

**DYNAMIC LOAD TESTING OF SAFE-T-STRAP ANCHOR ATTACHED TO A
RESIDENTIAL TIMBER TRUSS FOR THE ATTACHMENT OF FALL ARREST
EQUIPMENT OF ROOFERS**

***Original report dated November 22, 2002- Revised May 22, 2013 to clarify the test
results.***

Prepared for:
SAFE-T-STRAP
333 Frankcom Str.
Ajax, Ontario L1S 1R4

Prepared by:



Ralph Balbaa, M.Eng., P.Eng.,
HITE Engineering Corporation
May 22, 2013

"Authorized by the Association of
Professional Engineers of Ontario to
provide professional engineering services."



Professional Engineers
Ontario

Report of Finding- Revised May, 2013.docx
Page 1 of 7

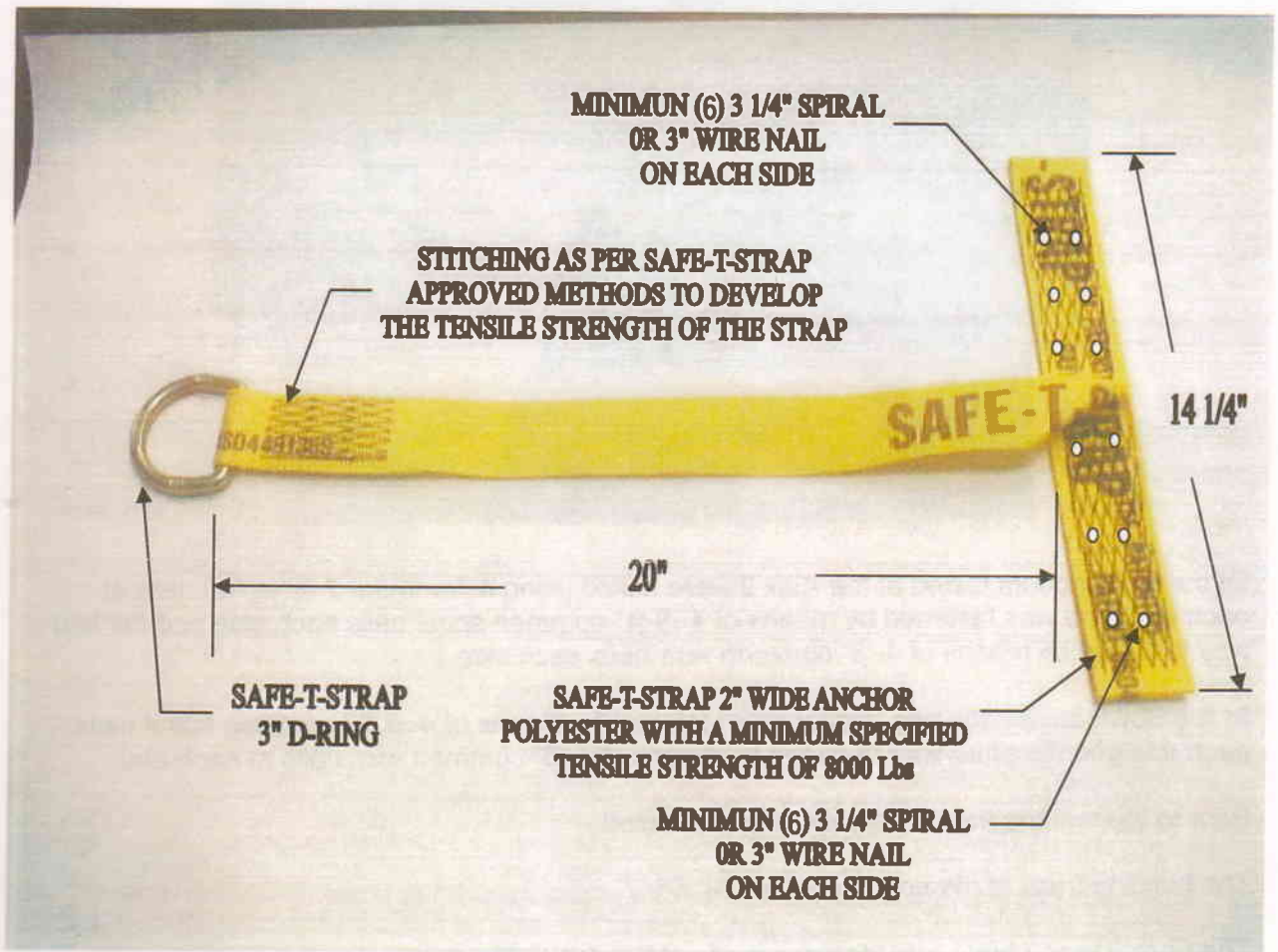
2660 Meadowvale Blvd., Unit 2
Mississauga, Ontario L5N 6M6
Tel: 905-812-3709
Toll Free: 1-877-360-0015
Fax: 905-812-3710
www.hite-engineering.co

1- Purpose of Test

The purpose of the load test was to determine whether a 2" wide safety strap anchor nailed to the top chord of a residential truss through the plywood sheathing at the truss ridge, would sustain the fall arrest forces of a worker attached to the anchor strap.

The testing was conducted on two residential construction sites in Ajax and Bowmanville, Ontario on Thursday November 7 & 14, 2002.

2- Anchor Specifications & Details



3- Test Set-Up & Procedure

At the Ajax site, 4 anchor straps were tested. These were tested by applying a force in a direction parallel to the nailed strap and the tests were repeated on the same anchors with the force applied in a perpendicular direction.

At the Bowmanville site, 2 anchors were tested in a direction perpendicular to the strap. At both test sites, a total of six Safe-T-Strap anchors were tested.

The anchors were nailed to the 2 x 4 top chord a residential truss through the plywood sheathing at the ridge.



Of the four anchors tested at the Ajax 2 were nailed using 4 common- 2 ½" spiral nails at each end, one was fastened by means of 4 - 3 ¼" common spiral nails each side and the last was fastened by means of 4- 3" common wire nails each side.

At the Bowmanville site one anchor was fastened by means of 4- 3 ¼" common spiral nails each end and the other was fastened by means of 4- 3" common wire nails at each end.

Prior to the test the framing system was inspected.

The building truss at the ridge spanned 28' 6"

The truss top and bottom cords were made of 2 x 4 SPF No. 2 nailed to the edge beam by means of 3- 3 1/4 spiral nails.

Ensuring Safety through Engineering

A typical 4 x 8 plywood sheathing was nailed down to the trusses by 30- 3 1/4" spiral nails, although some of the nails had missed the truss chord.



A Dynafor LCD Load Indicating Device- E98257 rated for 5Ton was attached to the D-Clip at the end of the anchor to measure the peak fall arrest force.. this in turn was attached to a chain the end of which was attached a 225 lb rigid mass



Ensuring Safety through Engineering

A forklift raised the loads to the point where there was a measured 4' slack in the chain.

The weights were then allowed to free-fall a distance of 4'.



The first series of tests were conducted where the Strap was perpendicular to the two nailed flaps, followed by testing the anchor straps in a direction parallel to the nailed anchor strap.

Ensuring Safety through Engineering
Test Direction



TEST 1
Load Perpendicular to nailed strap



TEST 2
Load Parallel to nailed strap

TEST RESULTS:

At the Ajax site, those tested with the load free-falling the perpendicular direction, no signs of failure or distress was exhibited.

The average force registered on the dynamometer was 850 lbs.

The force registered on the dynamometer is a fraction of the actual force applied to the strap by the free falling 250 lb. mass a distance of 4'. This is due to the shock absorbing feature of the strap. The strap itself has a capacity of supporting 8000 lbs. without failure.

Repeating the tests with the load free falling in a perpendicular direction to the nailed strap, the 2 1/2" spiral nails pulled out.

Those nailed by means of 3 1/4" common spiral or 3" wire (smooth) common nails had two nails securing the anchor pull out some 1/4- 1/2", there was some tearing of the stitches but the anchor remained in place.

It was decided to repeat the perpendicular force tests.

On November 14, 2002, two additional anchors were tested. These were nailed to the top chord by means of 6- 3" common wire nails at each end and 6- 3 1/4" common spiral nails at each end. The load was allowed to free-fall in the perpendicular direction. Here again, two nails pulled out some 1/4 -1/2" but the anchors remained in position.

2660 Meadowvale Blvd. Unit 2
Mississauga, Ontario L5N 6M6
Tel: (905) 812-3709
Fax: (905) 812-3710

"Authorized by

Professional Eng



Professional Engineers
Ontario
provide professional engineering services



4- Conclusion

- 1- A safety strap anchor nailed as specified (Minimum 6 x 3 1/4" spiral nails or 6 - 3" smooth nails to the top chord of a timber residential roof truss at the ridge will safely sustain the forces generated by the fall of a worker on the roof attached to the anchor strap.
- 2- Only one anchor must be attached to a truss top chord. The truss must be designed in accordance with Ontario Building Code or other approved Codes and installed in accordance with the requirements of section 9 of the Ontario Building Code or other approved Codes.
- 3- Ensure that the anchor is properly nailed to the truss top chord. A competent worker must ensure proper connection of the anchor to the truss top chord before the anchor is used.
- 4- A worker attached to the Safe-T-Strap must be wearing a full body harness equipped with a shock absorber or shock-absorbing lanyard.
- 5- Ensure that the distance below the worker is sufficient and clear of obstructions to allow the worker's arrest without impacting the floor beneath or any object.