70758-TDE-01

OSHA 1926.502 (B) COMPLIANCE

TIMOTHY AMMONS

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Background Information:

The NextGen 3000 Guardrail system tested consisted of two 10’ tubular steel rail sections, five steel bases referred to as Zip Bases, and two 5’ tie back tubular steel rail sections installed perpendicular to the main guardrail. The Zip Bases weigh approximately 58lbs each.

Guardrail System Description:

The portable guard rail system consisted of the following components:

- Guardrails (4)
  - Height of top rail: 44 inches
  - Width of sections: 10 feet and 5 feet
  - Height of intermediate rail: 22 inches
  - Construction: 1.66” OD 14 ga smooth steel pipe
- Bases (5)
  - Weight: 58lbs each
  - Construction: Plate steel

Test Procedure:

For testing the two 10’ sections were placed into three bases. Two tie backs using the 5’ rail sections were placed at either end of the guardrail section perpendicular to the running face of the longer sections. Two additional bases were installed to support the opposite end of the 5” tie backs. The rail sections were then pinned into the bases as required in the owner’s manual.

Top Rail Testing

A horizontal tensile load of 200lbs was applied incrementally and perpendicular to the plane of the guardrail with the tensile load and horizontal deflection measured at each incremental load. A ratchet puller fixed at one end and a calibrated load cell inline was used to apply the load and record the load respectively. Horizontal loading was performed at the end of the guardrail near the vertical support and mid-span of the guardrail.

A vertical tensile load of 200lbs was applied incrementally in a downward motion utilizing a pulley affixed to the floor, ratchet puller fixed at one end, and a calibrated load cell placed inline. The tensile load and the vertical deflection were then measured at each incremental load. Vertical loading was performed at the end of the guardrail near the vertical support and mid-span of the guardrail.

Intermediate Rail Testing

A horizontal tensile load of 150lbs was applied incrementally and perpendicular to the plane of the guardrail with the tensile load and horizontal deflection measured at each incremental load. A ratchet puller fixed at one end and a calibrated load cell inline was used to apply the load and record the load respectively. Horizontal loading was performed at the end of the guardrail near the vertical support and again mid-span of the guardrail.

A vertical tensile load of 150lbs was applied incrementally in a downward motion utilizing a pulley affixed to the floor, ratchet puller fixed at one end, and a calibrated load cell placed inline. The tensile load and the vertical deflection were then measured at each incremental load. Vertical loading was performed at the end of the guardrail near the vertical support and again mid-span of the guardrail.

Test Results:

The results of the tests described in this report indicate that the portable guardrail system tested was found to comply with OSHA regulations:

Standard Number: 1926.502

Standard Title: “Fall protection systems criteria and practices.”

Subpart: M

Subpart Title: “Fall Protection”

1926.502 (b)(1)

Top edge height of top rails, or equivalent guardrail system members, shall be 42 inches (1.1m) plus or minus 3 inches(8cm) above the walking/working level.

Test results indicate top rail height is 44 inches above walking/working level.

1926.502 (b)(2)

Mid-rails, 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 (53cm) high.

Test results indicate mid-rail height is 22 inches above walking/working level.

1926.502 (b)(2)(i)

Mid-rails, when used, shall be installed at a height midway between the top edge of the guardrail system and the walking/working level.

Test results indicate mid-rail is midway between top edge of the guardrail and the walking/working level.

1926.502 (b)(3)

Guardrail systems shall be capable of withstanding, without failure, a force of at least 200 pounds (890N) applied within 2 inches (5.1cm) of the top edge, in any outward or downward direction, at any point along the top edge.

Test results indicate the top rail can withstand a 200lb load in both the vertical and horizontal directions anywhere along its length.

1926.502 (b)(4)

When the 200-pound (890N) test load specified in the 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 (1.0m) 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.

Test results indicate top rail deflected to 43.14 inches under the 200lb vertical load.

1926.502 (b)(5)

Mid-rails, 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 (666N) applied in any downward or outward direction at any point along the mid-rail or other member.

Test results indicate the mid-rail can withstand a 150lb load in both the vertical and horizontal directions anywhere along its length.

Conclusion:

The conclusions contained in this report represent our professional opinions, based upon our interpretations of the test results, and OSHA regulations. These opinions were arrived at in accordance with currently accepted engineering practices at this time and location.

References:

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