDE BY 8 TO GET FLEXURAL PSI.

Humboldt Mfg. Co., 875 Tollgate Rd, Elgin, IL 60123
P: 1.708.468.6300 F: 1.708.456.0137

Product Description— H-3033A

The Humboldt Manufacturing Co Model H-3033, Concrete Beam Tester, is a lightweight portable unit to easily determine the flexural strength of up to 6x6x30" test beams.

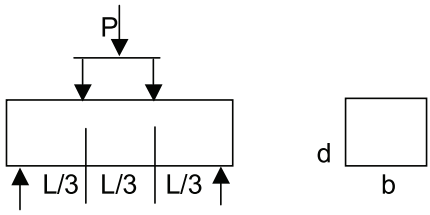
Physical Specifications:

Function	Modulus of rupture of concrete beams using third point loading
Range	0 - 1,250 lbf/in^2 (for 6x6”) 0 - 15,000 lbf
Shipping weight:	lb
Overall height:	"
Base dimension:	"

Theory Of Operation

The modulus of rupture[1] is defined as:

$$R = \frac{PL}{bd^2} \quad (1)$$



where:

R = modulus of rupture in lbf/in^2
b = average specimen width in inches
P = maximum applied load in lbf
d = average specimen depth in inches
L = span length in inches

[1] R is actually the stress in lbf/in^2 of the outer fibers of the beam (in compression at the top, in tension at the bottom).

Where: S = stress at top or bottom of the beam in lbf/in^2
M = bending moment (P/2 x L/2 – P/2xL/6)
c = distance from centroid to top of beam (d/2)
I = Inertia about the centroid (bd^3/12)

$$S = \frac{Mc}{I}$$

The most common usage of this unit will be to test 6x6" beams over a 18" span. For this geometry:

$$R = \frac{P \times 18}{6 \times 6^2} = \frac{P}{12} \quad \text{or} \quad P = 12R \qquad (2)$$

The gauge measures in pounds force. It must be corrected for calibration error and beam dimensions. See the example in the **Operation** section below.

When fracture occurs in the tension surface outside of the middle third of the span length by not more than 5% of the span length, the modulus of rupture becomes:

$$R = \frac{3Pa}{bd^2} \qquad (3)$$

Where 'a' is the average distance between the line of fracture and the nearest support on the tension surface.

Operation[2]

1. Center the test beam on the rollers.
2. Close the Flow Control Valve on the top of the cylinder.
3. Actuate the pump in a manner to achieve a smooth rate of applied load.
4. Record the gauge reading at break.
5. Measure the beam dimensions at the section of failure.
6. Calculate the modulus of rupture using equations (2) and (1) or (3).

Example: The gauge reads 5,400 lbf at break.
This corresponds to a modulus of rupture of 5,400/12 = 450 lbf/in^2
Per the calibration, the meter error at 5,400 is +0.5%.
The corrected load is 5,427 lbf.
The beam calipers as 6.1" deep, and 5.95" wide.
The modulus of rupture is:

$$R = \frac{5{,}427 \times 18}{5.95 \times 6.1 \times 6.1} = 441.2 \text{ lbf/in}^2$$

Calibration

The unit is calibrated by measuring the load applied on a calibrated load cell. The factory calibration is supplied at gauge readings of 10% FS, FS and 3 readings in between. Three load cell readings are averaged at each point to establish the correction for each point.

[2]Specific operation should follow the applicable specifications.
These operation procedures are supplied as a guideline.

Testing Equipment for Construction Materials

HUMBOLDT

www.humboldtmfg.com

CONCRETE BEAM TESTER CALIBRATION REPORT

CUSTOMER:

INSP. DATE:2/5/2009 TEMP.68

TESTER I.D.: B. LEATHERMAN

B. Leatherman

MODEL: H-3033 SERIAL NUMBER:371

TESTER READING	LOAD CELL READING 1	2	3	AVERAGE READING	ERROR (%+/-)
1500	1498.3	1506.8	1506.8	1504.0	+.3
4500	4496.6	4496.6	4505.1	4499.4	-.01
7500	7500.0	7491.5	7508.5	7500.0	0
11000	10983.0	10983.0	10983.0	10983.0	-.2
15000	14966.0	14966.0	14966.0	14966.0	-.2

CALIBRATION EQUIPMENT USED
HUMBOLDT H-4454.200 SER. #708 0-15000 LBF.
CALIBRATED BY: HUMBOLDT DATE: 2 FEB. 2009

DIRECT READING GAUGE READS POUNDS FORCE
USE FORMULA TO GET FLEXURAL PSI.

Humboldt Mfg. Co., 875 Tollgate Rd, Elgin, IL 60123
P: 1.708.468.6300 F: 1.708.456.0137

Warranty

Humboldt Mfg. Co. warrants its products to be free from defects in material or workmanship. The exclusive remedy for this warranty is Humboldt Mfg. Co., factory replacement of any part or parts of such product, for the warranty of this product please refer to Humboldt Mfg. Co. catalog on Terms and Conditions of Sale. The purchaser is responsible for the transportation charges. Humboldt Mfg. Co. shall not be responsible under this warranty if the goods have been improperly maintained, installed, operated or the goods have been altered or modified so as to adversely affect the operation, use performance or durability or so as to change their intended use. The Humboldt Mfg. Co. liability under the warranty contained in this clause is limited to the repair or replacement of defective goods and making good, defective workmanship.

Humboldt Mfg. Co.
875 Tollgate Road
Elgin Illinois 60123 U.S.A.

U.S.A. Toll Free: 1.800.544.7220
Voice: 1.708.468.6300
Fax: 1.708.456.0137
Email: hmc@humboldtmfg.com