On Top Safety Equipment
Personal Fall Arrest Drop Tests

Test Numbers: Drop Tests # 1
Drop Tests # 2
Drop Tests # 3
Drop Tests # 4
Drop Tests # 5
Drop Tests # 6
Drop Tests # 7

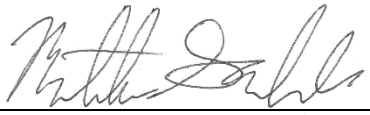
Report Date: February 8, 2017

Test Dates: January 25, 2017

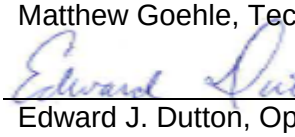
Test Conducted By:
Calspan Corporation
4455 Genesee Street
Buffalo, New York 14225
716.632.7500
1.800.CALSPAN

DISCLAIMER

The contents of this report relate only to the specific product evaluated under the specific test conditions, as defined within this report. The findings and conclusions are those of the author(s) and not necessarily those of Calspan Corporation. For the purposes of this report, Calspan Corporation provided test services only and was not involved with the consulting, design or manufacture of any product. Calspan Corporation does not endorse products or manufacturers. Further, Calspan Corporation (to include: any of its affiliates, parent companies or subsidiaries) assumes no liability associated with the contents of this report or the use of this report.

Prepared by:  Date: February 8, 2017

Matthew Goehle, Technical Solutions Manager

Approved by:  Date: February 8, 2017

Edward J. Dutton, Operations Manager
Transportation Test Operations

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SECTION 1

PURPOSE AND SUMMARY OF TEST

PURPOSE

To conduct drop tests on an On Top Safety Equipment “Eagle Claw Safety Cart” and collect data from a tether load cell in order to test OSHA Fall Arrest 29 CFR 1926.502(d) compliance and compare the dynamics of the various fall scenarios.

SUMMARY

An Eagle Claw safety cart, manufactured by On Top Safety Equipment, was tested by Calspan staff at 600 Cayuga Creek Road, Buffalo, NY 14227. The tests used a combination of 2 Hybrid II 50th Percentile Male ATDs (crash test dummies) dropped to simulate an employee fall.

A total of seven tests were conducted, to test various fall scenarios, measure the load difference with and without the use of the Eagle Claw damping system, test beyond the requirements of CFR 1926.502(d), and measure the load difference with a competitor’s safety cart.

The ATDs, serial number 171 and 101, respectively weigh 167lb and 164lb and intend to simulate anthropomorphic mass and drop dynamics. They were secured using CFR 1926.502 approved harnesses, and 9/16inch diameter cables 23.5ft long for drop scenarios where the cable extended 90 degrees from the cart direction, and 29.5ft long when the cable extended at 45 degrees from the cart direction.

A calibrated Lebow 3132 load cell was secured between the cart and the cable to measure dynamic loads. Data was acquired at 10kHz through a calibrated Kistler KiDAU. Video of the ATD and safety cart was captured at 1000fps from 2 DTS NXAir-4 high speed cameras.

SECTION 2

TEST RESULTS

Drop #	ATD 1 Serial Number	ATD 2 Serial Number	Total ATD Weight (lb)	Drop Height (ft)	Angle (deg)	Cart Setup	Arresting Force (lb)
1	101	N/A	164	10	90	EagleClaw with Damper	**1325.96**
2				10	90	EagleClaw without Damper	**1601.81**
3		171	331	6	90	EagleClaw without Damper	**1876.65**
4				6	90	EagleClaw with Damper	**1715.40**
5				12	45	EagleClaw with Damper	**1949.64**
6				6	45	EagleClaw with Damper	**1771.65**
7		N/A	164	10	90	AES Rapter R1000	**1525.66**

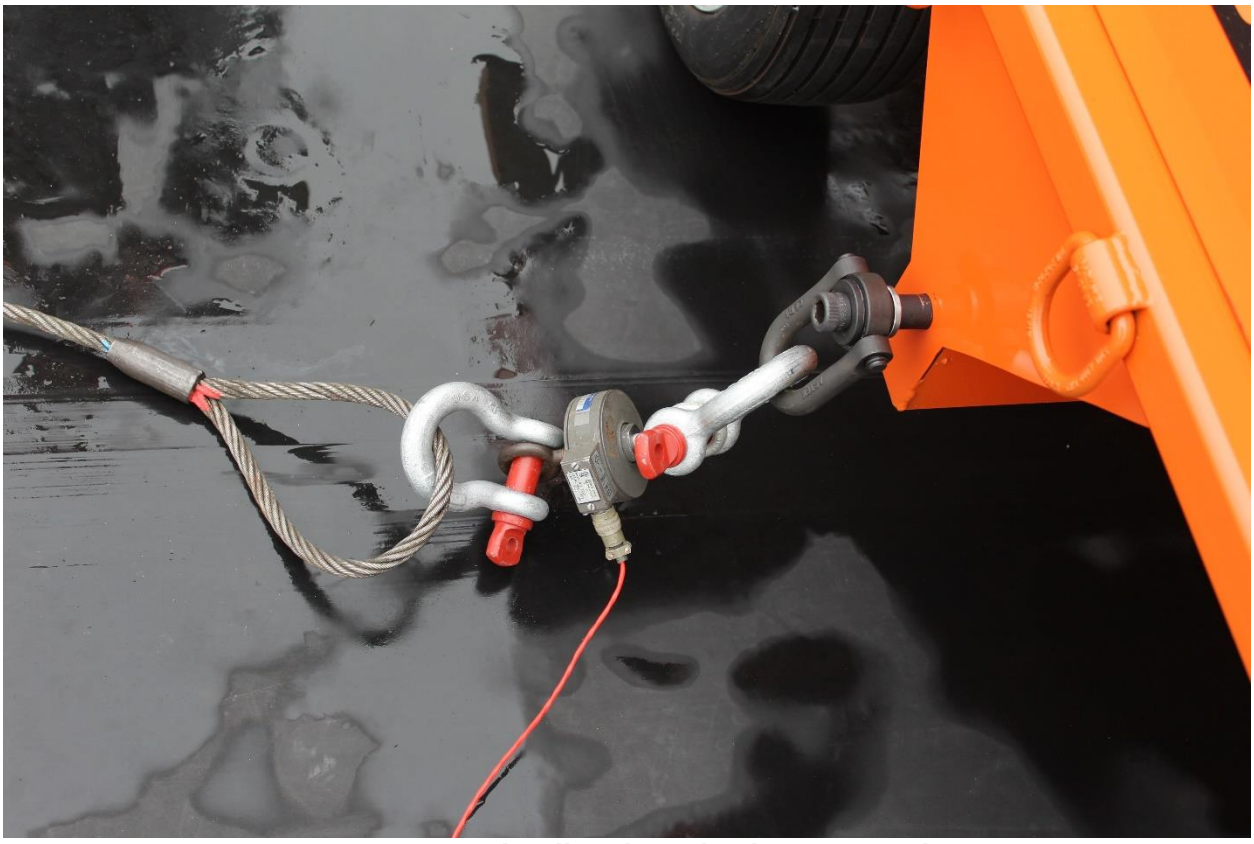
Comparing drop #1 and #2 calculates the EagleClaw damper reduced the arresting force by 275.86lb.

Comparing drop #1 and #7 calculates the EagleClaw with damper reduced the arresting force by 199.70lb from the AES Rapter R1000 cart.

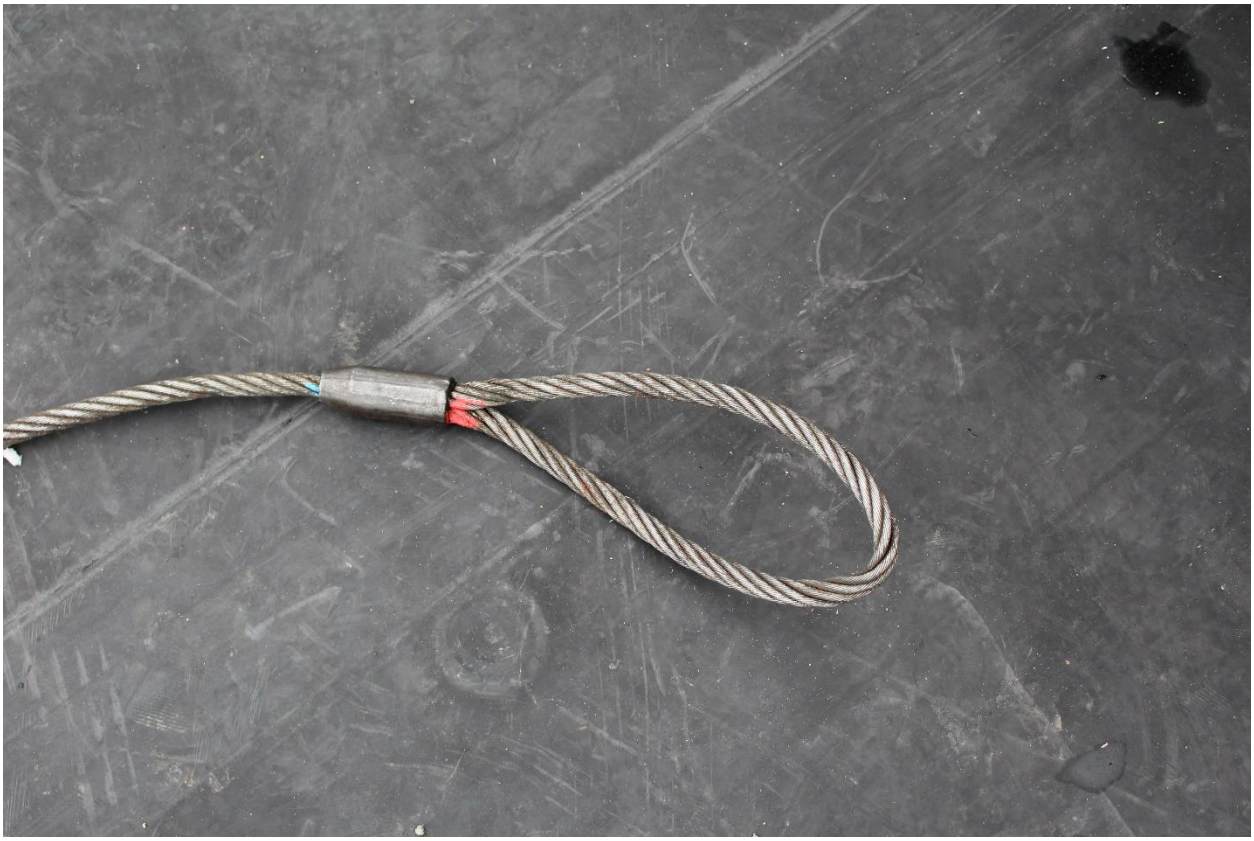
Drop test #4, dropped 331lb dummy weight, 6 feet, resulting with an arresting force of 1715.40lb. This drop shows that, when used in conjunction with appropriate harness and cabling system, and properly positioned safety cart, the EagleClaw safety cart exceeds the OSHA Fall Arrest requirements to “limit maximum arresting force on an employee to 1,800 pounds (8 kN) when used with a body harness”.

APPENDIX A

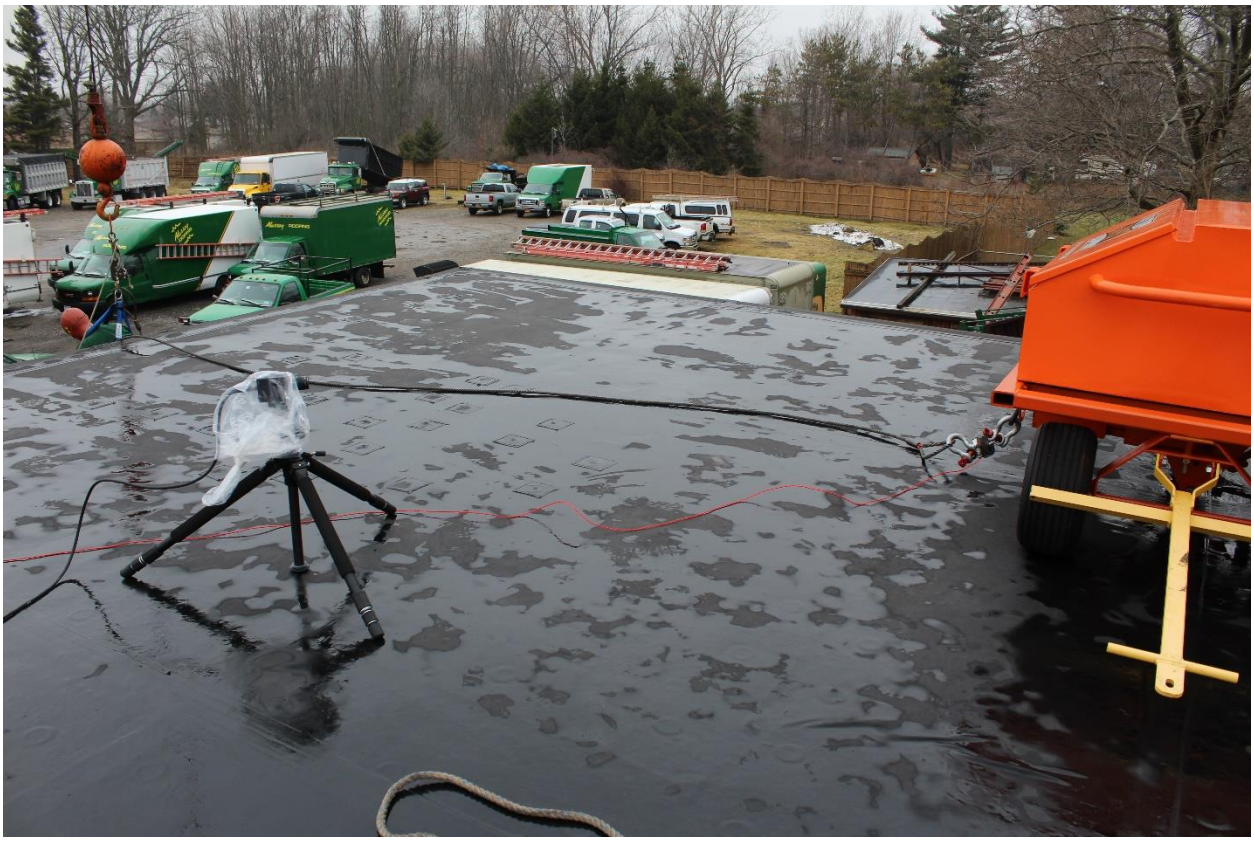
PHOTOS



Test Setup: Load Cell and Cart/Tether Connections



Test Setup: Cable Tether Swage



Test Setup: Camera and Roof Locations

Test Setup: EagleClaw Safety Cart Photo 1

Test Setup: EagleClaw Safety Cart Photo 2 Engaged

Test Setup: EagleClaw Safety Cart Photo 3 Engaged

Test Setup: EagleClaw Safety Cart Photo 4 Engaged

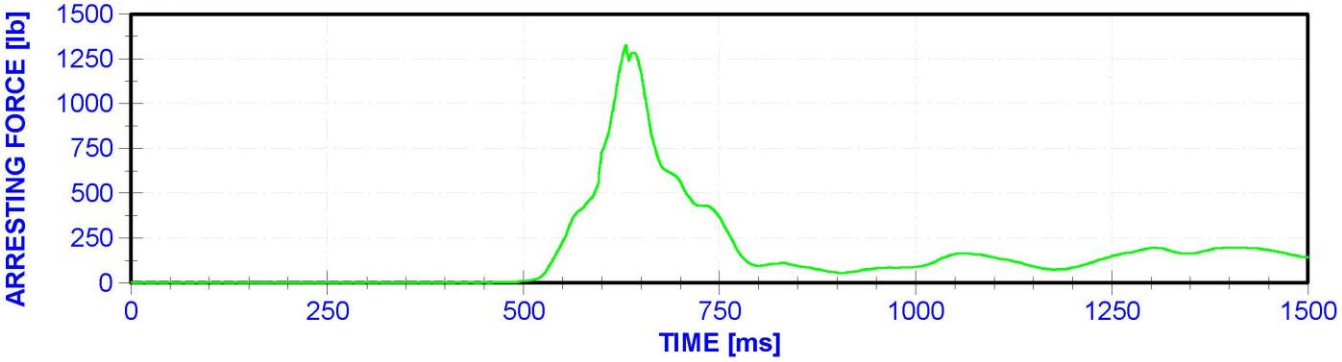
Test Setup: EagleClaw Safety Cart Photo 5

APPENDIX B

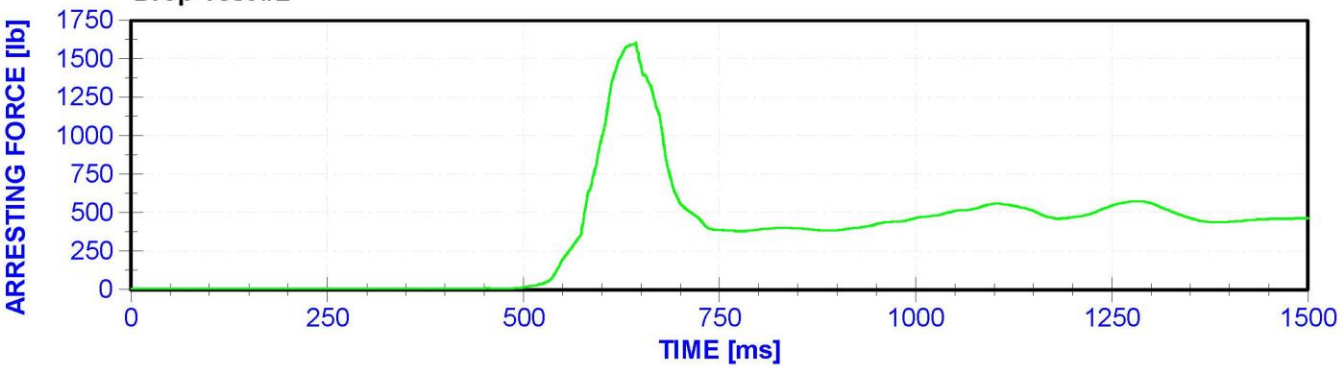
DATA PLOTS

Table of Data Plots

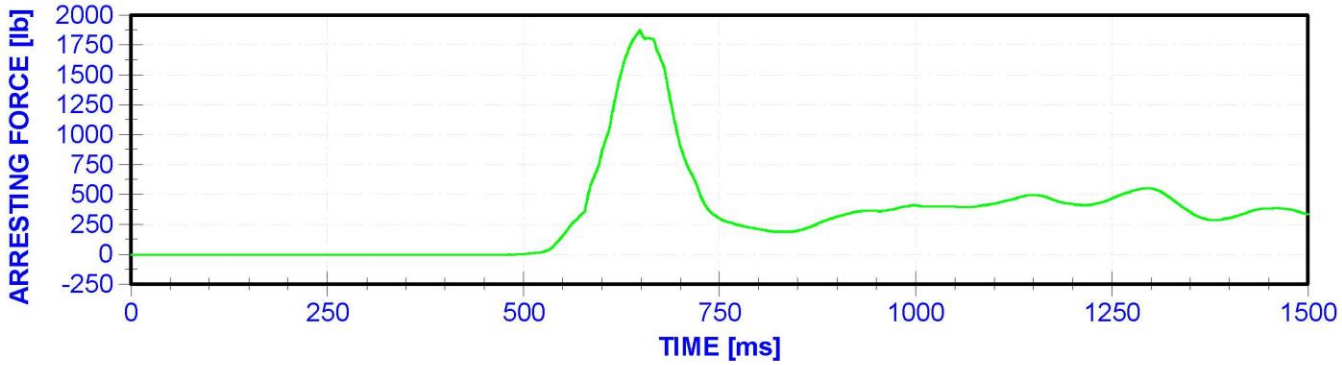
Drop Test #1



Drop Test #2



Drop Test #3



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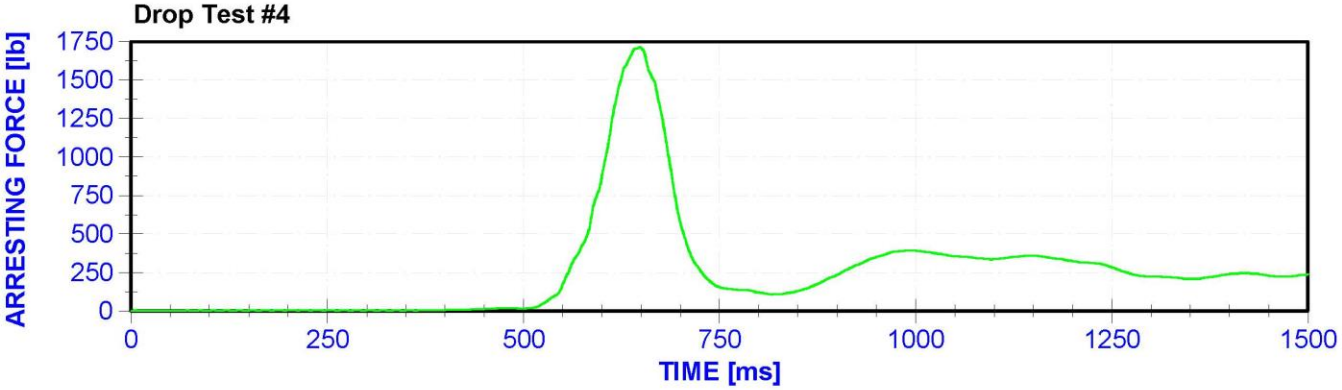

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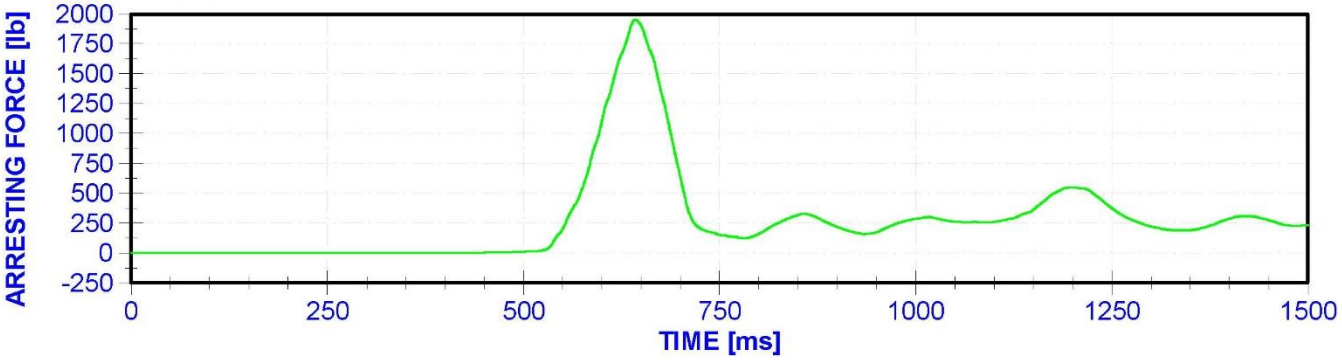

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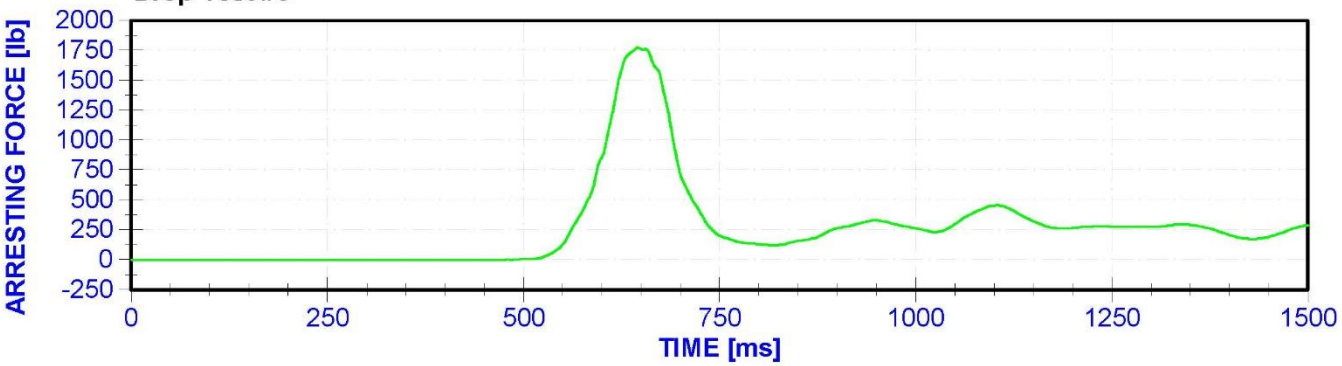

Drop Test #7