

On Top Safety Fast Track Guard Rail System

Guard Rail Tests

Prepared For:

On Top Safety

600 Cayuga Creek Rd

Buffalo, NY 14227



Engineer of Record

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Encorus Project # 19010

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1.0 INTRODUCTION

This report details the tests that were done on the On Top Safety Fast-Track fall protection guard rail system. Several tests were performed to verify that the guard rail system meets the testing requirements of 29 CFR 1926.502, Fall Protection Systems Criteria and Practices. The tests were done to verify the integrity of the handrail system components (posts, cable, struts, baseplates, etc.) as designed. The tests were not intended to verify components such as bolts/screws that attach the system baseplate to a building. Components (bolts/screws) used to attach the system to a building, integrity of the building material that it is being attached to, and proper assembly of the system is the responsibility of the contractor. Refer to Attachment A for typical configuration of handrail system.

2.0 DESCRIPTION OF TESTS

All tests of the On Top Safety Fast-Track guardrail system were performed on a simulated flat roof edge where the railing system was attached as it would be in the field.

OSHA 1926.502(b)(3) requires that guardrail rail systems be capable of withstanding, without failure, a force of at least 200 lb. applied within 2" of the top edge, in any outward (horizontal) or vertical direction at any point along the top edge. The horizontal test required two separate pull tests to verify worst case loading conditions. The first test was to apply a 200 lb. horizontal outward force to the upper cable at the midpoint between two posts spaced 84" apart and verify that it did not fail. The second test was to apply a 200 lb. horizontal outward force to a single post and verify that it did not fail.

OSHA 1926.502(b)(4) requires that when the 200 lb. test load is applied in a downward direction, the top edge of the guardrail (cable) shall not deflect to a height of less than 39 inches above the walking/working level. The test was done by applying the 200 lb. vertical force to the upper cable at the midpoint between two posts spaced 84" apart. This is the worst-case loading for the configuration and would cause the greatest deflection. The upper cable was initially measured to be 42" above the simulated working/walking level prior to application of the force.

All pull tests were done using a come-along type winch attached in series to a calibrated load cell with electronic readout.

3.0 TEST RESULTS

3.1 Test Results – Horizontal Pull Tests

Test 1 – A 200 lb. horizontal force was applied to the upper cable at the midpoint between two posts spaced 84” apart. The force was applied in a direction towards the outside edge of the simulated roof. The system did not experience any failures upon application of and subsequent removal of the force.

Test 2 – A 200 lb. horizontal force was applied to the top of a single post in a direction towards the outside edge of the simulated roof. The system did not experience any failures upon application of and subsequent removal of the force.

3.2 Test Results – Vertical Pull Test

A 200 lb. vertical downward force was applied to the upper cable at the midpoint between two posts spaced 84”. The upper cable was initially measured at 42” from the simulated walking/working level. Upon application of the load, the cable deflected to a distance of 39 ½” above the simulated walking/working level.

4.0 CONCLUSIONS

4.1 Horizontal Tests

The horizontal pull tests were done to test the system in the worst-case situation with regards to loading in accordance with OSHA 1926.502(b)(3). In both cases (load at the midpoint of the rail/cable, load at the post), the handrail system successfully withstood the horizontal pull tests without failure of any of the handrail components. The handrail system therefore, successfully met the criteria of the OSHA Standard.

4.2 Vertical Test

The vertical pull test was done to test the system in the worst-case situation with regards to vertical loading. OSHA 1926.502(b)(4) states that the top edge of the guardrail (cable) must not deflect below 39” above the walking/working elevation when the 200 lb. vertical load is applied. When the vertical load was applied, the upper cable deflected to a measured distance of 39 ½” above the simulated walking/working surface, and therefore successfully met the criteria of the OSHA Standard.

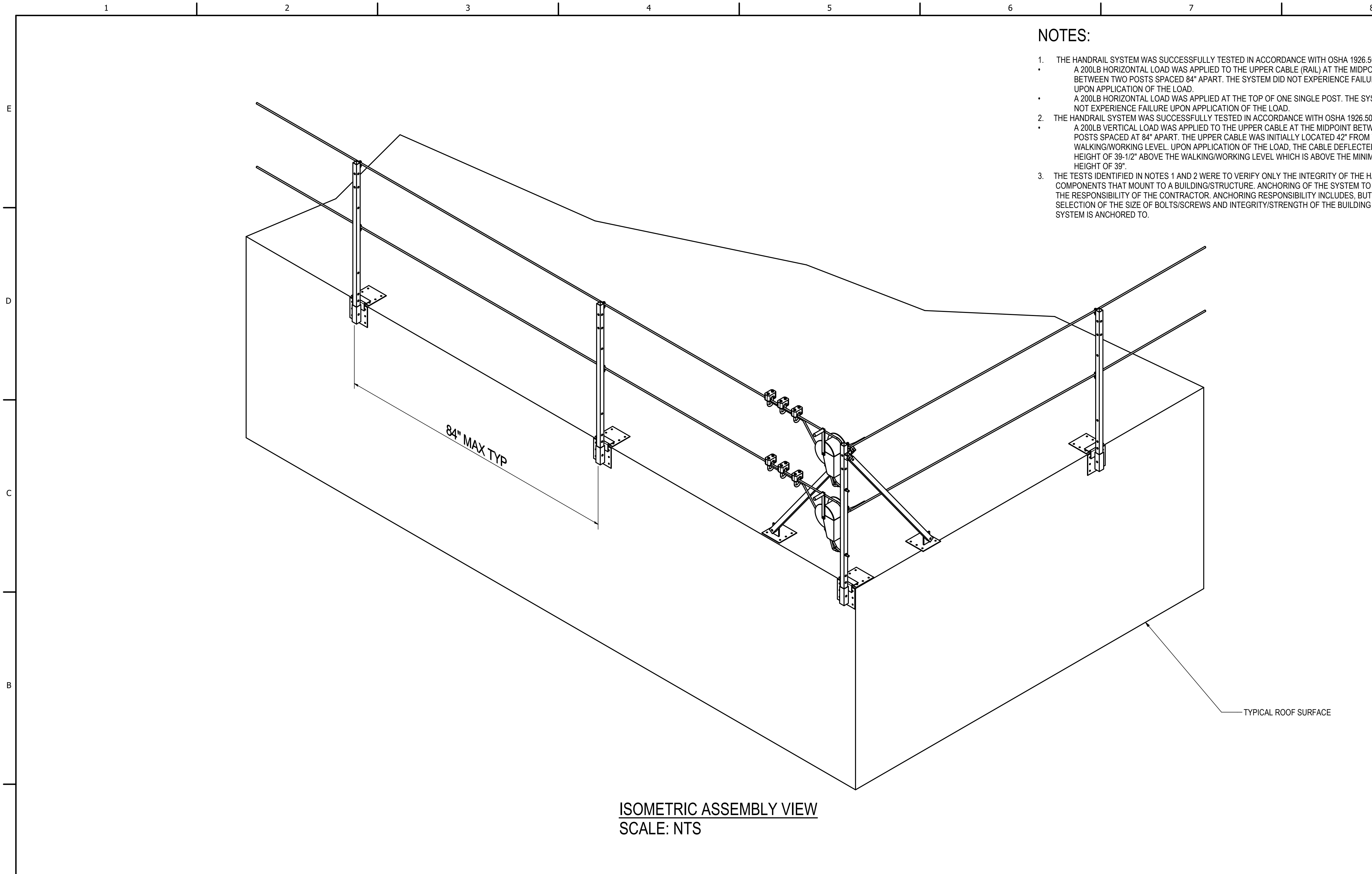
5.0 REFERENCES

1. OSHA 1926.502, Fall Protection Systems Criteria and Practices
2. Drawing S-801, Handrail Assembly.

ATTACHMENT A

Drawing S-801

On-Top Safety Fast-Track Guardrail System



ISOMETRIC ASSEMBLY VIEW
SCALE: NTS

NOTES:

1. THE HANDRAIL SYSTEM WAS SUCCESSFULLY TESTED IN ACCORDANCE WITH OSHA 1926.502(b)(3).
 - A 200LB HORIZONTAL LOAD WAS APPLIED TO THE UPPER CABLE (RAIL) AT THE MIDPOINT BETWEEN TWO POSTS SPACED 84" APART. THE SYSTEM DID NOT EXPERIENCE FAILURE UPON APPLICATION OF THE LOAD.
 - A 200LB HORIZONTAL LOAD WAS APPLIED AT THE TOP OF ONE SINGLE POST. THE SYSTEM DID NOT EXPERIENCE FAILURE UPON APPLICATION OF THE LOAD.
2. THE HANDRAIL SYSTEM WAS SUCCESSFULLY TESTED IN ACCORDANCE WITH OSHA 1926.502(b)(4).
 - A 200LB VERTICAL LOAD WAS APPLIED TO THE UPPER CABLE AT THE MIDPOINT BETWEEN TWO POSTS SPACED AT 84" APART. THE UPPER CABLE WAS INITIALLY LOCATED 42" FROM THE WALKING/WORKING LEVEL. UPON APPLICATION OF THE LOAD, THE CABLE DEFLECTED TO A HEIGHT OF 39-1/2" ABOVE THE WALKING/WORKING LEVEL WHICH IS ABOVE THE MINIMUM ALLOWABLE HEIGHT OF 39".
3. THE TESTS IDENTIFIED IN NOTES 1 AND 2 WERE TO VERIFY ONLY THE INTEGRITY OF THE HANDRAIL SYSTEM COMPONENTS THAT MOUNT TO A BUILDING/STRUCTURE. ANCHORING OF THE SYSTEM TO THE BUILDING IS THE RESPONSIBILITY OF THE CONTRACTOR. ANCHORING RESPONSIBILITY INCLUDES, BUT IS NOT LIMITED TO, SELECTION OF THE SIZE OF BOLTS/SCREWS AND INTEGRITY/STRENGTH OF THE BUILDING MATERIAL THAT THE SYSTEM IS ANCHORED TO.



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CLIENT:

ON-TOP SAFETY

ON-TOP SAFETY FAST-TRACK SYSTEM

PROJECT:

REVISIONS:

REV	DESCRIPTION	DATE	DFTR	CHKR
0	RELEASED	03/15/19	VAR	DMP

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 DRAFTER: VAR
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 ENGINEER: DMP
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DRAWING TITLE:

HANDRAIL ASSEMBLY

DRAWING NUMBER:

S-801