



# IMP Smart Post with wood rail system testing for compliance to OSHA regulations for fall protection systems and floor and wall openings guarding.

For:

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## Project Post Testing

Techshot Document Number

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Approved By: \_\_\_\_\_

Ron Byrnes  
Quality Engineer / Project Manager  
Techshot, Inc.

Date: \_\_\_\_\_



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## 1.0 Scope

This document defines and documents the results of the testing to determine if the IMP Smart Post with wood rail system meets the required OSHA regulations.

### 1.1 Document Overview

The purpose of this document is to determine if the guarding system made up of the IMP Smart Posts and wood rails is in compliance with the appropriate sections of the OSHA Regulations (Standards - 29 CFR) 1910.23 Guarding floor and wall openings and holes and 1926.502 Fall protection systems criteria and practices. And to document the testing method and record the results of the testing performed.

## 2.0 Requirements

Test the IMP Smart Post with raw cut 2" X 4" X 10' pine rails installed and post set on 8" centers to the appropriate sections of the OSHA regulation (Standards - 29 CFR) 1910.23 Guarding floor and wall openings and holes and 1926.502 fall protection systems criteria and practices.

## 3.0 Definitions

**Nominal** - of, being, or relating to a designated or theoretical size that may vary from the actual: approximate Source (<http://www.m-w.com/thesaurus.htm>) OSHA allows 3-4 inches when nominal is sited.



## 4.0 Test Plan and Results

### 4.1 Section Overview

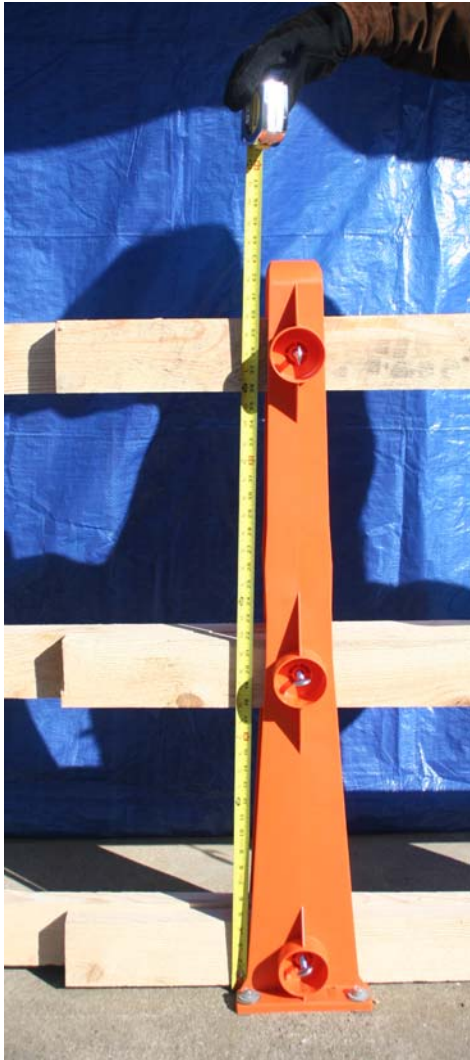
The purpose of the Verification Plan is to test and verify the IMP Smart Post in accordance with OSHA Regulations 1910.23 and 1926.502.

Verification to the requirements will be achieved by one of the following methods analysis (A), demonstration (D), inspection (I), or Test (T).

## 5.0 System Verification

### 5.1 Verify Rail System in Accordance with OSHA Regulation 1910.23


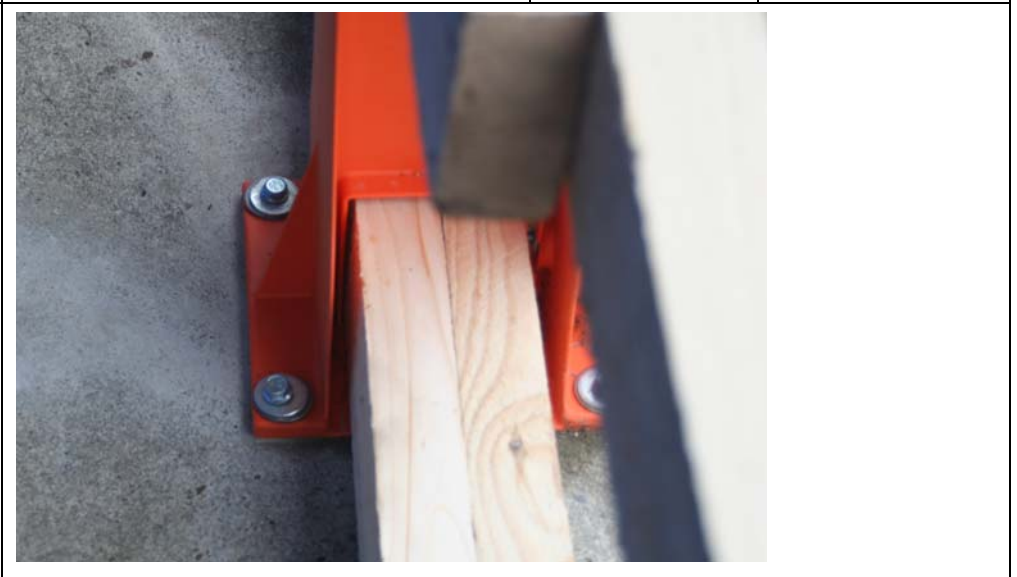
I	<a href="#">1910.23(e)(1)</a>	A standard railing shall consist of top rail, intermediate rail, and posts, and shall have a vertical height of 42 inches nominal from upper surface of top rail to floor, platform, runway, or ramp level. The top rail shall be smooth-surfaced throughout the length of the railing. The intermediate rail shall be approximately halfway between the top rail and the floor, platform, runway, or ramp. The ends of the rails shall not overhang the terminal posts except where such overhang does not constitute a projection hazard.	Verify vertical height of top rail by measurement and document with a photograph.	Meets requirement	See definition for nominal.
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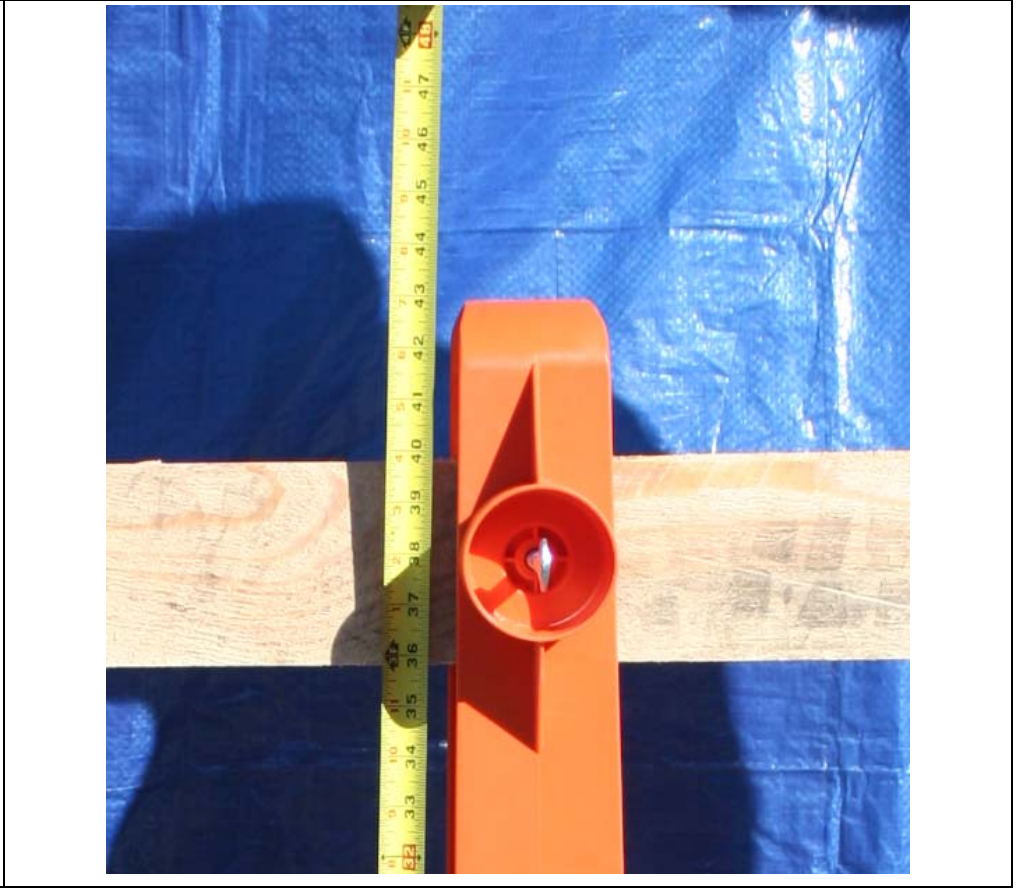
I	<a href="#">1910.23(e)(2)</a>	A stair railing shall be of construction similar to a standard railing but the vertical height shall be not more than 34 inches nor less than 30 inches from upper surface of top rail to surface of tread in line with face of riser at forward edge of tread.	Verify	Meets requirement	See <a href="#">1926.1052(c)(3)(i)</a>
I	<a href="#">1926.1052(c)(3)(i)</a>	Stair rails installed after March 15, 1991, shall be not less than 36 inches (91.5 cm) from the upper surface of the stair rail system to the surface of the tread, in line with the face of the riser at the forward edge of the tread.	Verify	Meets requirement	





T	1910.23(e)(3)(iv)	The anchoring of posts and framing of members for railings of all types shall be of such construction that the completed structure shall be capable of withstanding a load of at least 200 pounds applied in any direction at any point on the top rail.	Verify through pull test of 200 lbs. administered in the geometric center of the top rail. Record load and photograph test pull.	Meets requirement	See 1910.23(e)(3)(v)(b) for additional detail.
					

I	<b>1910.23(e)(3)(v)(a)</b>	A smooth-surfaced top rail at a height above floor, platform, runway, or ramp level of 42 inches nominal;	Verify through measurement and photographically document results.	Meets requirement	See definition for nominal.
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T	<b>1910.23(e)(3)(v)(b)</b>	A strength to withstand at least the minimum requirement of 200 pounds top rail pressure	Verify through pull test of 200 lbs. administered in the geometric center of the top rail. Record load and photograph test pull.	Meets requirement	
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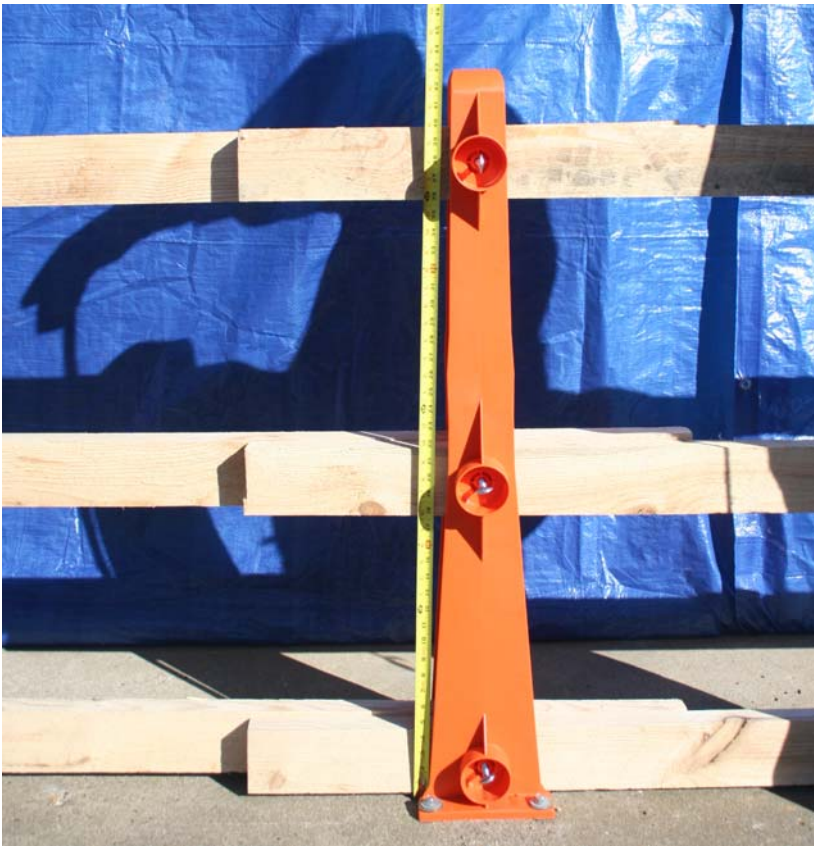
I	<b>1910.23(e)(4)</b>	A standard toeboard shall be 4 inches nominal in vertical height from its top edge to the level of the floor, platform, runway, or ramp. It shall be securely fastened in place and with not more than 1/4-inch clearance above floor level. It may be made of any substantial material either solid or with openings not over 1 inch in greatest dimension.	Verify through measurement and photographically document results.	Meets requirement	
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5.2 Verify Rail System in Accordance with OSHA Regulation 1926.502

I	<a href="#">1926.502(b)(1)</a>	<p>Top edge height of top rails, or equivalent guardrail system members, shall be 42 inches (1.1 m) plus or minus 3 inches (8 cm) above the walking/working level. When conditions warrant, the height of the top edge may exceed the 45-inch height, provided the guardrail system meets all other criteria of this paragraph.</p>	<p>Verify through measurement and photographically document results.</p>	<p>Meets requirement</p>	
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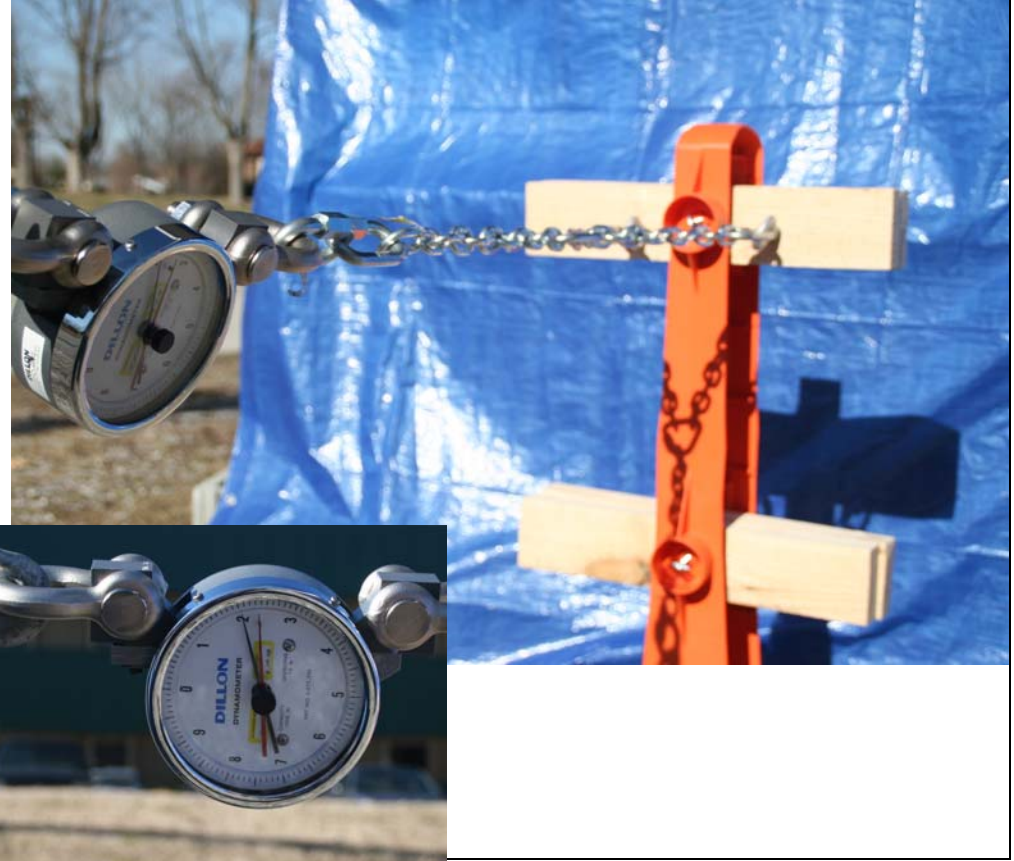
I	<a href="#">1926.502(b)(2)</a>	Midrails, screens, mesh, intermediate vertical members, or equivalent intermediate structural members shall be installed between the top edge of the guardrail system and the walking/working surface when there is no wall or parapet wall at least 21 inches (53 cm) high	Verify through measurement and photographically document results.	Meets requirement	
					
I	<a href="#">1926.502(b)(2)(i)</a>	Midrails, when used, shall be installed at a height midway between the top edge of the guardrail system and the walking/working level.	Verify through measurement and photographically document results.	Meets requirement	See <a href="#">1926.502(b)(2)</a>

T	<a href="#"><u>1926.502(b)(3)</u></a>	Guardrail systems shall be capable of withstanding, without failure, a force of at least 200 pounds (890 N) applied within 2 inches (5.1 cm) of the top edge, in any outward or downward direction, at any point along the top edge	Verify through pull test of 200 lbs. administered in the geometric center of the top rail. Record load and photograph test pull.	Meets requirement	
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T	<p><a href="#">1926.502(b)(4)</a></p>	<p>When the 200 pound (890 N) test load specified in paragraph (b)(3) of this section is applied in a downward direction, the top edge of the guardrail shall not deflect to a height less than 39 inches (1.0 m) above the walking/working level. Guardrail system components selected and constructed in accordance with the Appendix B to subpart M of this part will be deemed to meet this requirement.</p>	<p>Verify through pull test of 200 lbs. centered and administered on the upper surface of the top rail. Record load, deflection and photograph test pull.</p>	<p>Meets requirement</p>	
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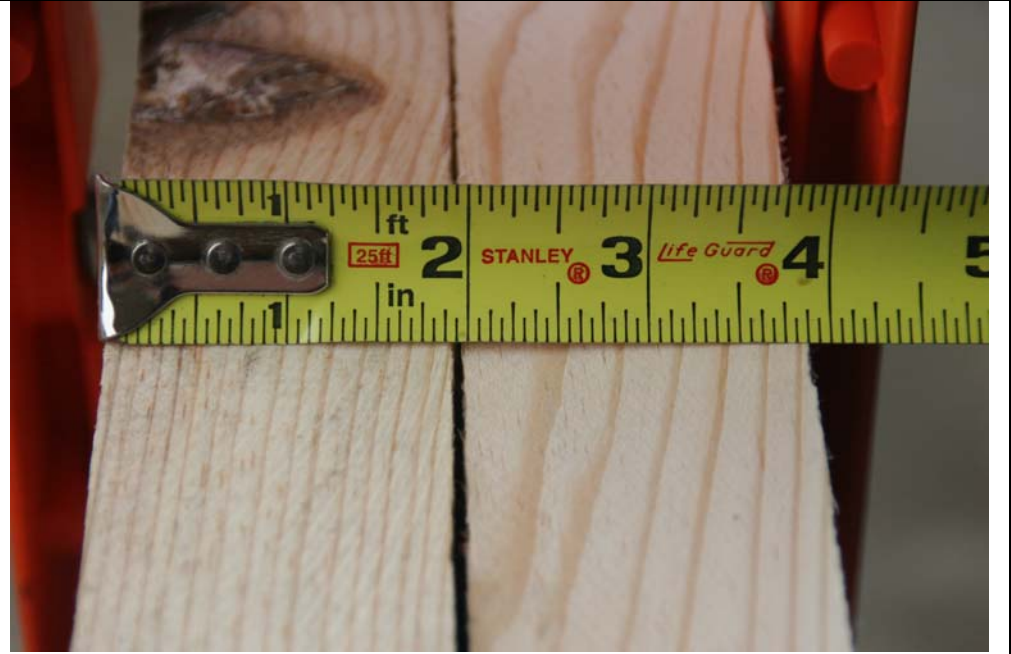
T	1926.502(b)(5)	Midrails, screens, mesh, intermediate vertical members, solid panels, and equivalent structural members shall be capable of withstanding, without failure, a force of at least 150 pounds (666 N) applied in any downward or outward direction at any point along the midrail or other member.	Verify through pull test of 200 lbs. centered and administered on the upper surface of the top rail. Record load, deflection and photograph test pull.	Meets requirement	
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I	1926.502(b)(6)	Guardrail systems shall be so surfaced as to prevent injury to an employee from punctures or lacerations, and to prevent snagging of clothing.	Verify by visual inspection of guard rail surfaces.	Meet requirement	
					
I	1926.502(b)(7)	The ends of all top rails and midrails shall not overhang the terminal posts, except where such overhang does not constitute a projection hazard.	Verify by visual inspection.	Meets requirement	

I	1926.502(b)(9)	Top rails and midrails shall be at least one-quarter inch (0.6 cm) nominal diameter or thickness to prevent cuts and lacerations. If wire rope is used for top rails, it shall be flagged at not more than 6-foot intervals with high-visibility material.	Verify through measurement and photographically record results.	Meets requirement	
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I	<a href="#"><u>1926.502(b)(10)</u></a>	<p>When guardrail systems are used at hoisting areas, a chain, gate or removable guardrail section shall be placed across the access opening between guardrail sections when hoisting operations are not taking place.</p>	Picture	Rails can be removed without tools.	
					



I	1926.502(d)(11)	"Protection from falling objects." Falling object protection shall comply with the following provisions:	Review data collected	Meets requirement	
T	1926.502(j)(2)	Toeboards shall be capable of withstanding, without failure, a force of at least 50 pounds (222 N) applied in any downward or outward direction at any point along the toeboard.	Verify through pull test of 50 lbs. centered and administered on the side surface of the toeboard. Record load, deflection and photograph test pull.	Meets requirement	



I	1926.502(j)(3)	Toeboards shall be a minimum of 3 1/2 inches (9 cm) in vertical height from their top edge to the level of the walking/working surface. They shall have not more than 1/4 inch (0.6 cm) clearance above the walking/working surface. They shall be solid or have openings not over 1 inch (2.5 cm) in greatest dimension.	Verify through measurement and photographically record results.	Meets requirement	
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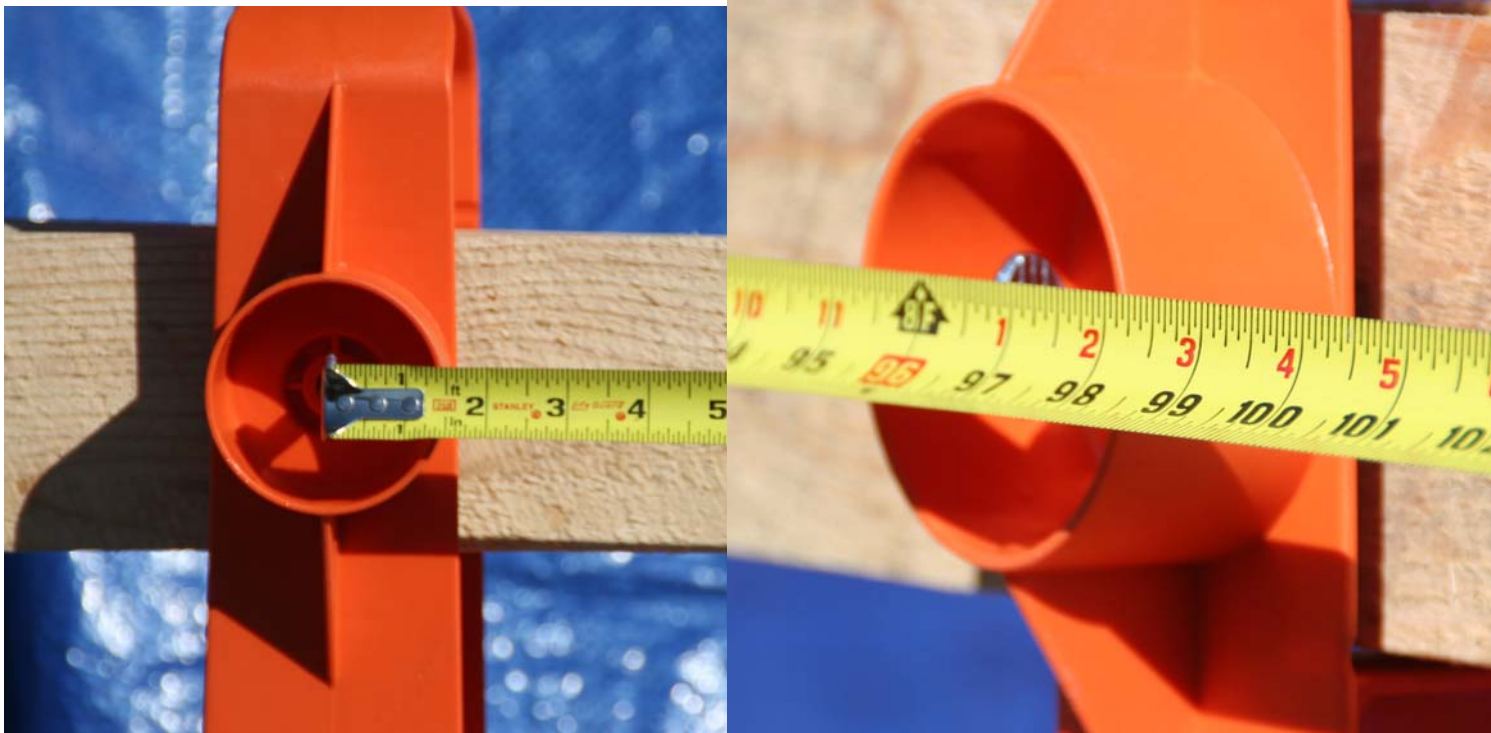


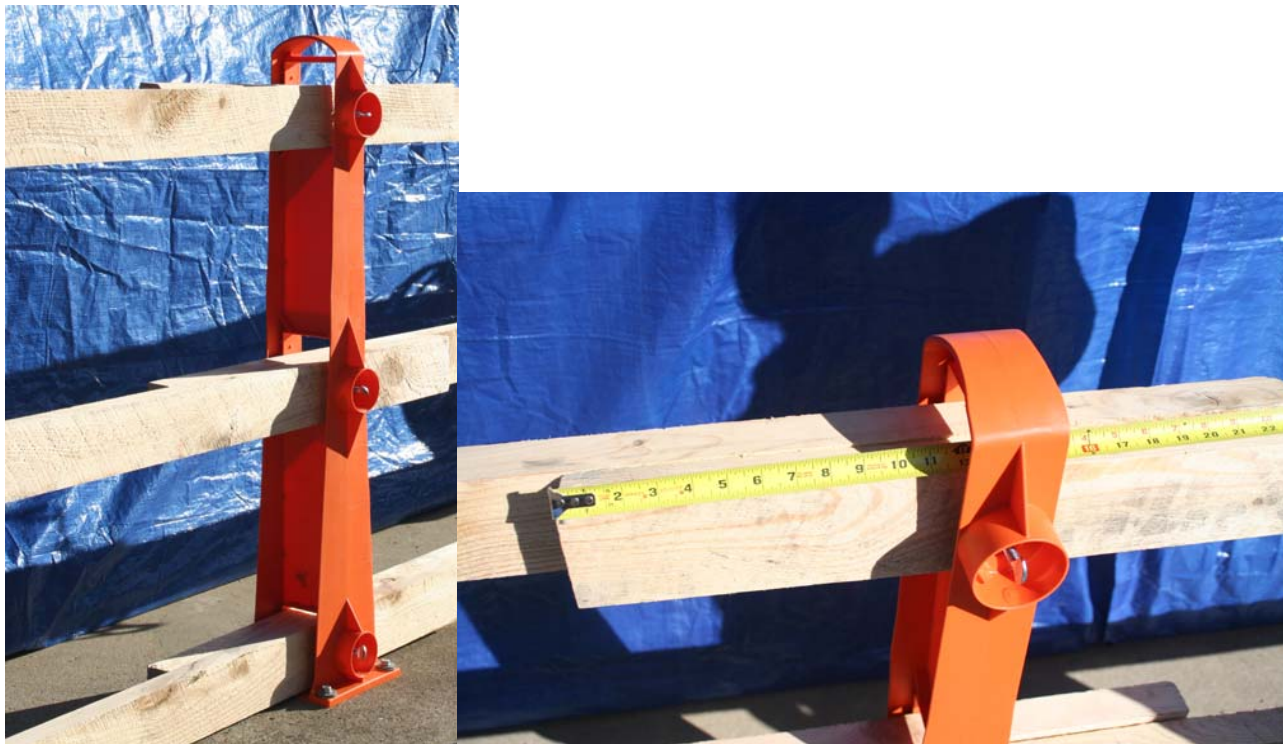
## 6.0 Set-up Pictures













## 7.0 Test conditions

All components were all to acclimate to the outside temperatures for 72 hours prior to testing. The temperature at the time of testing was 29° F and clear.



## Dynamic Measurement Systems

16515 Hedgcroft, Suite 320, Houston, TX, 77060 (281) 405-0606, Fax (281)405-0303

www.dynameasure.com

### CERTIFICATE OF CALIBRATION

#### PRODUCT INFORMATION

MANUFACTURER: Dillon  
MODEL #: 30006-0027  
CAPACITY: 1,000lbs.  
DESCRIPTION: AP Dynamometer  
UNIT SERIAL #: D31145

CALIBRATION DATE: 12-10-07  
DUE DATE: 6-10-08  
CALIBRATION TECH: E. Eldridge  
TEMPERATURE/HUMIDITY: 74/51  
MANUFACTURER'S ACCURACY:  $\pm$  .5% of Capacity

#### CALIBRATION DATA

EQUIPMENT READINGS (UNITS LB.)	(STANDARD) <u>AS RECEIVED</u> (UNITS LB.)	(STANDARD) <u>AFTER ADJUSTMENTS</u> (UNITS LB.)	<u>ERROR</u> (UNITS LB.)
200	200.6		+0.6
400	400.2		+0.2
600	602.0		+2.0
800	800.5		+0.5
1000	1000.0		+0.0

- Unit within tolerance, No adjustments required.  
 Recalibrated within unit accuracy specifications.

Parts replaced:

Comments: Initial calibration of rental unit.

#### THIS IS TO CERTIFY:

TEST WEIGHTS, LABORATORY CALIBRATING MACHINES AND/OR ELECTRONIC LOAD CELLS, USED IN THE CALIBRATION OF THIS EQUIPMENT HAVE BEEN CALIBRATED BY STANDARDS WITH ACCURACY TRACEABLE TO THE NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (N.I.S.T.). REFERENCE STANDARDS ARE CALIBRATED IN ACCORDANCE WITH ANSI/NCSL Z540-1-1994.

CERTIFICATIONS ON FILE, AVAILABLE FOR REVIEW AS NECESSARY.

#### CALIBRATION EQUIPMENT DATA

SYSTEM TYPE: DTM  
SYSTEM SERIAL#: K715646N  
SYSTEM CALIBRATION DATES: 8-20-07

LOAD RANGE: 2,000 lbs.  
CALIBRATION PROCEDURE: 1012  
SYSTEM CALIBRATION DUE DATE: 2-20-08

Technician, Eric Eldridge: 