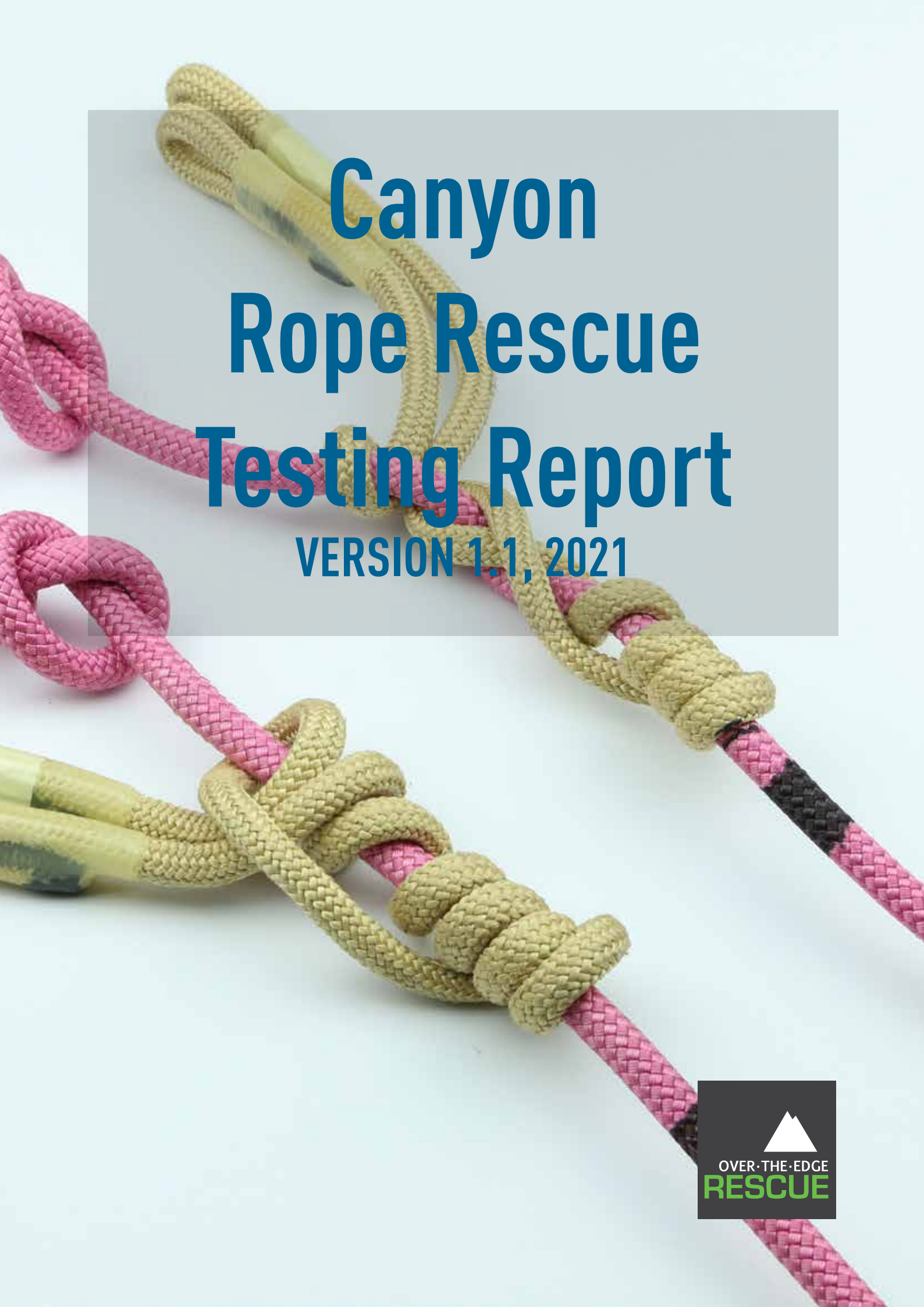

Canyon Rope Rescue Testing Report

VERSION 1.1, 2021

OVER·THE·EDGE
RESCUE

Canyon Rope Rescue Testing Report

Version: 1.1 , 2021

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Publisher: Over the Edge Rescue
https://overtheedgerescue.com

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The NZ Canyoning Association is the national organising body for recreational canyoning in New Zealand. NZ Canyoning Association mission is to protect our canyons, raise the awareness of our canyoners and grow the sport of canyoning in New Zealand safely. The NZ Canyoning Association is a non-profit, incorporated society run by volunteers. The NZ Canyoning Association operates Canyon Search and Rescue (CanyonSAR) on behalf of NZ LandSAR.

https://nzcanyoningassociation.org

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Introduction

In February 2019, a team of people from the NZ Canyoning Association got together for a weekend to discuss setting up CanyonSAR for New Zealand (as a specialist discipline under New Zealand Land SAR).

As part of this weekend, we discussed and practised rope rescue in the canyoning context with training as a focus.

Out of this discussion and practice came:

- The types of rope rescues we were likely to do?
- Who are the rescuers, their experience level and how many are likely to be on a team?
- The techniques we are likely to use, based on the types of rescue.
- The equipment used based on what canyoners have with them is flexible for all the techniques.
- Based on risk assessment in a canyon context, the critical rescue principles include the types of rope rescues, the rescuers, techniques, and equipment.

In October 2019, we undertook some initial testing before rolling out Canyon Rescue courses throughout New Zealand. After the courses, there were more questions and a process of filling in the gaps of knowledge. Over the rest of 2019, 2020 and 2021, we undertook several more rounds of testing to confirm further the suitability and define the edges of the system we were using.

Overall, 220 tests were undertaken with over 400m of rope and lots of devices destroyed.

We had funding supported by New Zealand Land Search and Rescue Training Limited and the New Zealand Canyoning Association (NZCA) project support.

Objectives

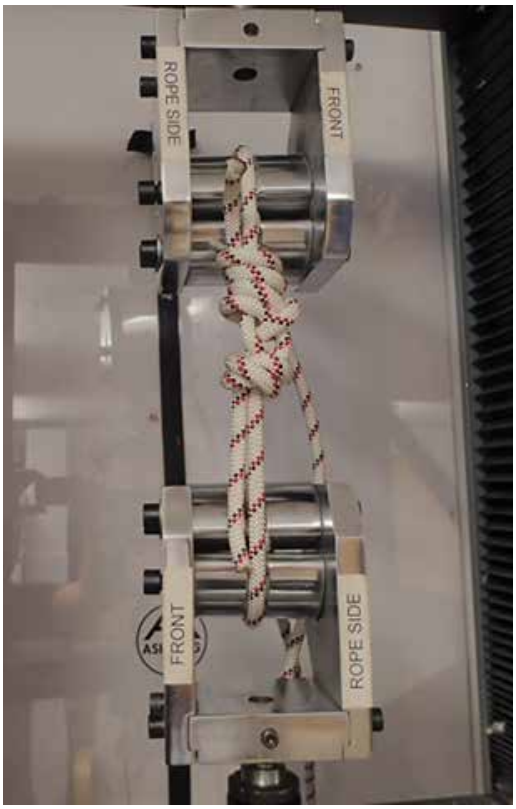
The objectives of this testing were to:

- To confirm the combination of the current equipment and techniques used have sufficient safety margin.
- To provide reference information for both rescuers and instructors to give confidence in the systems used.

Methods and Materials

Methods

General setup methods



- New rope, webbing and cord were used for the testing.
- All mechanical devices tested were new. After each test, inspected, and if not damaged, reused for the next test.
- All knots, bends and hitches had hand tension with all strands pulled tight.

Slow pull tests

- Each testing series records the slow pull tests set up (see Appendix 1-5).
- The slow pull testing was in one location:
  - Aspiring Safety, 1/6 Burdale Street, Riccarton, Christchurch, New Zealand.
  - https://www.aspiring.co.nz/
- Vertical testbed 1.6m Electronic Universal Testing Machine, Model WDW-100
  - Maximum Test Force 100kN
  - Sample rate 60 per second
  - Jinan Chuanbai Instrument Equipment Co Ltd

Friction testing

Each testing series records the friction tests set up (see Appendix 1-5).

Testing was undertaken at Aspiring Safety vertical testbed as detailed above.

Each test recorded:

- The First slip is thumb/finger holding.
- Limiting friction is max one gloved dominant hand holding the rope.
- The glove used was Razor X 500 (pictured to the right).

Drop testing

Each testing series records the drop tests set up (see Appendix 1-5).

The drop testing occurred at Over the Edge Rescue, 55 Mckenzie Street, Geraldine, New Zealand. https://overtheedgerescue.com

- Testing used two Rock Exotica Load Cells.
  - Fast mode: 500 samples/second,
  - MBS: 36 kN, Max Reading: 20kN,
  - Accuracy: +/- 2%,
  - Certification: CE.
  - https://www.rockexotica.com/enforcer-load-cell
- Test mass contained in 2 x 70 litre PVC bags (Aspiring Safety) filled with five bags of 20kgs of gravel. The test mass is secured into each bag and, so it couldn't shift during testing. When testing with a 200kg mass, the bags are attached at the base.
- The load release is a three-ring device (Access Gear, see below), resulting in a smooth drop.
- Both single rope and two rope systems were tested in lowering mode (load capture in behind with lowering device in front) and raising mode (load capture only).
- In general, a drop test was a 200kg mass 1m drop on 3m of rope with the ideal of less than 1m additional travel and less than 12kN of force. Other drop tests were undertaken and are detailed in Appendix 1-5.

Materials

Kordas 10mm Dana rope

- Static elongation: 3.8% (150kgs)
- Materials: Core/Sheath – Nylon/ Nylon
- Manufacturer: www.sacidkordas.com
- Weight: 63 g/m
- Breaking strength: 27kN
- Standards: EN 1891:1998, type A

PMI 10mm classic sport rope

- Static elongation: 2% (140kgs)
- Materials: Core/Sheath – Nylon/ Nylon
- Manufacturer: PMI – www.pmirope.com
- Weight: 66 g/m
- Breaking strength: 27kN
- Standards: CI 1801 static rope

PMI 8mm accessory cord

- Materials: Core/Sheath – Nylon/Nylon
- Manufacturer: PMI – www.pmirope.com
- Breaking strength: 14.3kN
- Standards: EN 564 Accessory Cord

Edelrid 25mm tubular webbing

- Brand/Model: Edelrid/X-Tube
- Materials: Nylon
- Manufacturer: www.edelrid.de
- Weight: 43 g/m
- Breaking strength: 20kN
- CE marking: 1019

Aspiring 16mm tubular webbing

- Brand/Model: Aspiring/Tubular webbing
- Materials: Nylon
- Brand: Aspiring Safety – www.aspiring.co.nz
- Weight: 34 g/m
- Breaking strength: 12.5kN
- Standards: Complies with EN 565

CT Dynamic 8.2mm Rope Sling (sewn)

- Elongation: 35 %
- Materials: Nylon/Nylon
- Rope manufacturer: CT 8.1mm route rope dynamic half/twin
- Standards Dynamic Rope: CE 1019, EN 892:2012, UIAA
- Weight: 46 g/m
- Breaking strength: 22kN
- Sling tested to EN 566:2017
- Sling Manufacturer Aspiring Safety: aspiring.co.nz

Petzl Basic

- Rope compatibility: 8 to 11 mm
- Manufacturer: Petzl – www.petzl.com
- Weight: 85 g
- Certification(s): CE EN 567, UIAA

Petzl Micro Traxion

- Sheave type: sealed ball bearings
- Sheave diameter: 25 mm
- Working load: 2 x 2.5 = 5 kN
- Breaking strength as progress capture: 4 kN
- Rope compatibility: 8 to 11 mm
- Weight: 85 g
- Breaking strength: 2 x 7,5 = 15 kN
- Certification(s): CE EN 567, UIAA
- Efficiency: 91 %
- Manufacturer: https://www.petzl.com

Petzl Tibloc

- Rope compatibility: 8 to 11 mm
- Manufacturer: https://www.petzl.com
- Weight: 35 g
- Certification(s): CE EN 567, UIAA
- Breaking strength as a rope grab: 4-7.6 kN (depending on rope type/diameter)
- Carabiner compatibility: all Petzl models except SPIRIT

Petzl Huit

- Material: aluminium
- Breaking strength: 25kN
- Rope compatibility: 8 to 13mm
- Weight: 100 g
- Manufacturer: https://www.petzl.com
- Working load limit: 100kg

Aspiring 8mm VT Prusik

- Breaking strength: 22kN
- Standards: EN 566:2017, ITCC 2.2.22
- Material: Kevlar/Polyester sheath, Dyneema core
- Manufacturer: aspiring.co.nz

BlueWater 7mm VT Prusik

- Breaking strength: 22.6kN Basket
- Manufacturer: bluewaterropes.com
- Material: Technora sheath, Nylon core

BlueWater 8mm VT Prusik

- Breaking strength: 29.5kN Basket
- Manufacturer: bluewaterropes.com
- Material: Technora sheath, Nylon core

Results

Kordas 10mm Dana

Slow pull tests (100mm/minute)

Items tested	Av. kN	# Tests	Comment	Appx. 1
Figure-eight on a bight knot	19.53 (72%)	5	Broke at the knot	pg. 24
Alpine butterfly knot	18.19 (67%)	3	Broke at the knot	pg. 27
Bowline knot	15.94 (59%)	3	Broke at the knot	pg. 30
Figure-eight rethread bend	16.37 (60%)	5	Broke at the bend	pg. 33
Bluewater 8mm VT 6-on-1 Prusik	17.96	3	First slip 11.89kN, broke rope at figure-8 on a bight (2) and kept on slipping (1)	pg. 36
Bluewater 8mm VT 5-on-1 Prusik	10.82	3	First slip 9.27kN, kept on slipping	pg. 39
Bluewater 7mm VT 6-on-1 Prusik	16.10	3	First slip 13.39kN, several major slips then stripped sheath of 10mm rope	pg. 42
Petzl Shunt single rope	3.04	3	First slip 2.5kN, kept on slipping	pg. 45
Petzl Shunt double rope	6.89	3	Didn’t slip, ropes came out of device (spread open), damaged sheath both ropes 50% cam side.	pg. 45
Petzl Micro Traxion	5.76	3	Stripped sheath of rope	pg. 50
Petzl Tibloc	7.64	3	Stripped sheath of rope	pg. 53
Petzl Basic	6.35	3	Stripped sheath of rope	pg. 56
Biner block	16.31 (60%)	3	Broke the rope at the 8mm rapide	pg. 59
Munter mule overhand	15.35 (57%)	3	Broke at the rope at the first cross of the Munter	pg. 62
Figure-8 device block v3	16.12 (60%)	3	Broke the rope at the 8mm rapide	pg. 65
Figure-8 device in front of 8mm VT Prusik 6-on-1	17.33	3	Broke(1) and bent(2) small eye of the Petzl Huit figure-8 device	pg. 68

Friction tests (100mm/minute)

Items tested	First Slip	Limiting friction	Comment	Appx. 1
Figure-8 device canyon style low friction	0.31	0.61	1 test, max 1 gloved hand	pg. 71
Figure-8 device canyon style high friction	0.81	1.32	1 test, max 1 gloved hand	
Figure-8 device canyon style low friction + redirect carabiner	0.40	1.21	1 test, max 1 gloved hand	
Figure-8 device canyon style high friction + redirect carabiner	1.02	2.32	1 test, max 1 gloved hand	

Drop tests (200kg) single rope 1m drop 3m of rope

Items tested	Av. kN	# Tests	Comment	Appx. 1
Figure-8 device low friction in front of 8mm BlueWater 6-on-1 VT Prusik	10.01	3	Caught load, 8.5-24cm slip at Figure-8, 1-2cm slip at Prusik, Prusik releasable	pg. 76
8mm BlueWater 6-on-1 VT Prusik	8.02	3	Caught load, slipped 17-88.5cm at Prusik, Prusik fused	pg. 79
Figure-8 device low friction in front of 7mm BlueWater 6-on-1 VT Prusik	10.30	3	Caught load, 13.5-16cm slip at Figure-8, 1-1.5cm slip at Prusik, Prusik releasable	pg. 82
7mm BlueWater 6-on-1 VT Prusik	8.17	3	Caught load, slipped 19-67cm at Prusik, Prusik fused	pg. 85
8mm BlueWater 5-on-1 VT Prusik	6.95	3	Caught load, slipped 34.5-107cm at Prusik, Prusik fused	pg. 88
Petzl Micro Traxion	6.22	2	(#1) Caught load , slipped 99cm, stripped sheath. (#2) Load hit the ground, cut rope	pg. 91

Note: P = Prusik, D = Device, T = Total

Drop tests (200kg) single rope 1.5m drop 3m of rope

Items tested	Av. kN	# Tests	Comment	Appx. 1
8mm BlueWater 6-on-1 VT Prusik	8.45	3	Caught load, slipped 20-78.5cm at Prusik, Prusik fused	pg. 93

Drop tests (200kg) two ropes 1m drop 3m of rope

Items tested	Av. kN	# Tests	Comment	Appx. 1
Figure-8 device low friction in front of 8mm BlueWater 6-on-1 VT Prusik	R1 = 5.91 R2 = 5.39 T = 11.30	3	R1: Caught load, 2cm slip at Prusik, Prusik releasable, 12cm slip at device. R2: Caught load, 1cm slip at Prusik, Prusik releasable, 12cm slip at device.	pg. 96
8mm BlueWater 6-on-1 VT Prusik	R1 = 5.33 R2 = 5.17 T = 10.50	3	R1: Caught load, 2cm slip at Prusik, Prusik releasable. R2: Caught load, 2cm slip at Prusik, Prusik releasable.	pg. 100
7mm BlueWater 6-on-1 VT Prusik	R1 = 5.62 R2 = 5.39 T = 11.01	3	R1: Caught load, 2.5cm slip at Prusik, Prusik releasable. R2: Caught load, 2.5cm slip at Prusik, Prusik releasable.	pg. 103
8mm BlueWater 5-on-1 VT Prusik	R1 = 5.39 R2 = 5.55 T = 10.94	3	R1: Caught load, 2cm slip at Prusik, Prusik fused. R2: Caught load, 2cm slip at Prusik, Prusik fused.	pg. 106
Petzl Micro Traxion	R1 = 6.00 R2 = 5.84 T = 11.84	1	R1: Caught load, 18.5cm slip at Micro Traxion, stripped sheath, 20cm bunching before device. R2: Caught load, 18.5cm slip at Micro Traxion, stripped sheath, 20cm bunching before device	pg. 109

Note: R1 = Rope 1, R2 = Rope 2, T = Total

Drop tests (200kg) single rope 0m drop 3m of rope

Items tested	Av. kN	# Tests	Comment	Appx. 1
8mm BlueWater 6-on-1 VT Prusik, start two ropes, 50% on tension on each rope, released onto 1 rope	2.77	3	Caught load. 0.5-1.0cm slip. Prusik releasable.	pg. 111
8mm BlueWater 6-on-1 VT Prusik, start two ropes, 100% on tension on 1 rope, released onto other rope	4.01	3	Caught load. 0.5-1.0cm slip. Prusik releasable.	pg. 111

PMI 10mm Classic Sport

Slow pull testing (100mm/minute)

Items tested	Avg. kN	# Tests	Comment	Appx. 2
Figure-8 on a bight knot	18.17 (67%)	3	Broke at the knot	pg. 114
Alpine butterfly knot	19.43 (72%)	3	Broke at the knot	pg. 117
Bowline knot	17.52 (65%)	3	Broke at the knot	pg. 120
Figure-8 rethread bend	18.13 (67%)	3	Broke at the bend	pg. 123
Aspiring 8mm VT 6-on-1 Prusik	17.70	3	First slip 12.89kN, slipped 5-6cm, glazed sheath, broke fig-8 knot	pg. 126
Aspiring 8mm VT 5-on-1 Prusik	15.42	3	First slip 9.87kN, slipped and regripped, kept on slipping	pg. 129
Petzl Shunt single rope	2.31	3	First slip 2.17kN, kept on slipping	pg. 132
Petzl Shunt double rope	5.99	1	Didn't slip, both ropes came out of device as it spread open, damaged sheath both ropes 50% on the cam side.	pg. 132
Petzl Micro Traxion	5.90	3	Stripped sheath of rope	pg. 137
Petzl Tibloc	7.02	3	Stripped sheath of rope	pg. 140
Petzl Basic ascender	6.00	3	Stripped rope sheath (2) and device broke (1)	pg. 143
Biner block	15.59 (58%)	3	Broke the rope at the 8mm rapide	pg. 146

Friction tests

Items tested	First Slip kN	Limiting friction kN	Comment	Appx. 2
Munter / Italian	0.54	1.41	1 test, max 1 gloved hand	pg. 149
Double Munter / Italian	1.37	3.85	1 test, max 1 gloved hand	
Munter / Italian + redirect carabiner	0.69	1.29	1 test, max 1 gloved hand	
Double Munter / Italian + redirect carabiner	1.55	4.08	1 test, max 1 gloved hand	

Drop tests (200kg) Single Rope 1m drop 3m of rope

Items tested	Av. kN	# Tests	Comment	Appx. 2
Figure-8 device low friction in front of 8mm Aspiring 6-on-1 Schwabisch VT Prusik	12.14	3	Caught load, 16-20cm slip at Figure-8, 1-3cm slip at Prusik, Prusik releasable	pg. 154
8mm Aspiring 6-on-1 Schwabisch VT Prusik	10.30	3	Caught load, slipped 9-17cm at Prusik, Prusik fused	pg. 157
8mm Aspiring 5-on-1 Schwabisch VT Prusik	8.69	3	Caught load, slipped 35.5-82cm at Prusik, Prusik fused	pg. 160

Drop tests (200kg) Two Ropes 1m drop 3m of rope

Items tested	Av. kN	# Tests	Comment	Appx. 2
Figure-8 device low friction in front of 8mm Aspiring 6-on-1 Schwabisch VT Prusik	R1 = 6.62 R2 = 5.90 T = 12.52	1	R1: Caught load, 1cm slip at Prusik, Prusik releasable, 13cm slip at device. R2: Caught load, 1cm slip at Prusik, Prusik releasable, 12.5cm slip at device.	pg. 163
8mm Aspiring 6-on-1 Schwabisch VT Prusik	R1 = 6.93 R2 = 5.79 T = 12.72	3	R1: Caught load, 4.5cm slip at Prusik, Prusik fused. R2: Caught load, 3cm slip at Prusik, Prusik fused.	pg. 166
8mm Aspiring 5-on-1 Schwabisch VT Prusik	R1 = 6.32 R2 = 6.30 T = 12.62	1	R1: Caught load, 10cm slip at Prusik, Prusik fused. R2: Caught load, 10cm slip at Prusik, Prusik fused.	pg. 169

Note: R1 = Rope 1, R2 = Rope 2, P = Prusik, D = Device, T = Total

PMI 8mm Accessory Cord

Slow pull tests (100mm/minute)

Items tested	Average kN	# Tests	Comment	Appx. 3
Loop: double fisherman's bend	23.82	3	Broke at the bend	pg. 172
Loop: figure-8 rethread bend	20.34	3	Broke at the 12mm pin and bend	pg. 175
Wrap 3 pull 2 on a 30mm pin	35.30	3	Broke 1 strand at the carabiner	pg. 178
Wrap 2 pull 2 on a 30mm pin	29.54	3	Broke 1 strand at the carabiner	pg. 181
2-point anchor, overhand knot, 2 strands clipped, 1 carabiner	24.47	3	Broke at fixed overhand, top side 1 strand, leg without bend	pg. 184
2-point anchor floating focal, overhand limiting knots, 1 strand clipped, 1 carabiner	18.36	3	Broke at limiting overhand, bottom side, leg without bend	pg. 187
2-point anchor floating focal, overhand limiting knots, 2 strand clipped, 2 carabiners	29.61	3	Broke at limiting overhand, bottom and top, leg without bend	pg. 190

Drop tests (200kg)

Items tested	Av. kN	# Tests	Comment	Appx. 3
2-point anchor fixed focal, overhand knot, 2 strands clipped, 1 carabiner, 0cm drop	2.79	3	Dropped onto the side without bend	pg. 193
	2.59	3	Dropped onto the side with bend	
2-point anchor floating focal, overhand limiting knots, 1 strand clipped, 1 carabiner, 10cm drop	5.45	3	Dropped onto the side without bend	pg. 198
	4.96	3	Dropped onto the side with bend	

Edelrid 25mm Tubular Webbing

Slow pull tests (100mm/minute)

Items tested	Average kN	# tests	Comment	Appx. 4
Loop: Tape/Overhand rethread bend	27.83	3	Broke at tape/overhand bend	pg. 206
Wrap 3 pull 2 on a 30mm pin	40.08	3	Broke 1 strand at the carabiner	pg. 209
Wrap 2 pull 2 on a 30mm pin	37.93	3	Broke 1 strand at the carabiner	pg. 212
2-point anchor fixed focal, overhand knot, 2 strands clipped, 1 carabiner	36.23	3	Broke at overhand knot single strand and steel carabiner	pg. 215

CT 8.2mm Dynamic Rope

Slow pull tests (100mm/minute)

Items tested	Average kN	# tests	Comment	Appx. 5
Loop: Sewn	22.47	3	Broke at stitching	pg. 218
2-point anchor fixed focal, overhand knot, 2 strands clipped, 1 carabiner	30.24	3	Broke at fixed overhand, both strands, bottom leg	pg. 221
2-point anchor floating focal, overhand limiting knots, 1 strand clipped, 1 carabiner	18.07	3	Broke at limiting overhand knot, 1 strand, on the sewn leg	pg. 224
2-point anchor floating focal, overhand limiting knots, 2 strand clipped, 2 carabiner	31.53	3	Broke at limiting overhand, both strands, on the sewn leg	pg. 227

Drop tests (200kg)

Items tested	Av. kN	# Tests	Comment	Appx. 1
2-point anchor fixed focal, overhand knot, 2 strands clipped, 1 carabiner, 0cm drop	2.45	3	Dropped onto the side without stitching	pg. 230
	2.39	3	Dropped onto the side with stitching	
2-point anchor floating focal, overhand limiting knots, 1 strand clipped, 1 carabiner, 10cm drop	3.90	3	Dropped onto the side without stitching	pg. 235
	4.19	3	Dropped onto the side with stitching	

Discussion

Kordas 10mm Dana

Slow pull tests

Knots, bends and hitches:

- The knots used (figure-8 and alpine butterfly) were over 18kN and are suitable for canyon rescue. The bowline was under 16kN is not suitable; however, it is not used.
- The figure-8 rethread bend had a lower breaking strength (16.5kN) than the figure-8 knot (19.53kN). It is suitable for canyon rescue joining Kordas Dana rescue ropes as there is currently no better alternative.

Rope grabs:

- The 8mm BlueWater VT Prusik 6-on-1 hitch slipped at 12kN and breaking either the rope or kept on slipping at 18kN. The 8mm BlueWater VT Prusik 5-on-1 hitch slipped at 9kN and kept on slipping at 11kN. The 7mm BlueWater VT Prusik 6-on-1 hitch slipped at 13kN and stripped the sheath of the 10mm rope at 16kN. All variations are suitable for canyon rescue as a progress capture and rope grab.
- The Petzl Shunt was tested as a pulley system rope grab for a single rope (3kN) and double rope (7kN). The single rope Shunt is preferred as it slides without damaging the 10mm rope.
- The Petzl Basic (6kN) and Tibloc (7.5kN) were tested for use as a pulley system rope grab. The Basic is not recommended as it broke half in 2 out of the 3 tests and held 1.5kN less (on average) than the Tibloc. The Tibloc, where it used as a rope grab on half of a two rope system (100kg), is suitable for rescue.
- The Petzl Micro Traxion (6kN) was tested as a pulley system load capture. Due to the potential of dynamic loading for this part of the system, it was not suitable.

Canyon rope blocks:

- Standard canyoning rope blocking and releasable methods including the biner block (16kN), Munter mule overhand (15kN) and the Figure-8 device block v3 (16kN) were tested. These blocks could end up in the rescue system, so it was good to have some data to understand any limitations. The figure-8 device block was changed (v3) so not to slip and instead broke the rope.

Lowering device:

- The Figure-8 device (Petzl Huit) in Canyon mode friction, on an extension, with a 6-on-1 8mm VT behind (rescue lowering mode) broke at 17kN, which is close to 18kN and the breaking strength of the knots. Suitable for all rescue lowering situations.

Friction tests

- The Figure-8 device (Petzl Huit) in Canyon mode friction, on an extension, with a redirect, had friction over 1kN for half a two rope system and could be converted to 2kN+. Therefore this device and method had suitable friction for their use in rescue.

Drop tests

1m drop on 3m of rope, 200kg

Drop tests were undertaken to represent two people plus equipment with a short section of rope in play (1m drop on 3m of rope, 200kg).

- **Single Rope:** The average force for a 7/8mm BlueWater VT Prusik 5/6-on-1 Prusik was 10kN in lowering mode (2cm slip) and 7-8kN in raising mode (83cm slip). All the VT tested are suitable for a progress capture and have a high margin.
- **Single Rope:** The average force for a Petzl Micro Traxion was 6kN in raising mode (99cm slip or cut the rope) and is not suitable as a progress capture as it stripped the sheath or cut the rope.
- **Two Ropes:** The average force for a 7/8mm BlueWater VT Prusik 5/6-on-1 Prusik was 5.5kN per rope (11kN total) in lowering mode (2cm slip) and 5.25kN per rope (10.50kN total) in raising mode. All the VT/Figure-8 devices tested are suitable and have a high margin.
- **Note:** A failure onto double ropes will increase the combined force on the anchor system as there is less stretch. Use caution where systems share anchors (some or all) between both ropes and are not independent.
- **Two Ropes:** The average force for a Petzl Micro Traxion was 6kN per rope (12kN total) in raising mode (18.5cm slip, stripped sheath) and is not suitable as a progress capture.

0m drop on 3m of rope, 200kg

Drop tests were undertaken to represent two people plus equipment with ropes in normal operating raising mode either with 50% on each rope (50/50) or 100% on one and 0% on the other (100/0).

- The average force for an 8mm BlueWater VT Prusik 6-on-1 Prusik 50/50 was 2.77kN in raising mode (.5-1cm slip). On average, about 1.5x the load.
- The average force for an 8mm BlueWater VT Prusik 6-on-1 Prusik 100/0 was 4.01kN in raising mode (.5-1cm slip). On average, about 2x the load.

1.5m drop on 3m of rope, 200kg

Drop tests were undertaken to represent two people plus equipment with ropes a worst-case short amount of rope in play (1.5m drop on 3m of rope, 200kg).

- The average force for an 8mm BlueWater VT Prusik 6-on-1 Prusik was 8.45kN in raising mode (20-78.5cm slip).
- On average around 0.5kN more than the equivalent 1m drop on 3m of rope drop test and around the same slip.
- The VT Prusik performed well, considering the extreme nature of the test.

PMI 10mm Classic Sport

Slow pull tests

- The knots used (figure-8 and alpine butterfly) were over 18kN and are suitable for canyon rescue. The bowline was under 18kN; however, it is not used by canyon rescue.
- The figure-8 rethread bend has a breaking strength over 18kN and is suitable for canyon rescue for joining rescue ropes.
- The 8mm Aspiring VT Prusik 6-on-1 hitch slipped at 13kN and broke the rope at the figure-8 at 17.5kN. The 8mm BlueWater VT Prusik 5on1 hitch slipping at 10kN and kept on slipping at 15.5kN. All variations are suitable for canyon rescue as a progress capture and rope grab.
- The Petzl Shunt was tested as a pulley system rope grab for a single rope (2kN) and double rope (6kN). The single rope Shunt is preferred as it slides without damaging the 10mm rope.
- The Petzl Basic (6kN) and Tibloc (7kN) were tested for use as a pulley system rope grab. The Basic is not recommended as it broke half in 1 out of the 3 tests and held 1kN less (on average) than the Tibloc.
- The Petzl Micro Traxion (6kN) was tested as a pulley system load capture. Due to the potential of dynamic loading for this part of the system, it was not suitable.
- Standard canyoning rope blocking methods, including the biner block (15.5kN) were tested. These may end up in the rescue system, so it was good to have some data to understand any limitations.

Friction tests

The Munter/Italian hitch, on an extension, with a redirect, had friction over 1kN for half a two rope system. Therefore this device and method had suitable friction for their use in rescue.

Drop tests

All drop tests were undertaken to represent two people plus equipment with a short section of rope in play (1m drop on 3m of rope, 200kg).

- **Single rope:** The average force for a 8mm Aspiring VT Prusik 6on1 Prusik was 12kN in lowering mode (2cm slip) and 10kN in raising mode (13.5cm slip). The average force for a 8mm Aspiring VT Prusik 5on1 Prusik was 8.5kN in lowering mode (51.5cm slip). All the VT tests held, are suitable and have a high margin.
- **Note:** The PMI rope has nearly half the stretch of the Kordas rope, so it has a higher (1-2kN) max arrest force.
- **Two ropes:** The average force for an 8mm Aspiring VT Prusik 6on1 Prusik was 5.5kN per rope (11kN total) in lowering mode (2cm slip) and 6.25kN per rope (12.5kN total) in raising mode (4cm slip). The average force for an 8mm Aspiring VT Prusik 5on1 Prusik was 6.25kN per rope (12.5kN total) in raising mode (10cm slip). All the VT tested are suitable and have a high margin.
- **Note:** A failure onto double ropes will increase the combined force on the anchor system as there is less stretch. Use caution where systems share anchors (some or all) between both ropes and are not independent.

PMI 8mm Accessory Cord

Slow pull tests

- The loops tested (figure-8 rethread and double fisherman's) were over 20kN and suitable for rescue use.
- The W3P2 and W2P2 tested well over 20kN (30-35kN) and are suitable for use for rescue.
- Floating focal point testing of a single strand is suitable for one side of a rescue system (18kN) or as part of a multi-point anchor. With two strands clipped, on average, tested over 29kN and are suitable for both sides of a rescue system.
- A two-point fixed focus anchor is, on average, over 24kN and is suitable for rescue.

Drop tests

- Drop testing a fixed focal by failing one side gave results of, on average, 2.5kN.
- Drop testing a floating focal by failing one side gave results of, on average, 5kN. The limiter overhands do the job well of decreasing the impact force fall after a single anchor failure. Used in the proper context, it is suitable for rescue.

Aspiring 25mm Tubular Tape

Slow pull tests

- The loop tested with a tape bend tested over 27kN and is suitable for rescue.
- The W3P2 and W2P2 tested well over 20kN (37-40kN) and is suitable for rescue.
- A two-point fixed focus anchor is well over 20kN (36kN) and is suitable for rescue.

CT 8.2mm Dynamic Rope

Slow pull tests

- The sewn loop, on average, tested over 24kN and is suitable for rescue.
- A two-point fixed focus anchor, on average, tested over 30kN and is suitable for rescue.
- A two-point floating focus anchor with a single strand with limiter overhands, on average, tested over 18kN and is suitable for rescue on one side of a two rope system.
- A two-point floating focus anchor with two strands with limiter overhands, on average, tested over 30kN and is suitable for rescue on both sides of a two rope system.

Drop tests

- Drop testing a fixed focal by failing one side gave results of, on average, 2.5kN.
- Drop testing a floating focal by failing one side gave results of, on average, 4kN. The limiter overhands do the job well of decreasing the impact force fall after a single anchor failure. Used in the proper context, it is suitable for rescue.

Conclusions

- We have tested canyoners' equipment to understand what works and what doesn't in the rescue context.
- A greater understanding of the system and the safety margin in normal operating mode and worst-case failure has been gained.
- Testing gives confidence that the systems used are going to work effectively. This confidence is essential as there are lots of other things going on in an actual rescue. It frees up our thinking up to concentrate on other vital elements.
- This testing has focused on parts of the system failing. However, the opposite action is the best focus in the field – working together to prevent failure.

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Disclaimer

1. Information contained in this test report is not a complete instructional guide—intended to supplement training from experienced and competent rescue instructors.
2. Use at your own risk. The publisher and author assume no responsibility or liability for any accident, injury, loss or damage sustained while following any of the recommendations or techniques described.
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4. Testing was under controlled conditions with a limited set of equipment. Testing with different equipment or operating in different conditions may result in different outcomes.
5. The views, information, or opinions expressed in the test report are solely those of the author and do not necessarily represent those of other organisations or individuals listed.

Glossary of terms

Bends: Where two pieces of rope or webbing are tied together usually at their ends, with both playing an integral part. The load is pulling in line through the bend. An example is a double fisherman's bend.

Maximum Force (kN): Maximum amount of tensile stress that the material can withstand before failure (rupture), such as breaking or permanent deformation. Tensile strength specifies the point when a material goes from elastic to plastic deformation.

Extension: in the context of testing, stretching of a material in order to make it longer recorded from a start to an end position.

Force (kN): In physics, force is the push or pull on an object with mass that causes it to change velocity (to accelerate). Force represents as a vector, which means it has both magnitude and direction. The SI unit of force is the newton (N).

Fused: Fused together (in the context of rope rescue testing) means when the two materials permanently attach and combine through melting of one or both. If it is not releasable then it is classed as fused.

Glazed: means overlaid or covered with a smooth, shiny coating. This usually occurs when one material slides on top of another, melts and leaves a coating, for example, a Prusik sliding on a rope.

Hitches: Where a rope is tied to an object where if the object is removed the hitch falls apart. An example is the Italian/Munter hitch.

Knots: 'If it's not a bend or a hitch then it's a knot'. In the widest sense a generic name for all types of rope and cord entanglements but specifically where a connection is tied that is self-sustaining in rope or webbing.

Limiting friction (kN): When the body overcomes the force of static friction, it reaches to maximum value which is called limiting friction. After this, body starts moving and friction decreases. This value of friction is then called kinetic friction.

Mass (kg): the quantity of matter in a body

Maximum Arrest Force (MAF) (kN): A term used for fall arrest systems. This means that for a medium body weight of 100 kg, the maximum arrest force is 6 kN according to European standardisation. Only certain components, or assembly of components, fulfill these conditions and can be used where there is the risk of falling from height.

Slip: where one body on another overcomes the friction and slides unintentionally for a short distance.

Static (rescue) loads (kg): Predominantly associated with the mass of the rescue itself, and as such remain stationary and relatively constant over the duration of the rescue. Static loads may include the mass of any ropes, carabiners, stretchers, people and other rescue elements so on. For the practical purposes of testing and calculation of forces in a rescue system the following values have been used based on the number of people plus equipment. A **single person rescue load** is a 100kg. A **two person rescue load** is a 200kg.

Stripped: Remove all coverings (sheath) from the core.

Appendix 1: Korda’s Dana 10mm

Figure-8 on a bight knot

Slow Pull Test	~~Friction Test~~	~~Drop Test~~

Materials

- Korda’s 10mm Dana (27kN)

Test setup

- Tied a figure-8 on a bight on one end

Test parameters

- Slow pull speed 100mm/minute
- Tested between a 12mm pin and rope grab

Results

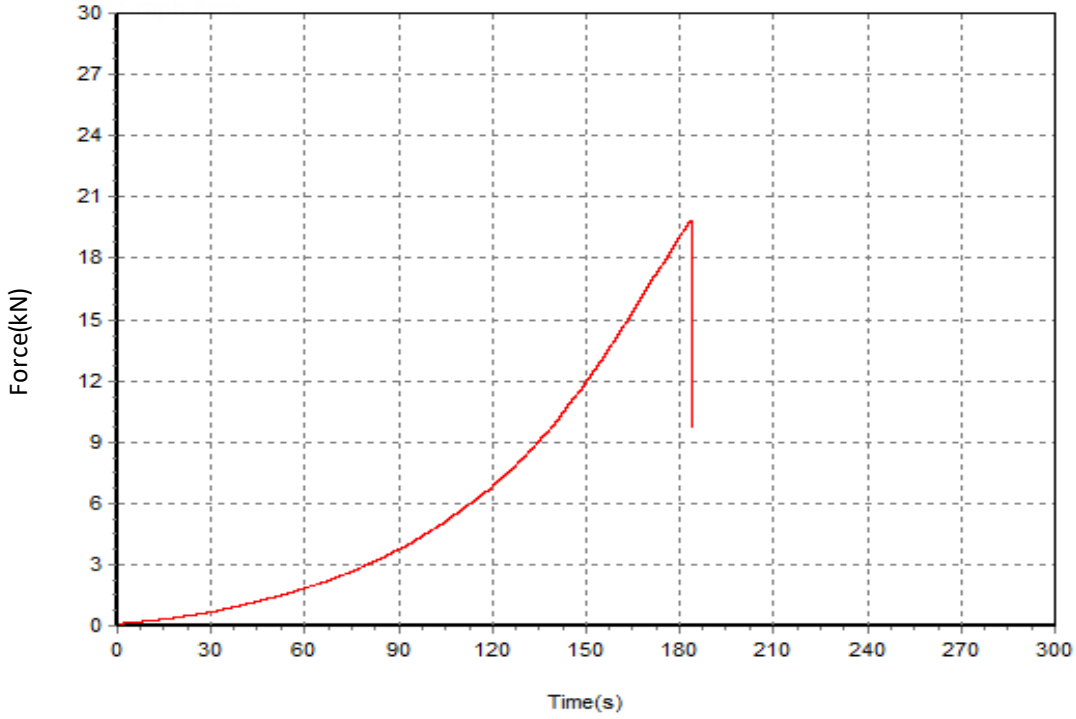
Date	#	Max force (kN)	%	Comments
5/06/20	19*	19.87	73%	Broke at knot
5/06/20	20	19.54	72%	Broke at knot
5/06/20	21	19.28	71%	Broke at knot
5/06/20	22	20.15	74%	Broke at knot
5/06/20	23	18.82	69%	Broke at knot
Average		**19.53**	**72%**	

* Sample 5/06/20 #19 of the testing shown on the following pages.

ASPIRING

Test Date:	Friday, 5 June 2020
Max Force (kN):	19.87
Product Name:	Fig-8 oab
Batch #:	19
Material:	Kordas Dana 10mm

Force-Time Curve



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Signed:

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#: 19 Date: 5/6/20
Test: Slow Pull 100mm/min
Type: Fig-8 on a bight
Rope: 10mm Korda's Dana
Force: 19.87kN

Alpine butterfly knot

Slow Pull Test	~~Friction Test~~	~~Drop Test~~

Materials

- Korda's 10mm Dana (27kN)

Test setup

- Alpine butterflies on both ends

Test parameters

- Slow pull speed 100mm/minute
- Tested between 12mm pins

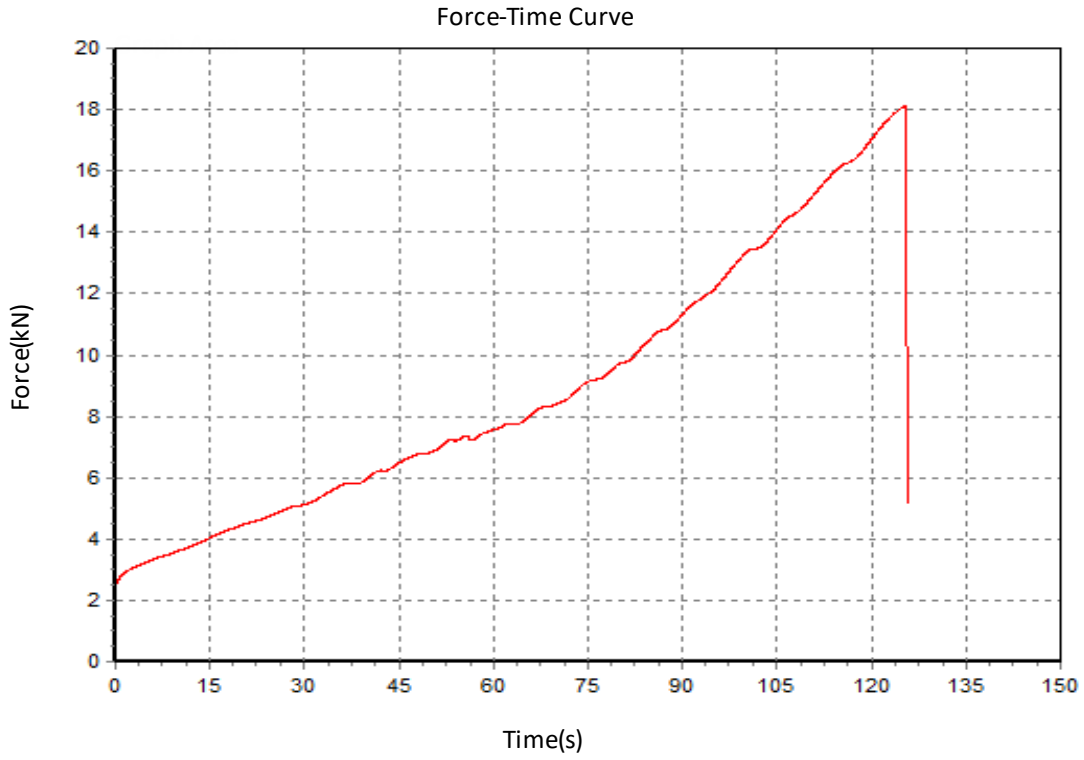
Results

Date	#	Max force (kN)	%	Comments
24/10/19	21*	18.11	67%	Broke at one of the knots
24/10/19	22	17.19	64%	Broke at one of the knots
15/02/21	20	19.27	71%	Broke at the knot
Average		**18.19**	**67%**	

* Sample 24/10/19 #21 of the testing shown on the following pages.

ASPIRING

Test Date:	Thursday, 24 October 2019
Max Force (kN):	18.11
Product Name:	Alpine Butterfly Knot
Batch #:	21
Material:	10mm Kordas Dana



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21
24.10.19
18.11 KN
ABF
Kordas Dana 10mm

Bowline knot

Materials

- Korda's 10mm Dana (27kN)

Test setup

- Bowlines on both ends

Test parameters

- Slow pull speed 100mm/minute
- Tested between 12mm pins

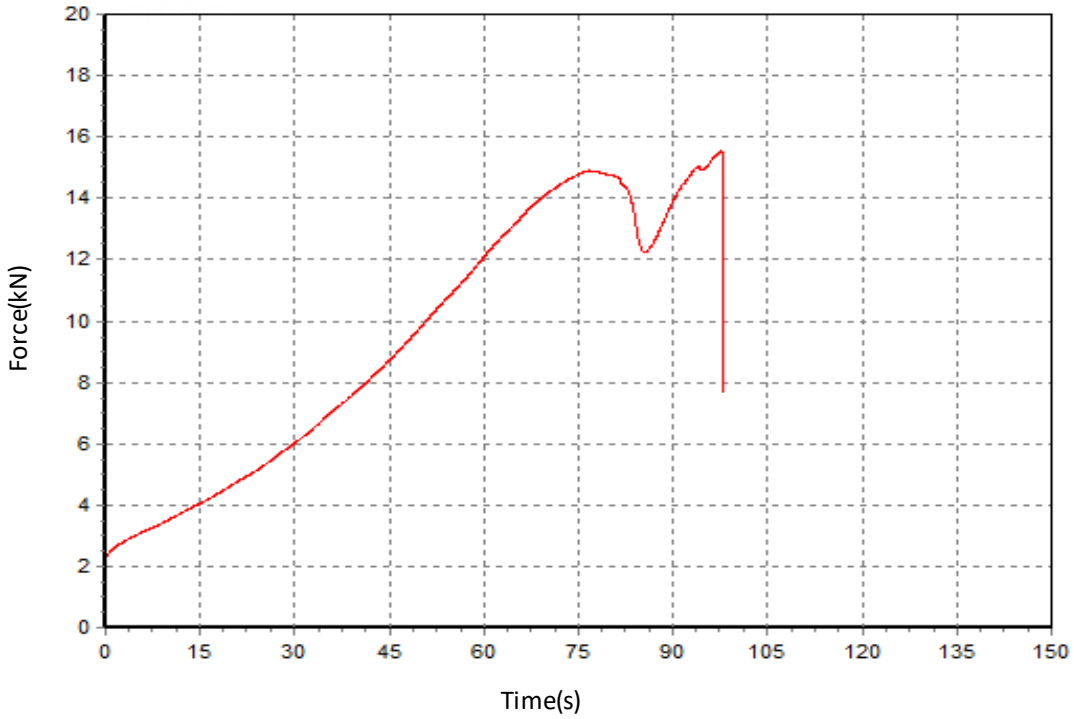
Date	#	Max force (kN)	%	Comments
24/10/19	23*	15.53	58	Broke at one of the knots
24/10/19	24	16.35	61	Broke at one of the knots
15/02/21	19	18.30	68	Broke at the knot
Average		**16.73**	**62**	

* Sample 24/10/19 #23 of the testing shown on the following pages.

ASPIRING

Test Date:	Thursday, 24 October 2019
Max Force (kN):	15.53
Product Name:	Bowline
Batch #:	23
Material:	10mm Kordas Dana

Force-Time Curve



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Tested by: Grant Prattley

Signed: Grant Prattley

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23
24.10.19
15.53kN
Bowline
Kordas Dana 10mm

Figure-8 rethread bend

Slow Pull Test	~~Friction Test~~	~~Drop Test~~

Materials

- Korda's 10mm Dana (27kN)

Test setup

- Figure-8 on a bight on one end

Test parameters

- Slow pull speed 100mm/minute
- Tested between rope grabs

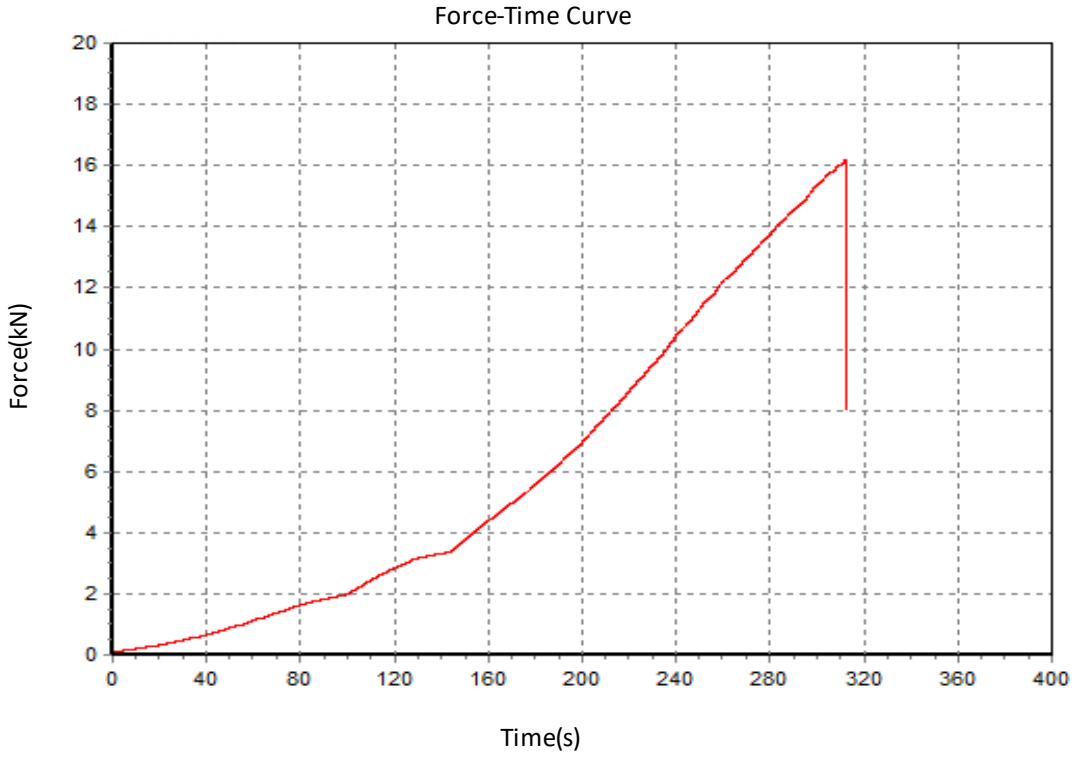
Results

Date	#	Max force (kN)	%	Comments
28/09/20	3*	16.18	59%	Broke at the bend
28/09/20	4	15.92	58%	Broke at the bend
28/09/20	5	16.48	60%	Broke at the bend
28/09/20	6	16.35	60%	Broke at the bend
28/09/20	7	16.91	62%	Broke at the bend
Average		**16.37**	**60%**	

* Sample 28/09/20 #3 of the testing shown on the following pages.

ASPIRING

Test Date:	Monday, 28 September 2020
Max Force (kN):	16.18
Product Name:	Fig-8 rethread bend
Batch #:	3
Material:	10mm Kordas Dana



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#: 3 Date: 28/9/20
Test: Slow Pull 100mm/min
Type: Figure-8 rethread bend
Rope: 10mm Kordas Dana
Force: 16.18kN

8mm BlueWater VT Prusik 6-on-1

Slow Pull Test	~~Friction Test~~	~~Drop Test~~

Materials

- Korda's 10mm Dana (27kN)
- BlueWater 8mm VT (29.5kN)

Test setup

- 8mm VT sewn
- 6-on-1 Schwabisch asymmetric Prusik
- Figure-8 on a bight on one end

Test parameters

- Slow pull speed 100mm/minute
- Tested between 12mm pins, 12mm steel carabiner and rope grab

Results

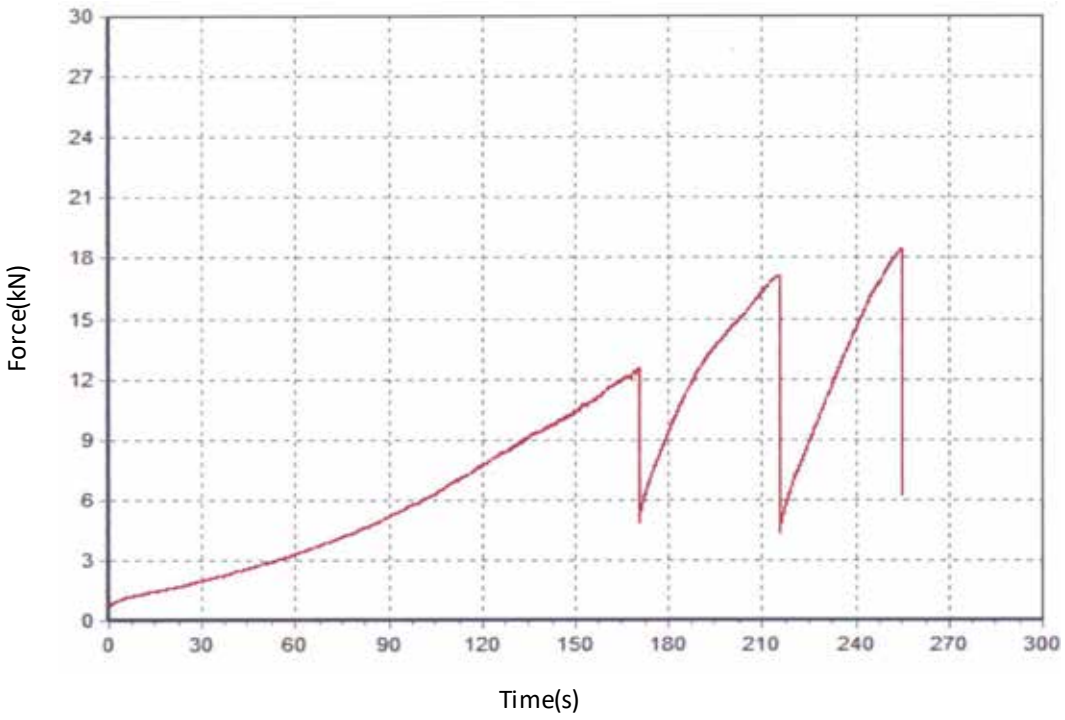
Date	#	First slip (kN)	Max force (kN)	Comments
7/08/19	1	10.5	17.76	Slipped 17cm, glazed sheath, started to damage sheath under the Prusik, broke fig-8 knot
7/08/19	2*	12.2	18.47	Slipped 10cm, glazed sheath, started to damage sheath under the Prusik, broke fig-8 knot
23/02/21	13	12.98	17.65	Kept on slipping, did not break.
Average		**11.89**	**17.96**	

* Sample 7/08/19 #2 of the testing shown on the following pages.

ASPIRING

Test Date:	Wednesday, 7 August 2019
Max Force (kN):	18.47
Product Name:	8mm VT BW 6on1 Asymetric
Batch #:	2
Material:	10mm Kordas Dana

Force-Time Curve



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2
7.8.19
12.2kN First Slip
18.47kN
6on 1 VT
Kordas Dana 10mm

8mm BlueWater VT Prusik 5-on-1

Slow Pull Test	~~Friction Test~~	~~Drop Test~~

Materials

- Korda's 10mm Dana (27kN)
- BlueWater 8mm VT (29.5kN)

Test setup

- 8mm VT sewn
- 5-on-1 Schwabisch asymmetric Prusik
- Figure-8 on a bight on one end

Test parameters

- Slow pull speed 100mm/minute
- Tested between 12mm pins

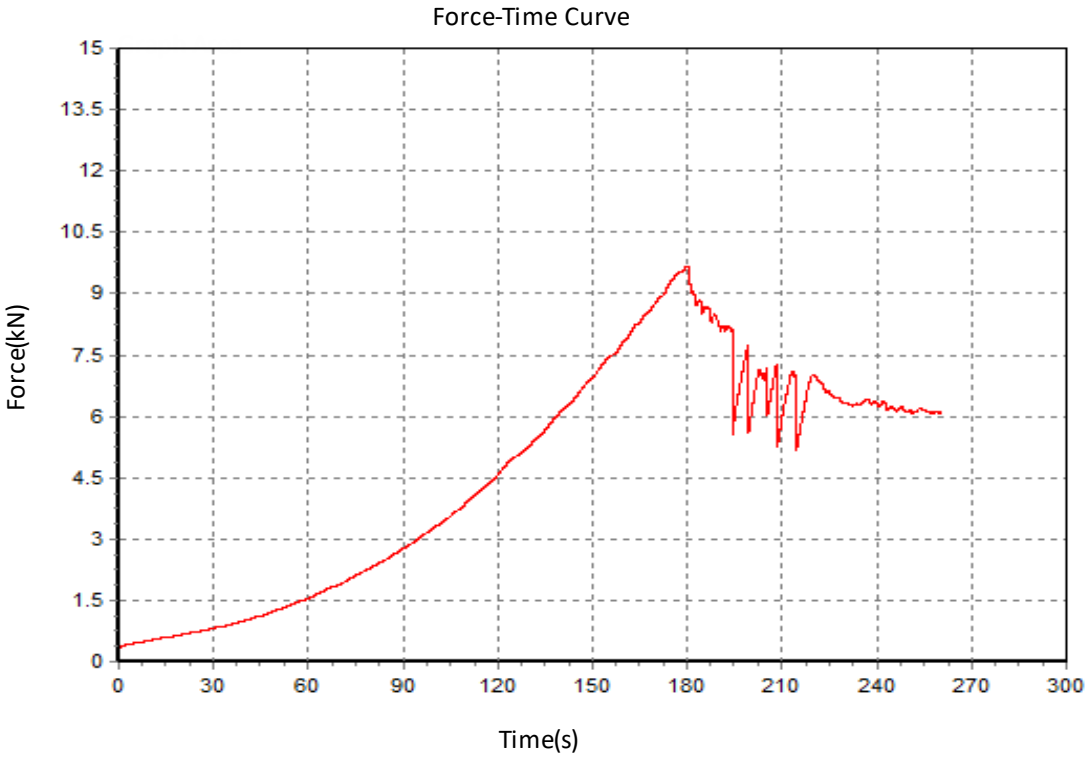
Results

Date	#	First slip (kN)	Max force (kN)	Comments
12/11/19	1*	9.67	9.67	Kept on slipping
12/11/19	2	8.83	8.83	Kept on slipping
15/02/21	21	9.30	13.97	Kept on slipping
Average		**9.27**	**10.82**	

* Sample 12/11/19 #1 of the testing shown on the following pages.

ASPIRING

Test Date:	Tuesday, 12 November 2019
Max Force (kN):	9.67
Product Name:	5on1 8mm VT BW
Batch #:	1
Material:	10mm Kordas Dana



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#: 1 Date: 12/11/19
Test: Slow Pull 100mm/min
Type: 5-on-1 8mm BW VT
Rope: 10mm Kordas Dana
Break: 9.67kN

7mm BlueWater VT Prusik 6-on-1

Slow Pull Test	~~Friction Test~~	~~Drop Test~~

Materials

- Korda's 10mm Dana (27kN)
- BlueWater 7mm VT (22.6kN)

Test setup

- 8mm VT sewn
- 6-on-1 Schwabisch asymmetric Prusik

Test parameters

- Slow pull speed 100mm/minute
- Tested between 12mm steel carabiner and rope grab

Results

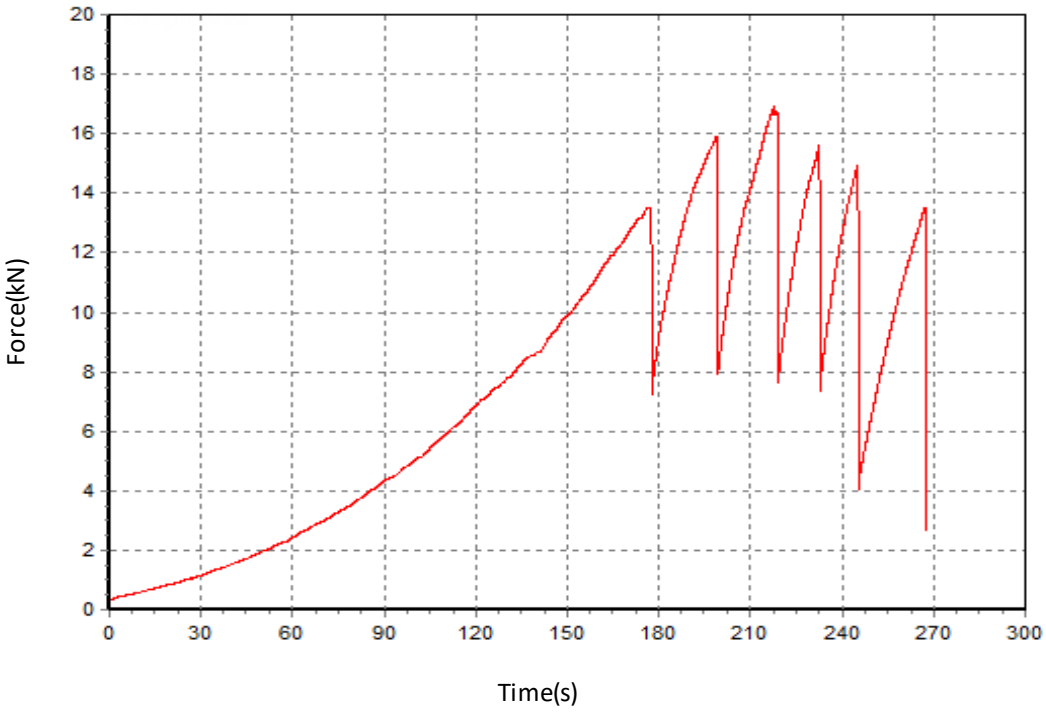
Date	#	First slip (kN)	Max force (kN)	Comments
23/02/21	14*	13.52	16.93	Several major slips then stripped sheath of 10mm rope.
23/02/21	15	12.86	16.79	Several major slips then stripped sheath of 10mm rope.
23/02/21	16	13.80	14.57	Kept on slipping then stripped sheath of 10mm rope.
Average		**13.39**	**16.10**	

* Sample 23/02/21 #14 of the testing shown on the following pages.

ASPIRING

Test Date:	Tuesday, 23 February 2021
Max Force (kN):	16.93
Product Name:	BW 6on1 7mm VT
Batch #:	14
Material:	10mm Korda's Dana

Force-Time Curve



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Tested by: Grant Prattley

Signed: Grant Prattley

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#: 14 Date: 23/02/21
Test: Slow Pull 100mm/min
Bend: 7mm BW VT 6on1
Cord: 10mm Kordas Dana
Force: 16.93kN

Petzl Shunt

Slow Pull Test	~~Friction Test~~	~~Drop Test~~

Materials

- Korda's 10mm Dana (27kN)
- Petzl Shunt

Test setup

- Single/Double rope
- Figure-8 on a bight on one end

Test parameters

- Slow pull speed 100mm/minute
- Tested between 12mm pin and 12mm steel carabiner

Results single rope

Date	#	First slip (kN)	Max force (kN)	Comments
24/10/19	1*	2.50	3.13	Kept on slipping
24/10/19	2	2.50	3.33	Kept on slipping
10/08/20	3	2.61	2.65	Kept on slipping
Average		**2.54**	**3.04**	

* Sample 24/10/19 #1 of the testing shown on the following pages.

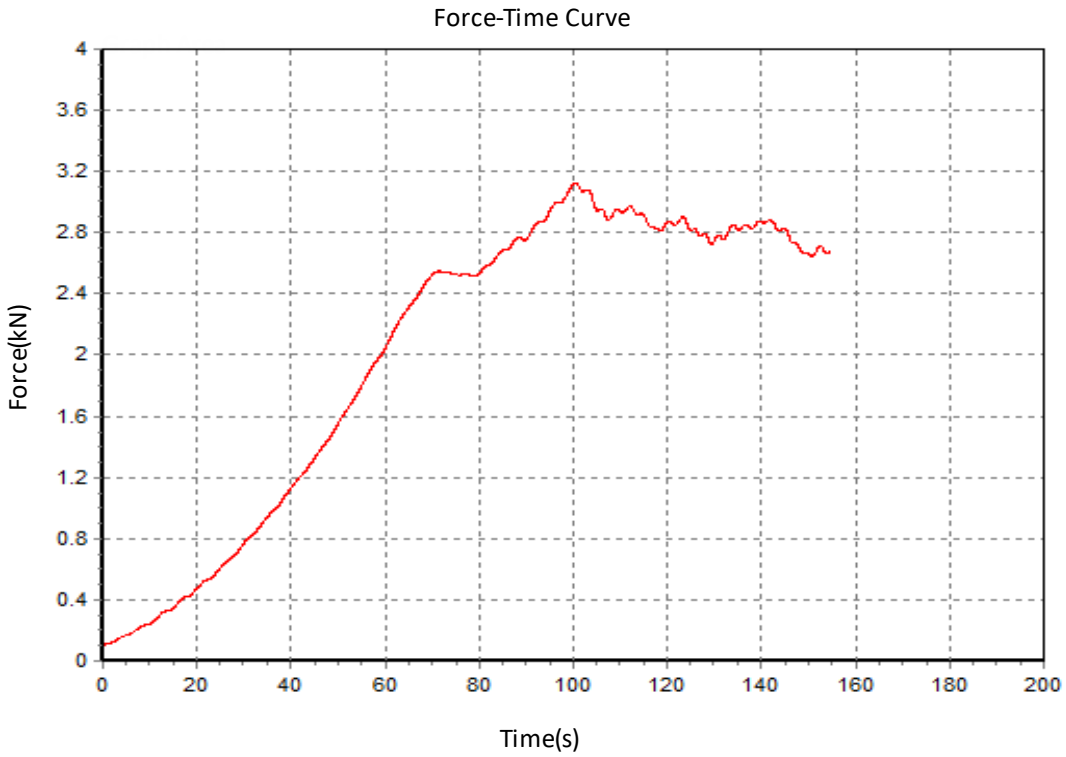
Results double rope

Date	#	Max force (kN)	Comments
24/10/19	3*	6.94	Didn't slip, both ropes came out of device as it spread open, damaged sheath both ropes around 50% on the cam side.
11/03/21	6	6.62	Didn't slip, both ropes came out of device as it spread open, damaged sheath both ropes around 50% on the cam side.
9/04/21	1	7.11	Didn't slip, both ropes came out of device as it spread open, damaged sheath both ropes around 50% on the cam side.
Average		**6.89**	

* Sample 24/10/19 #3 of the testing shown on the following pages.

ASPIRING

Test Date:	Thursday, 24 October 2019
Max Force (kN):	3.13
Product Name:	Petzl Shunt single rope
Batch #:	1
Material:	10mm Kordas Dana



ECAAS ISO 9001 CERTIFIED QUALITY MANAGEMENT

Tested by: Grant Prattley

Signed: Grant Prattley

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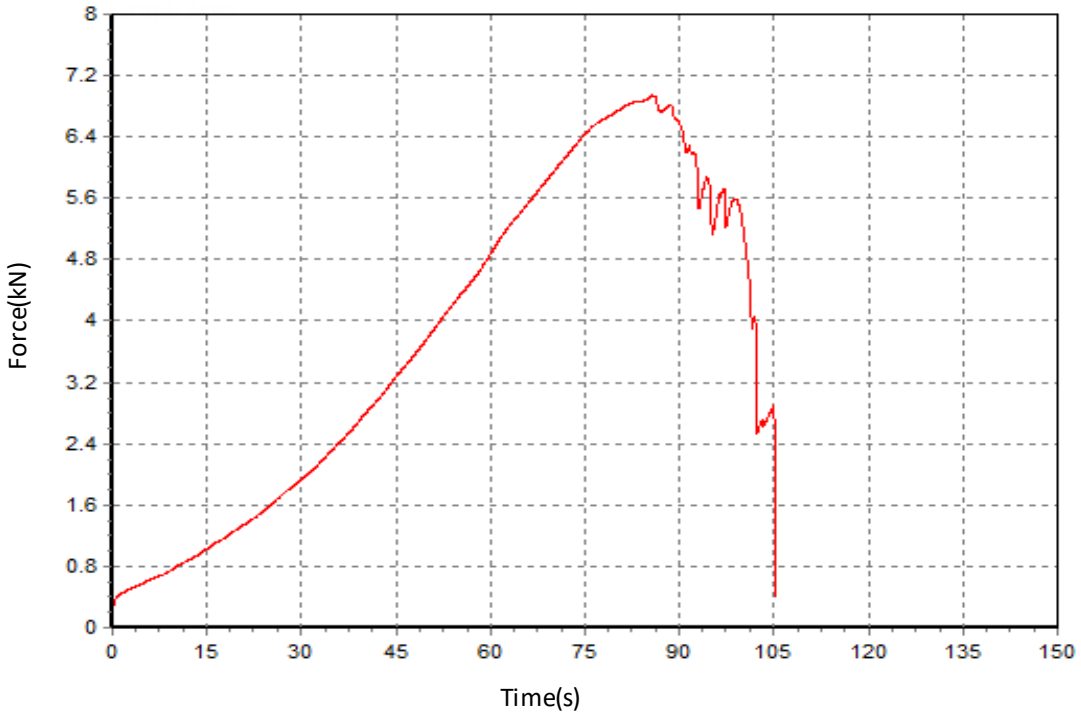
① 24.10.19
3.13kN
Petzl Shunt single
Kordas Dana 10mm


SHUNT

ASPIRING

Test Date:	Thursday, 24 October 2019
Max Force (kN):	6.94
Product Name:	Petzl Shunt double rope
Batch #:	3
Material:	10mm Kordas Dana

Force-Time Curve



ECAAS ISO 9001 CERTIFIED QUALITY MANAGEMENT

Tested by: Grant Prattley

Signed: Grant Prattley

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③ 24.10.19
6.94 kN
Petzl Shunt double
Kordas Dana 10mm

Petzl Micro Traxion

Slow Pull Test	~~Friction Test~~	~~Drop Test~~

Materials

- Kordas 10mm Dana (27kN)
- Petzl Micro Traxion

Test setup

- Figure-8 on a bight on one end

Test parameters

- Slow pull speed 100mm/minute
- Tested between 12mm pin and 12mm steel carabiner

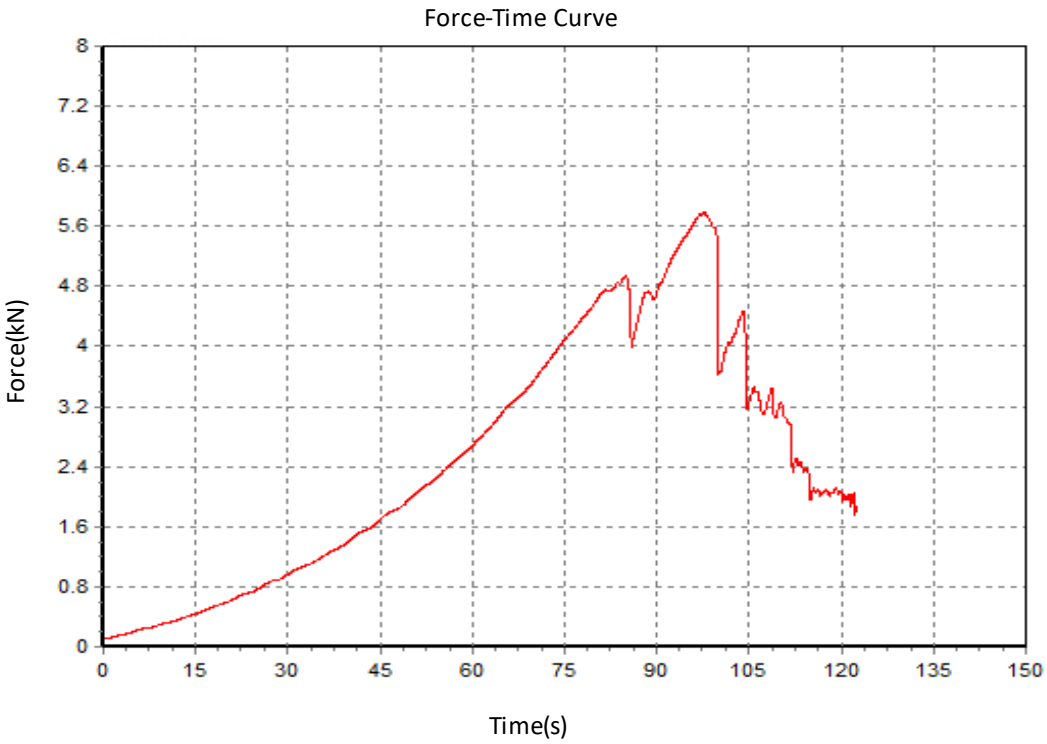
Results

Date	#	Max force (kN)	Comments
31/10/19	10*	5.80	Stripped sheath of rope
31/10/19	11	6.00	Stripped sheath of rope
11/02/21	10	5.49	Stripped sheath of rope
Average		**5.76**	

* Sample 31/10/19 #10 of the testing shown on the following pages.

ASPIRING

Test Date:	Thursday, 31 October 2019
Max Force (kN):	5.80
Product Name:	Micro Traxion
Batch #:	10
Material:	10mm Kordas Dana



ECAAS ISO 9001 CERTIFIED QUALITY MANAGEMENT

Tested by: Grant Prattley

Signed: Grant Prattley

Machine has a current calibration certificate. www.aspiring.co.nz


10
31. 10. 19
5.80kN
Micro Traxion
Kordas Dana 10mm

Petzl Tibloc

Slow Pull Test	~~Friction Test~~	~~Drop Test~~

Materials

- Korda's 10mm Dana (27kN)
- Petzl Tibloc

Test setup

- Figure-8 on a bight on one end

Test parameters

- Slow pull speed 100mm/minute
- Tested between 12mm pin and 12mm steel carabiner

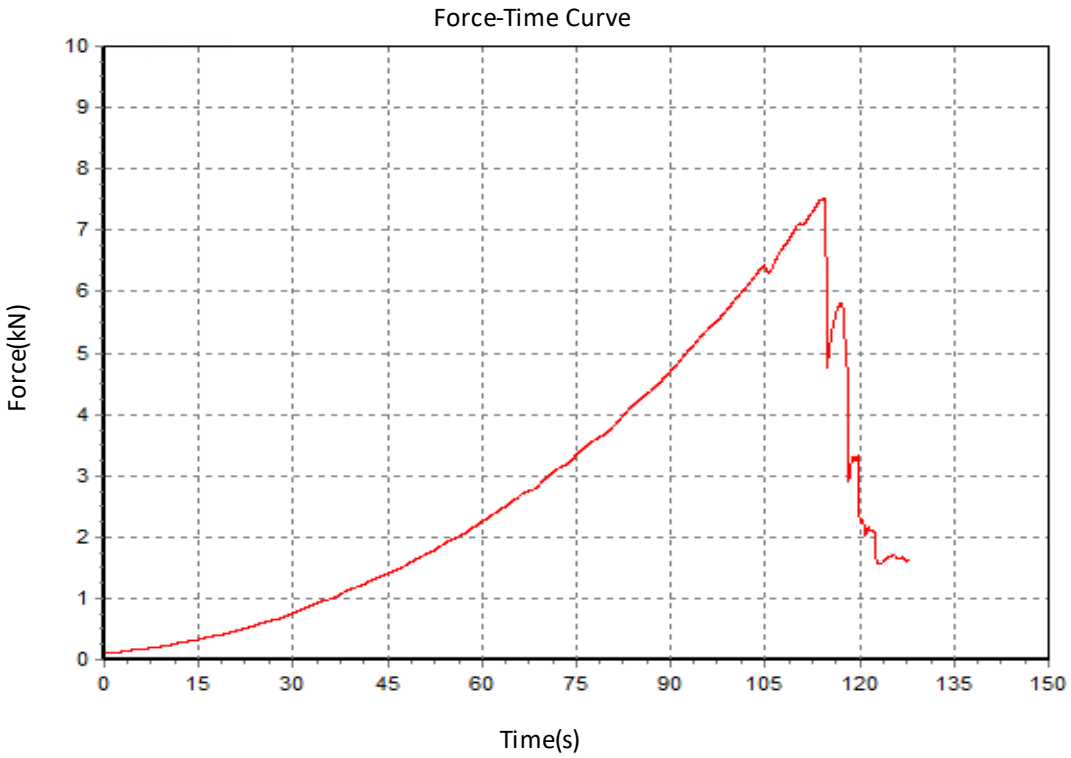
Results

Date	#	Max force (kN)	Comments
31/10/19	6*	7.51	Stripped sheath of rope
31/10/19	7	7.03	Stripped sheath of rope
10/08/20	1	8.38	Stripped sheath of rope
Average		**7.64**	

* Sample 31/10/19 #6 of the testing shown on the following pages.

ASPIRING

Test Date:	Thursday, 31 October 2019
Max Force (kN):	7.51
Product Name:	Tibloc
Batch #:	6
Material:	10mm Kordas Dana



ECAAS ISO 9001 CERTIFIED QUALITY MANAGEMENT

Tested by: Grant Prattley

Signed: Grant Prattley

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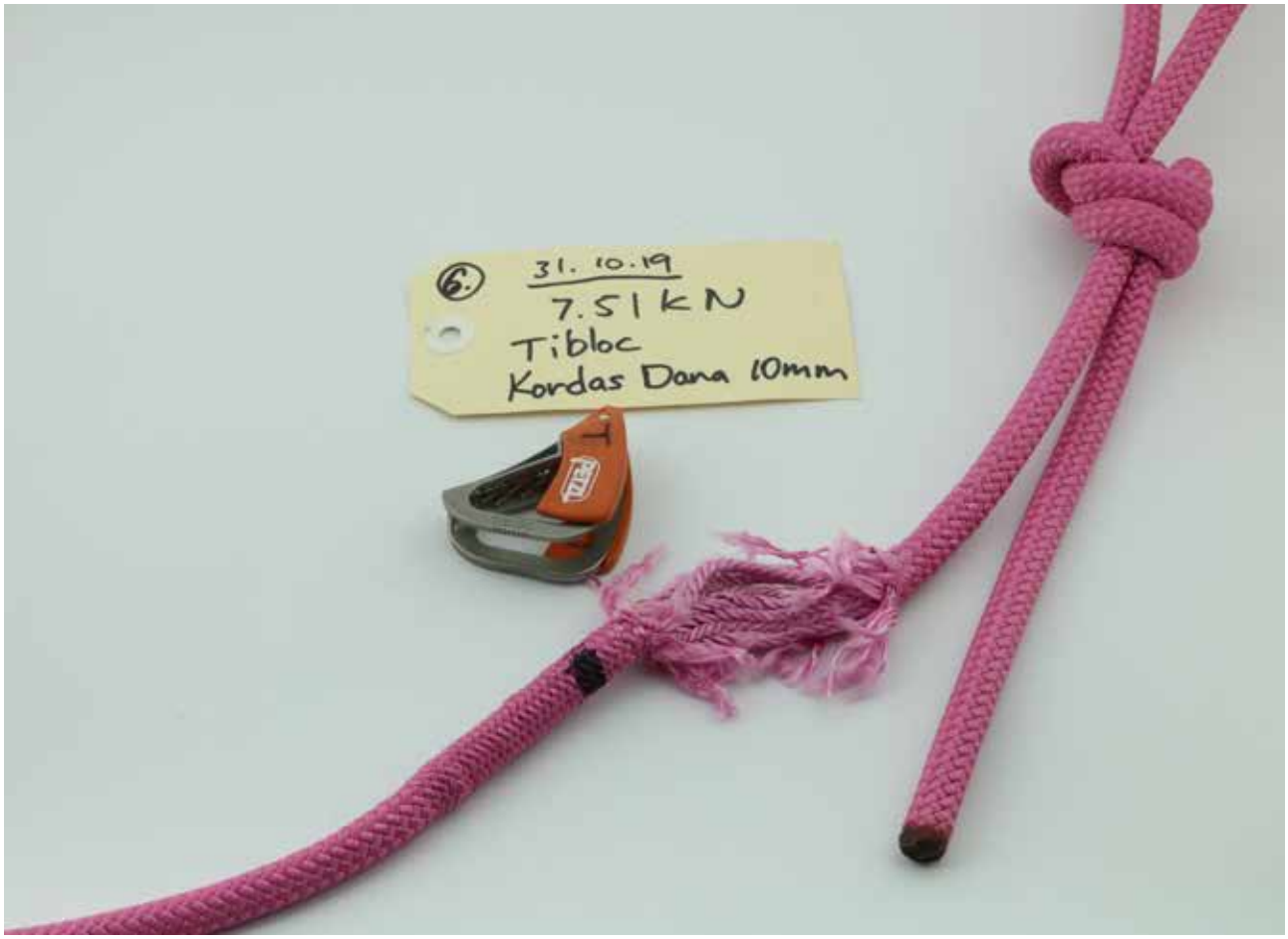

6.
31. 10.19
7.51kN
Tibloc
Kordas Dana 10mm


TIBLOC

Petzl Basic

Slow Pull Test	~~Friction Test~~	~~Drop Test~~

Materials

- Korda's 10mm Dana (27kN)
- Petzl Basic

Test setup

- Figure-8 on a bight on one end

Test parameters

- Slow pull speed 100mm/minute
- Tested between 12mm pin and 12mm steel carabiner

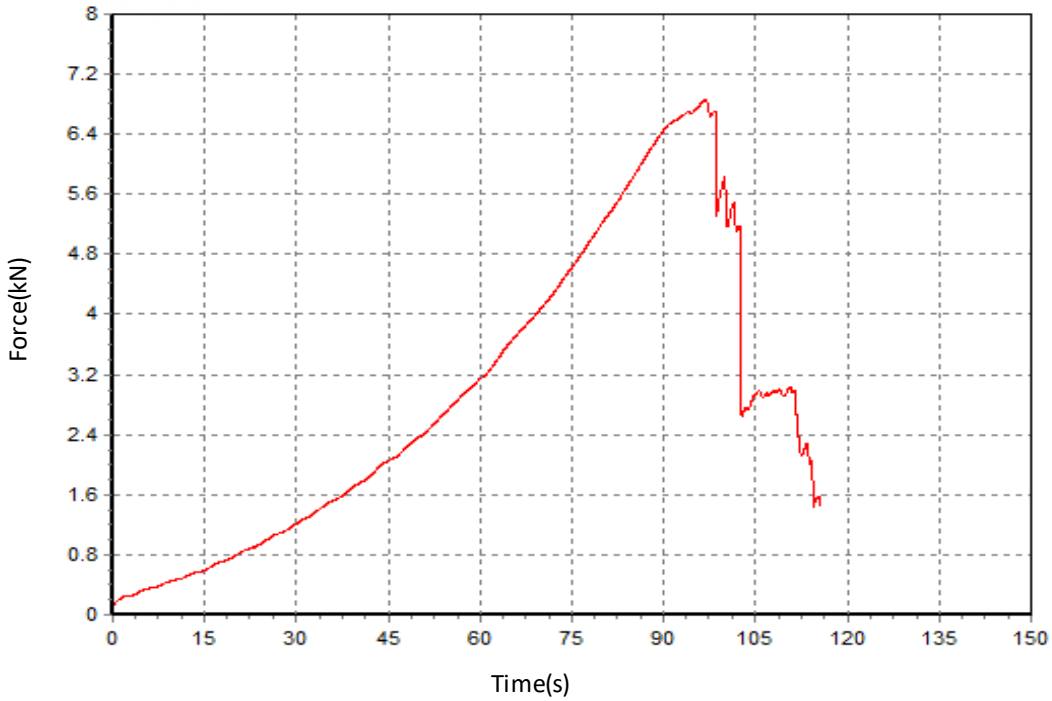
Results

Date	#	Max force (kN)	Comments
31/10/19	8	5.29	Device broke in half. Minor rope damage. Had been used for previous tests.
31/10/19	9*	6.85	Stripped sheath of rope
10/08/20	2	6.92	Device broke in half. Minor rope damage. New device.
Average		**6.35**	

* Sample 31/10/19 #9 of the testing shown on the following pages.

Test Date:	Thursday, 31 October 2019
Max Force (kN):	6.85
Product Name:	Basic
Batch #:	9
Material:	10mm Kordas Dana

Force-Time Curve



Tested by: Grant Prattley

Signed:

Machine has a current calibration certificate. www.aspiring.co.nz


9.
31.10.19
6.85kN
Basic
Kordas Dana 10mm

Biner block

Slow Pull Test	~~Friction Test~~	~~Drop Test~~

Materials

- Korda's 10mm Dana (27kN)
- 12mm steel carabiner 50kN

Test setup

- Figure-8 on a bight on one end
- 8mm oval rapide
- Clove hitch on spine of 12mm steel carabiner

Test parameters

- Slow pull speed 100mm/minute
- Tested between 12mm pin, 8mm rapide and 12mm steel carabiner

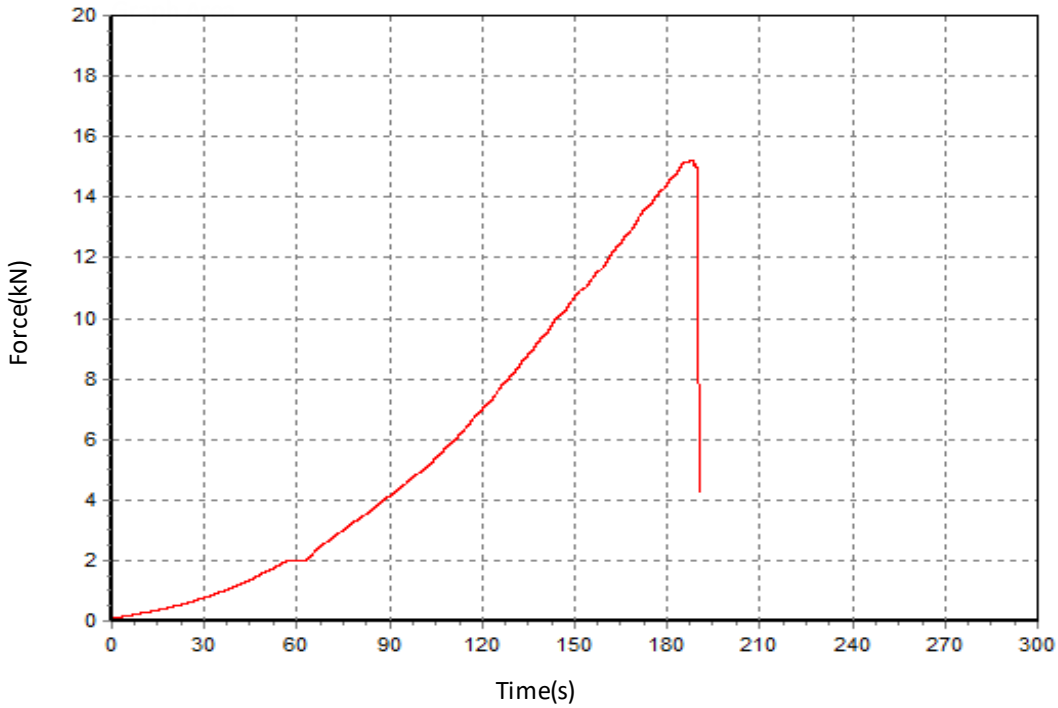
Results

Date	#	Max force (kN)	%	Comments
11/03/21	2*	15.21	56	Broke at the rope as it exited the clove hitch threaded through the 8mm rapide
31/03/21	3	16.91	63	Broke at the rope as it exited the clove hitch threaded through the 8mm rapide
31/03/21	4	16.80	62	Broke at the rope as it exited the clove hitch threaded through the 8mm rapide
Average		**16.31**	**60**	

* Sample 11/03/21 #2 of the testing shown on the following pages.

Test Date:	Thursday, 11 March 2021
Max Force (kN):	15.21
Product Name:	Biner Block
Batch #:	2
Material:	10mm Kordas Dana

Force-Time Curve



Tested by: Grant Prattley

Signed:

Machine has a current calibration certificate. www.aspiring.co.nz


#: 2 Date: 11/03/21
Test: Slow Pull 100mm/min
Product: Biner block clove hitch
Rope: 10mm Kordas Dana
Force: 15.21kN (56%)

Munter mule overhand

Slow Pull Test	~~Friction Test~~	~~Drop Test~~

Materials

- Korda's 10mm Dana (27kN)
- CT Steel carabiner

Test setup

- Figure-8 on a bight on one end
- Munter mule overhand on the 12mm steel carabiner

Test parameters

- Slow pull speed 100mm/minute
- Tested between 12mm pin and 12mm steel carabiner

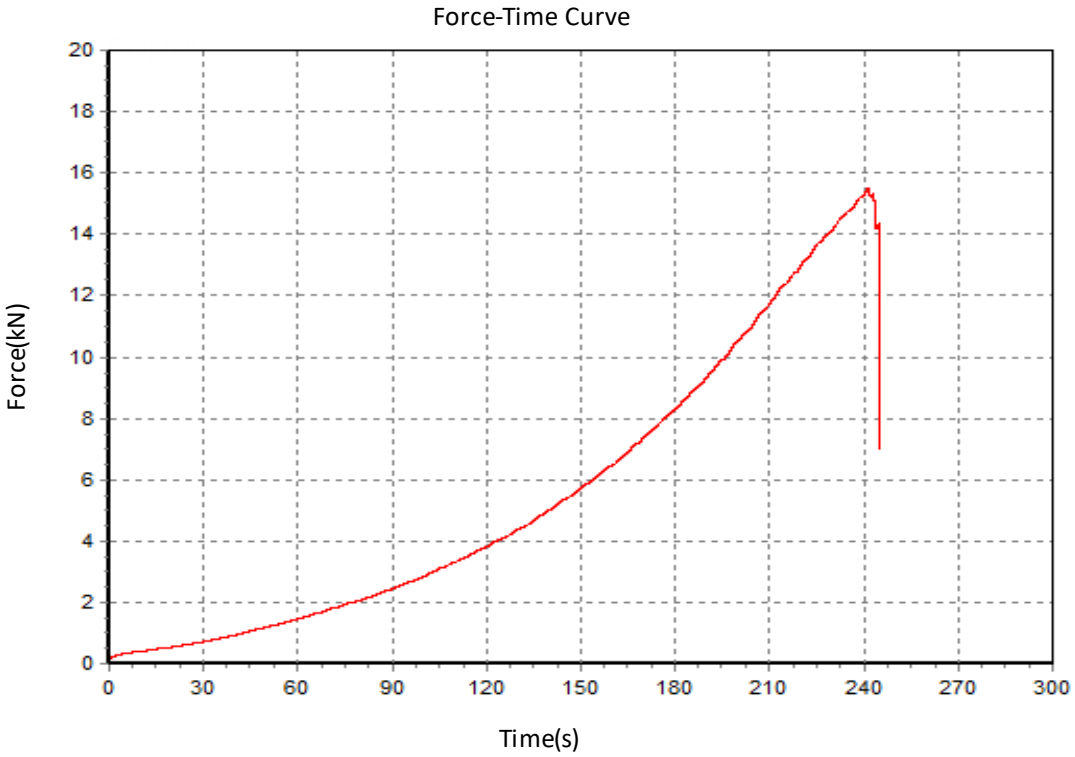
Results

Date	#	Max force (kN)	%	Comments
31/10/19	12*	15.51	57%	Broke at the rope at the first cross of the Munter
31/10/19	13	15.87	59%	Broke at the rope at the first cross of the Munter
18/06/19	11	14.67	54%	Broke at the rope at the first cross of the Munter
Average		**15.35**	57%	

* Sample 31/10/19 #12 of the testing shown on the following pages.

ASPIRING

Test Date:	Thursday, 31 October 2019
Max Force (kN):	15.51
Product Name:	Munter Mule Overhand
Batch #:	12
Material:	10mm Kordas Dana



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Tested by: Grant Prattley

Signed: Grant Prattley

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(12) 31.10.19
15.51 KN
Munter Mule
Kordas Dana 10mm

Figure-8 device block (version 3)

Slow Pull Test	~~Friction Test~~	~~Drop Test~~

Materials

- Korda's 10mm Dana (27kN)
- Petzl Huit Figure-8

Test setup

- Figure-8 on a bight on one end
- 8mm oval rapide

Test parameters

- Slow pull speed 100mm/minute
- Tested between 12mm pin and 12mm steel carabiner

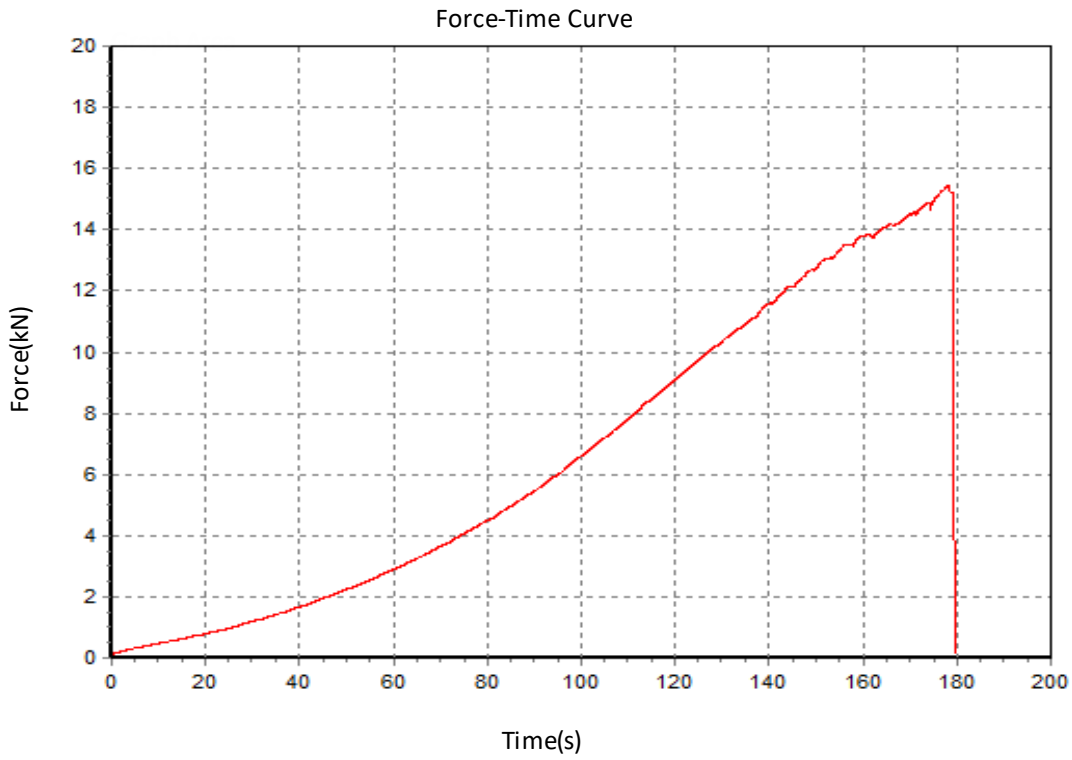
Results

Date	#	Max force (kN)	%	Comments
31/03/21	5*	15.44	57	Broke at the rope as it exited the figure-8 block threaded through the 8mm rapide
31/03/21	6	16.41	61	Broke at the rope as it exited the figure-8 block threaded through the 8mm rapide
31/03/21	7	16.52	61	Broke at the rope as it exited the figure-8 block threaded through the 8mm rapide
Average		**16.12**	**60**	

* Sample 31/03/21 #5 of the testing shown on the following pages.

ASPIRING

Test Date:	Wednesday, 31 March 2021
Max Force (kN):	15.44
Product Name:	Fig-8 Block v3
Batch #:	5
Material:	10mm Kordas Dana



ECAAS ISO 9001 CERTIFIED Quality Management

Tested by: Grant Prattley

Signed: Grant Prattley

Machine has a current calibration certificate. www.aspiring.co.nz


#: 5 Date: 31/03/21
Test: Slow Pull 100mm/min
Product: Figure-8 device block
version 3
Rope: 10mm Kordas Dana
Force: 15.44kN (57%)

Figure-8 in front of 8mm VT Prusik 6-on-1

Slow Pull Test	~~Friction Test~~	~~Drop Test~~

Materials

- Korda's 10mm Dana (27kN)
- BlueWater 8mm VT (29.5kN)
- Petzl Huit (figure-8 device)

Test setup

- 8mm VT sewn
- 6-on-1 Schwabisch asymmetric Prusik
- Figure-8 on a bight on one end
- Extension sling 30cm (90cm 10mm dyneema sling - 22kN - tripled)

Test parameters

- Slow pull speed 100mm/minute
- Tested between 8mm rapides and rope grab

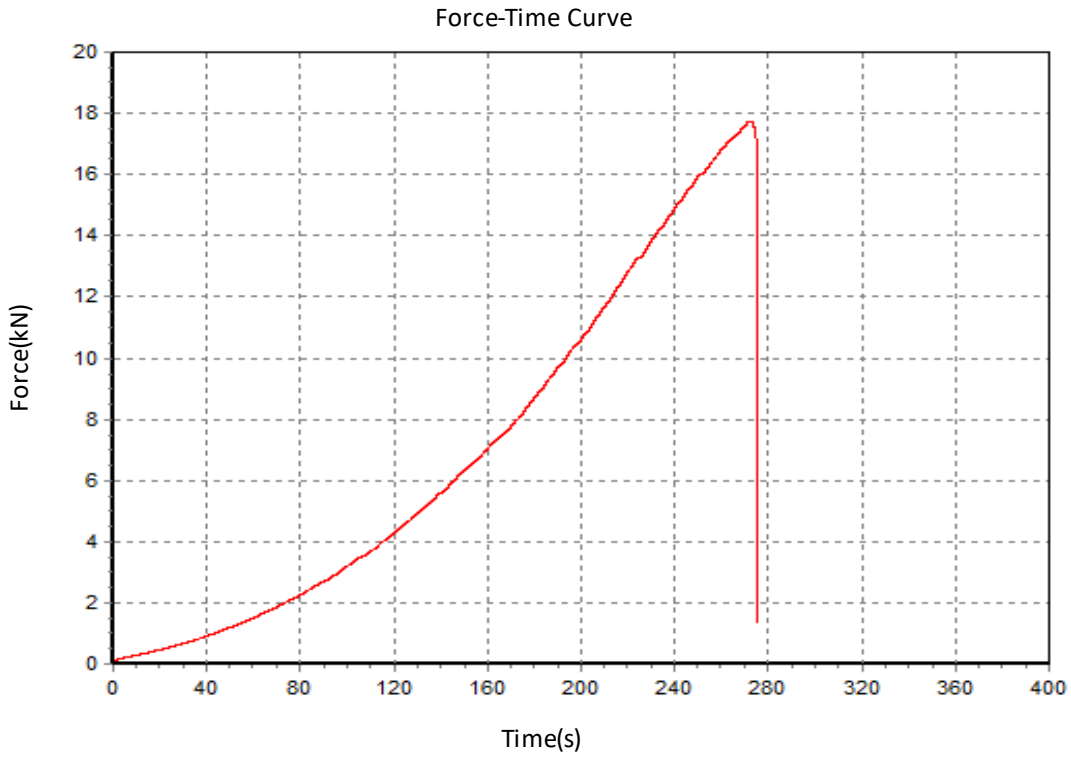
Results

Date	#	Max force (kN)	Comments
11/03/21	14	17.31	Bent small eye of the Petzl Huit figure-8 device.
11/03/21	15*	17.72	Broke small eye of the Petzl Huit figure-8 device.
9/4/21	2	16.97	Bent small eye of the Petzl Huit figure-8 device.
Average		**17.33**	

* Sample 11/02/21 #15 of the testing shown on the following pages.

ASPIRING

Test Date:	Thursday, 11 March 2021
Max Force (kN):	17.72
Product Name:	6on1 BW VT 8mm Fig-8 device in front
Batch #:	15
Material:	10mm Dana Kordas



ECAAS ISO 9001 CERTIFIED QUALITY MANAGEMENT

Tested by: Grant Prattley

Signed: Grant Prattley

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#: 15 Date: 11/03/21
Test: Slow Pull 100mm/min
Product: Figure-8 device CM +
8mm VT 6on1 BW
Rope: 10mm Kordas Dana
Force: 17.72kN

Figure-8 Canyon mode with redirect

~~Slow Pull Test~~	**Friction Test**	~~Drop Test~~

Materials

- Kordas Dana (27kN)
- Petzl Huit figure-8 device

Test setup

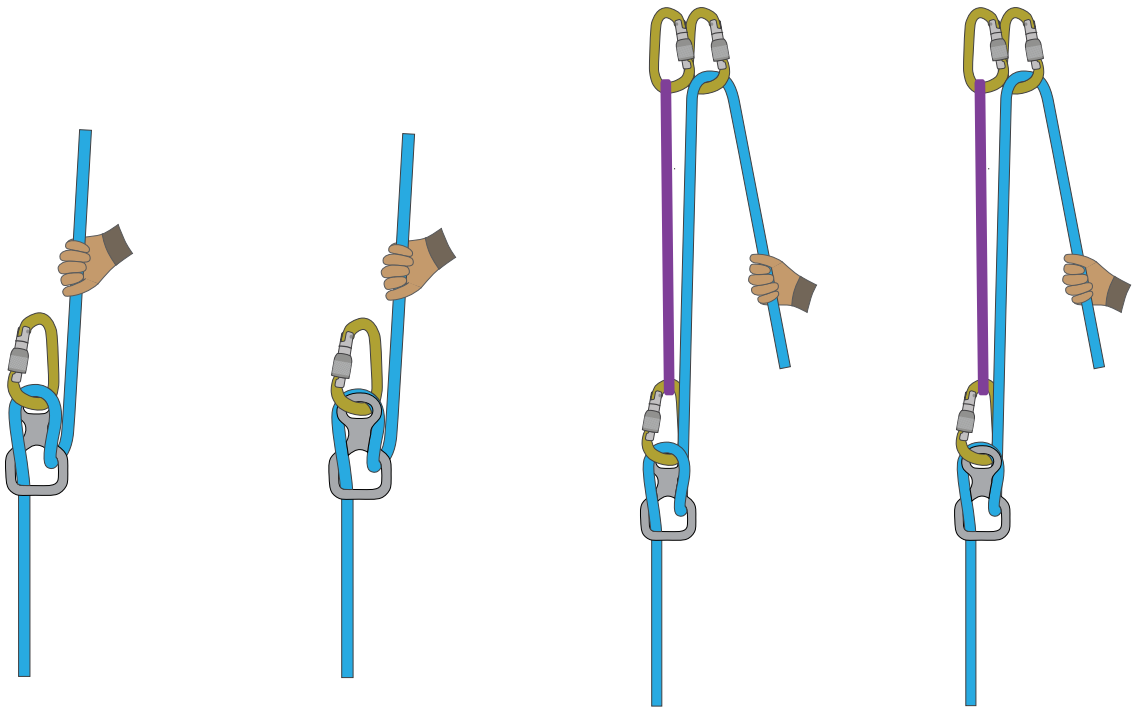
- Figure-8 on a bight on one end, low/high friction settings
- Extension sling 30cm (60cm 10mm dyneema sling - 22kN - doubled)
- First slip is thumb and index finger holding the rope
- Limiting friction is max one gloved dominant hand holding the rope

Test parameters

- Slow Pull speed 100mm/minute
- Tested between 12mm pin and 12mm steel carabiners

Results

Date	#	Type	First slip kN	Limiting friction kN
29/07/20	1	Canyon style low friction	0.31	0.61
29/07/20	2	Canyon style high friction	0.81	1.32
28/09/20	1	Canyon style low friction + redirect	0.4	1.21
28/09/20	2	Canyon style high friction + redirect	1.02	2.32



Low friction | High friction | Low friction with redirect carabiner | High friction with redirect carabiner

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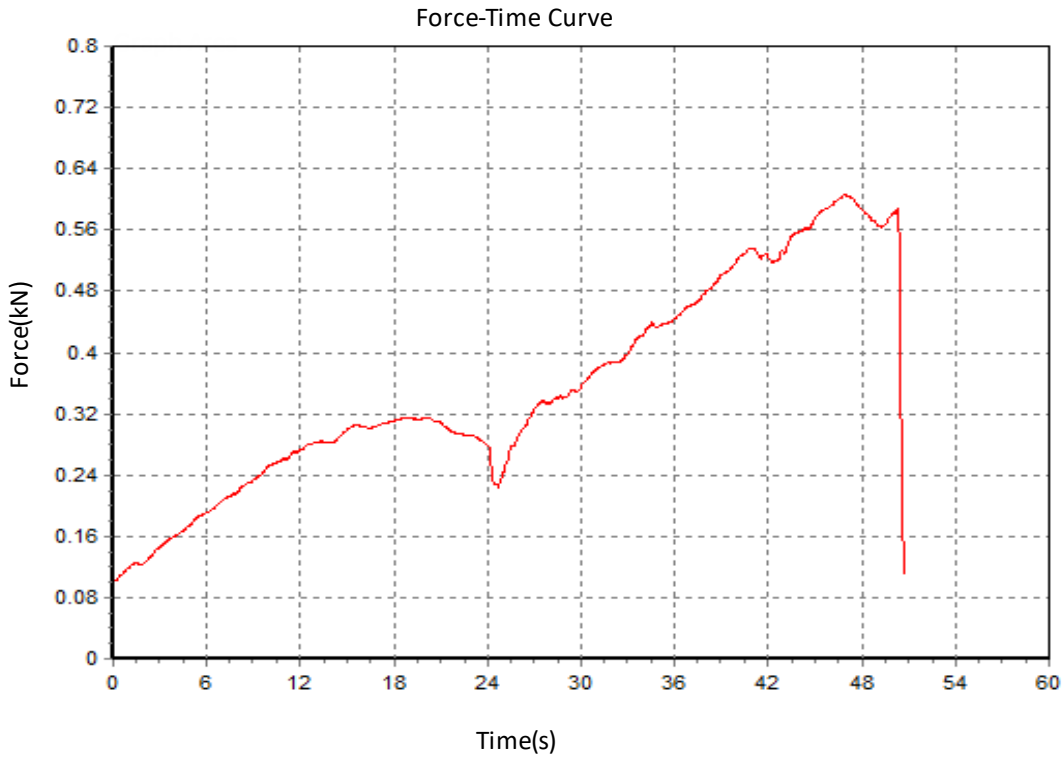
Test Date:	Wednesday, 29 July 2020
Max Force (kN):	0.61
Product Name:	Fig-8 device canyon mode low friction
Batch #:	1
Material:	10mm Kordas Dana



ECAAS ISO 9001 CERTIFIED QUALITY MANAGEMENT

Tested by: Grant Prattley

Signed: Grant Prattley

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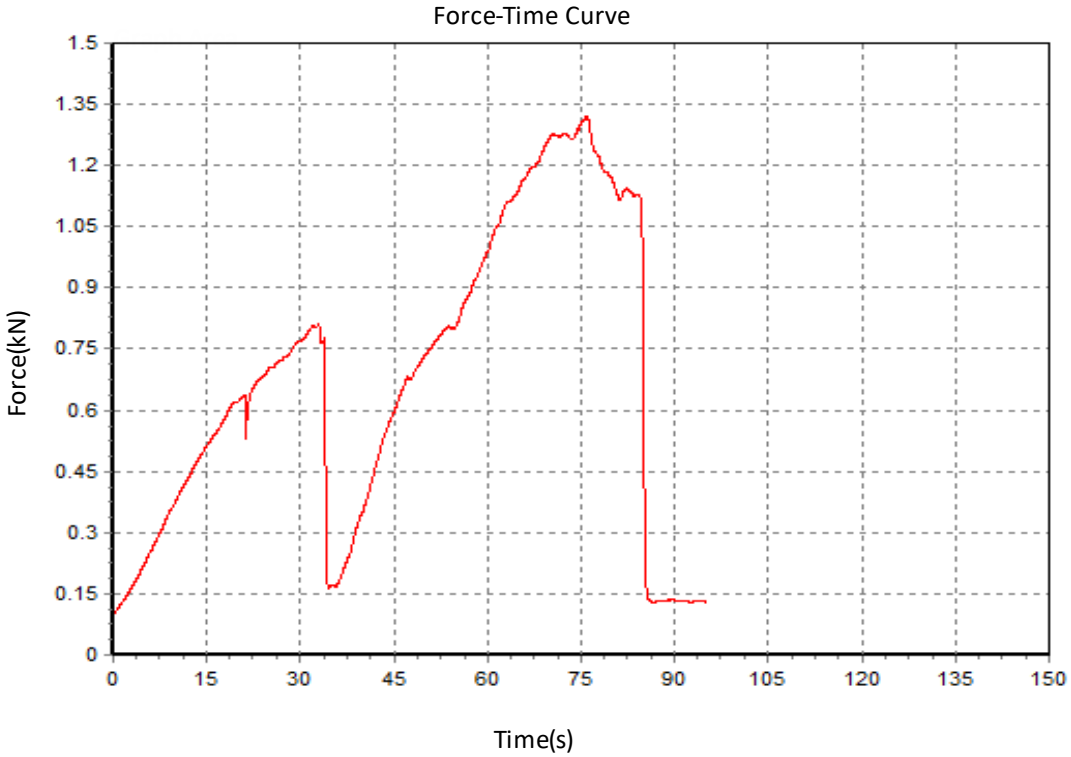
ASPIRING

Test Date:	Wednesday, 29 July 2020
Max Force (kN):	1.32
Product Name:	Fig-8 device canyon mode high friction
Batch #:	2
Material:	10mm Kordas Dana



ECAAS ISO 9001 CERTIFIED QUALITY MANAGEMENT

Tested by: Grant Prattley

Signed: Grant Prattley

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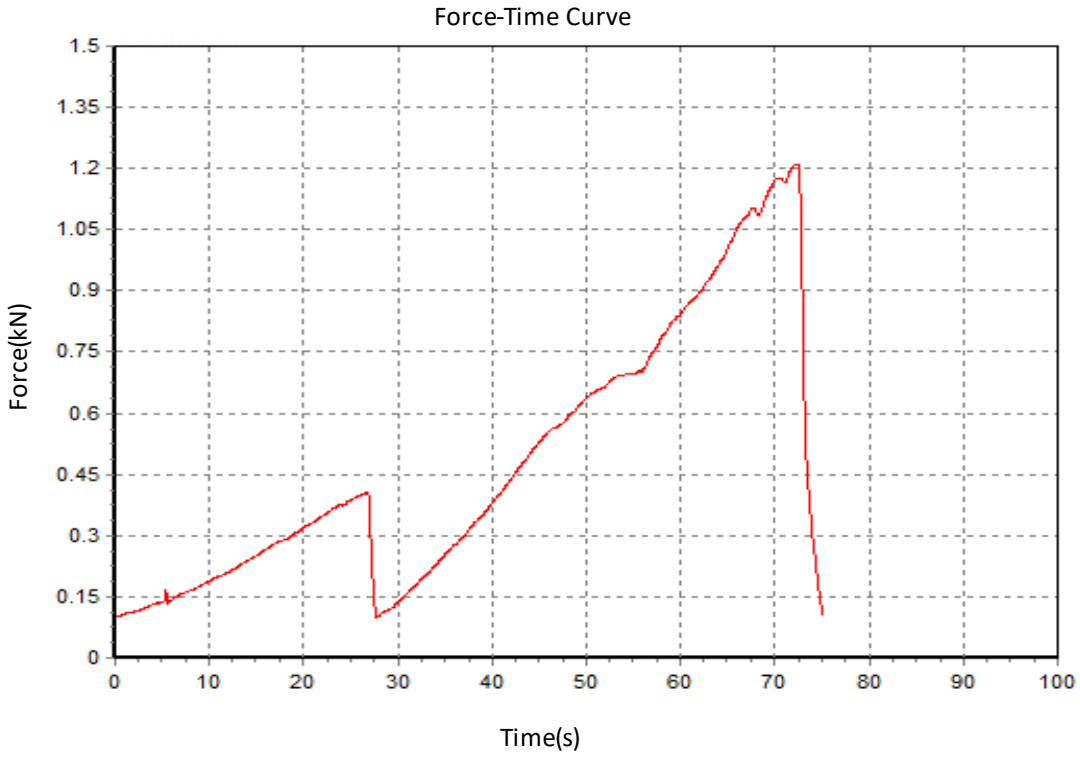
Test Date:	Monday, 28 September 2020
Max force (kN):	1.21
Product Name:	Fig-8 Canyon Style Low friction + redirect
Batch #:	1
Material:	10mm Kordas Dana



ECAAS ISO 9001 CERTIFIED QUALITY MANAGEMENT

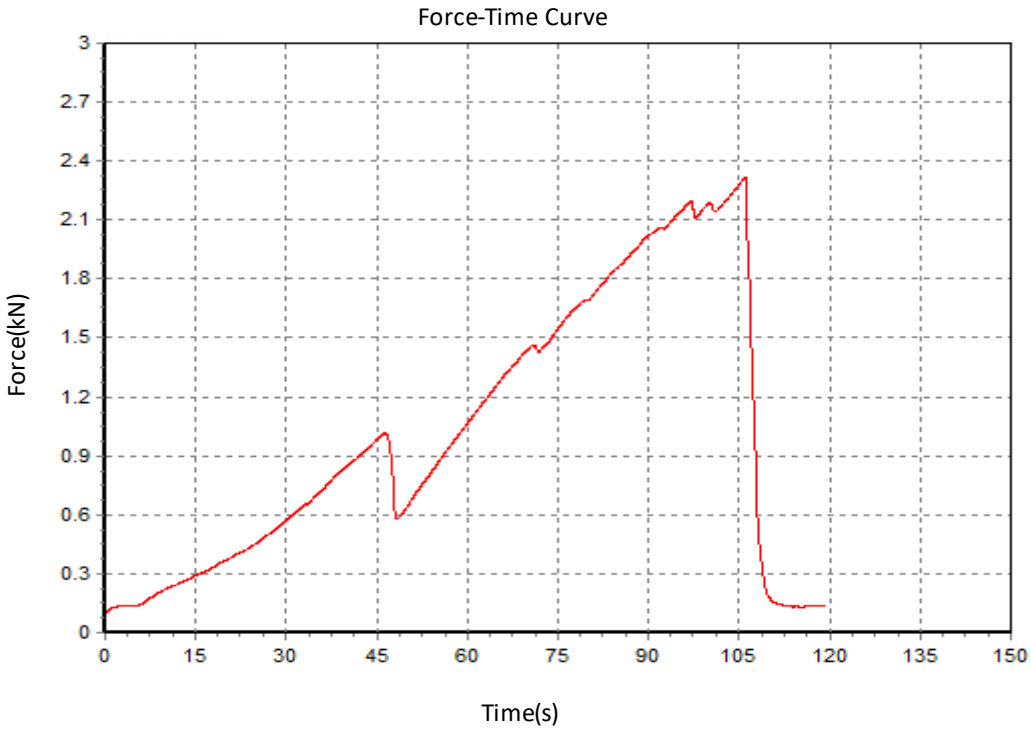
Tested by: Grant Prattley

Signed: Grant Prattley

Machine has a current calibration certificate. www.aspiring.co.nz

ASPIRING

Test Date:	Monday, 28 September 2020
Max Force (kN):	2.32
Product Name:	Fig-8 Canyon Style High friction + redirect
Batch #:	2
Material:	10mm Kordas Dana



ECAAS ISO 9001 CERTIFIED QUALITY MANAGEMENT

Tested by: Grant Prattley

Signed: Grant Prattley

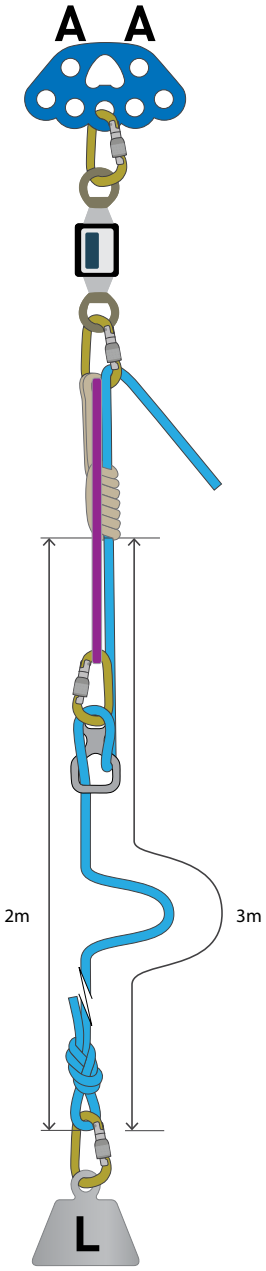
Machine has a current calibration certificate. www.aspiring.co.nz

Figure-8 in front of 8mm VT Prusik 6-on-1 single rope

~~Slow Pull Test~~	~~Friction Test~~	**Drop Test**

Materials

- Korda's 10mm Dana (27kN)
- BlueWater 8mm VT (29.5kN)
- Petzl Huit
- Aspiring 16mm webbing (12.5kN)



Test setup

- 6-on-1 Schwabisch asymmetric Prusik
- Figure-8 device low friction on a 60cm extension
- Extension is a 60cm 16mm webbing tied with a tape bend
- Figure-8 knot on a bight on one end

Test parameters

- 1m drop on 3m of rope (3m measured from Prusik)
- 200kg mass
- Single rope
- Tested between 12mm steel carabiners

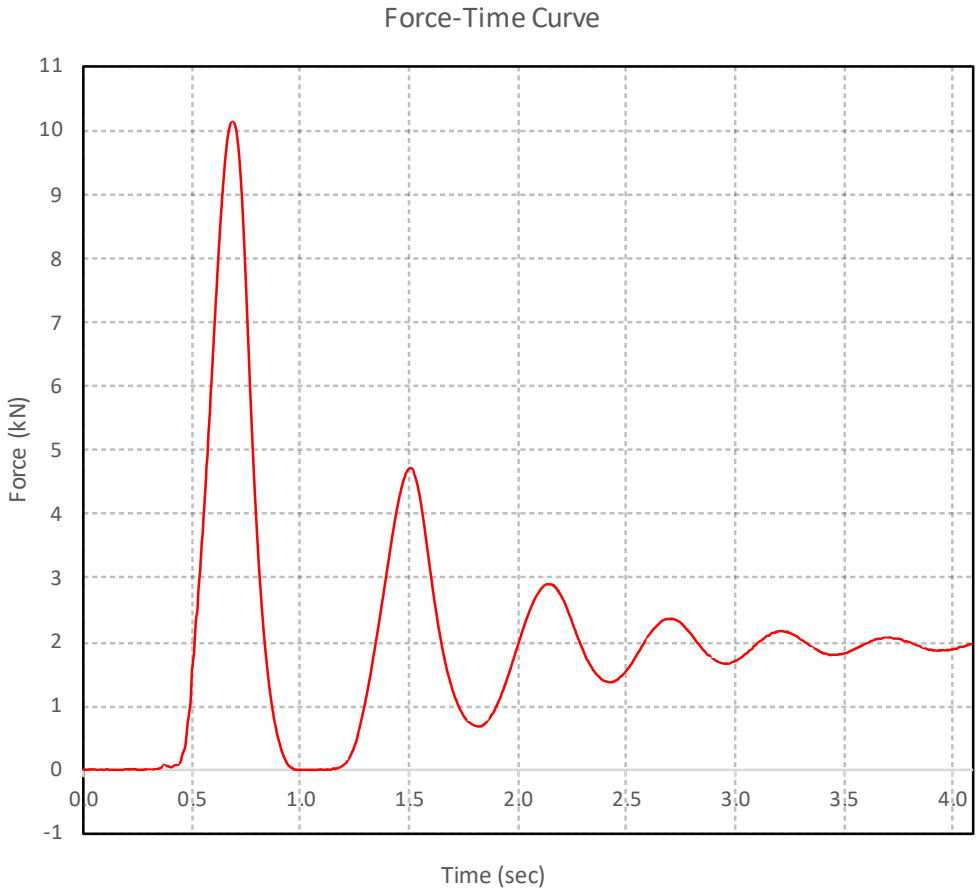
Results

Date	#	Max arrest force (kN)	Comments
13/09/21	1*	10.14	Caught load, 1cm slip at Prusik, slip at device 8.5cm, Prusik releasable
13/09/21	2	9.84	Caught load, 2cm slip at Prusik, slip at device 24cm, Prusik releasable
13/09/21	3	10.01	Caught load, 1cm slip at Prusik, slip at device 14.5cm, Prusik releasable
Average		**10.00**	

* Sample 13/09/21 #1 of the testing shown on the following pages.

OVER·THE·EDGE RESCUE

Test Date:	Monday, 13 September, 2021
Test #:	1
Product Name:	8mm 6on1 BW VT Prusik, single rope, Fig-8 device on 60cm extension
Material:	10mm Korda's Dana
Test type:	1m drop 3m of rope, 200kg
Max arrest force (kN):	10.14kN



Tested by: Grant Prattley

Signed:

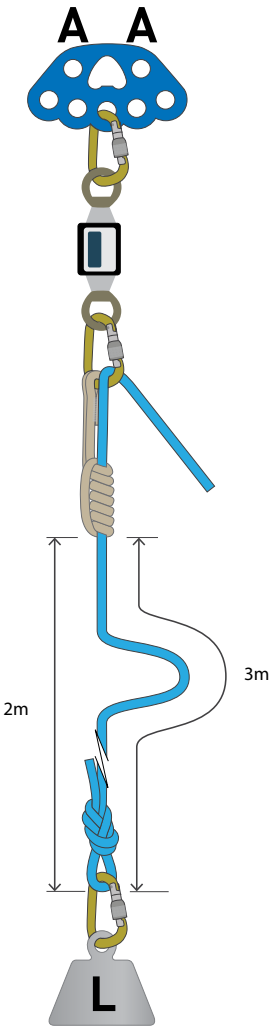

#: 1 Date: 13/09/21
Test: Drop test, 1m drop, 3m rope, 200kg, single rope
Type: Figure-8 device in front of 8mm BlueWater VT 6-on-1
Rope: 10mm Kordas Dana
Force: 10.14kN

8mm VT Prusik 6-on-1 drop single rope

~~Slow Pull Test~~	~~Friction Test~~	**Drop Test**

Materials

- Korda's 10mm Dana (27kN)
- BlueWater 8mm VT (29.5kN)



Test setup

- 8mm VT sewn
- 6-on-1 Schwabisch asymmetric Prusik
- Figure-8 on a bight on one end

Test parameters

- 1m drop on 3m of rope (3m measured from the Prusik)
- 200kg mass
- Single rope
- Tested between 12mm steel carabiners

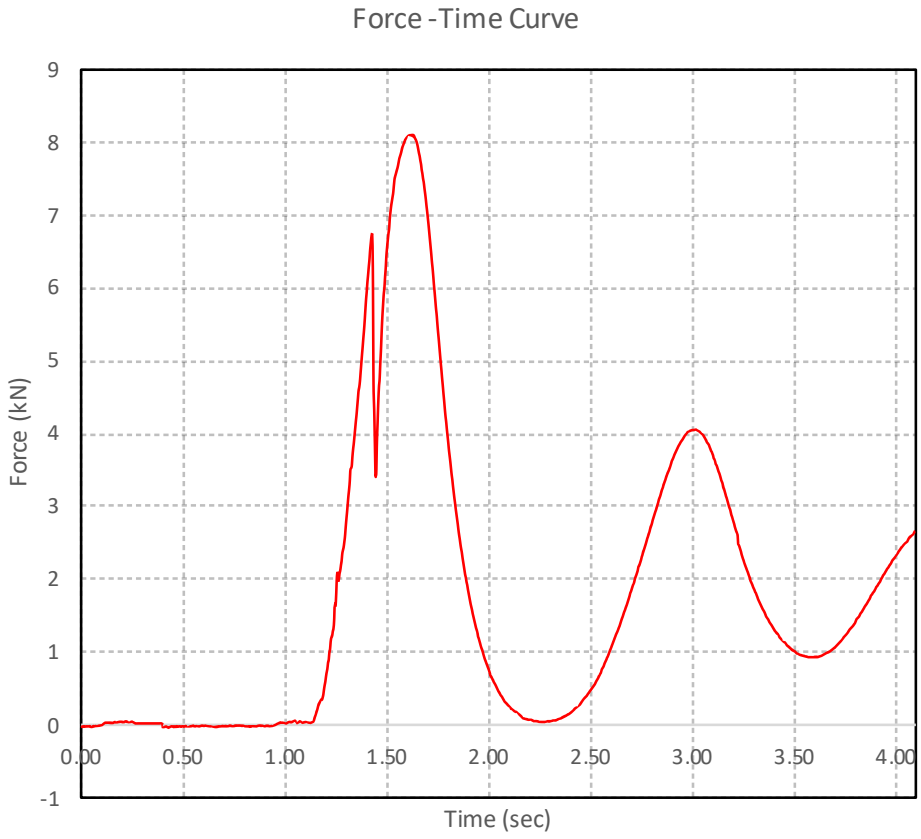
Results

Date	#	Max arrest force (kN)	Comments
9/08/19	1	7.40	Caught load, 88.5cm slip at Prusik, Prusik fused
9/08/19	2	8.54	Caught load, 23cm slip at Prusik, Prusik fused
8/06/20	2*	8.12	Caught load, 17cm slip at Prusik, Prusik fused
Average		**8.02**	

* Sample 8/06/20 #2 of the testing shown on the following pages.

OVER·THE·EDGE RESCUE

Test Date:	Monday, 8 June, 2020
Test #:	2
Product Name:	8mm 6on1 BW VT Prusik, single rope
Material:	10mm Korda's Dana
Test type:	1m drop 3m of rope, 200kg
Max arrest force (kN):	8.12kN



Tested by: Grant Prattley

Signed: Grant Prattley

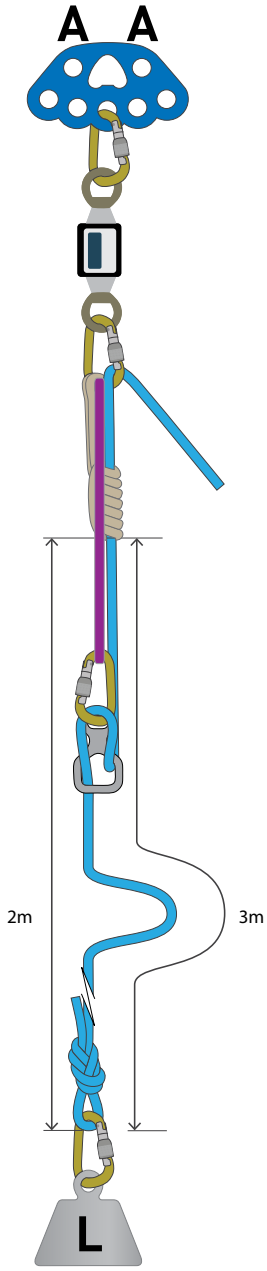

#: 2 Date: 8/6/20
Test: Drop test, 1m drop, 3m rope, 200kg, single rope
Type: 8mm 6-on-1
Rope: 10mm Korda's Dana
Force: 8.12kN

Figure-8 in front of 7mm VT Prusik 6-on-1 single rope

~~Slow Pull Test~~	~~Friction Test~~	**Drop Test**

Materials

- Korda's 10mm Dana (27kN)
- BlueWater 7mm VT (22.6kN)
- Petzl Huit
- Aspiring 16mm webbing (12.5kN)



Test setup

- 6-on-1 Schwabisch asymmetric Prusik
- Figure-8 device low friction on a 60cm extension
- Extension is a 60cm 16mm webbing tied with a tape bend
- Figure-8 knot on a bight on one end

Test parameters

- 1m drop on 3m of rope (3m measured from Prusik)
- 200kg mass
- Single rope
- Tested between 12mm steel carabiners

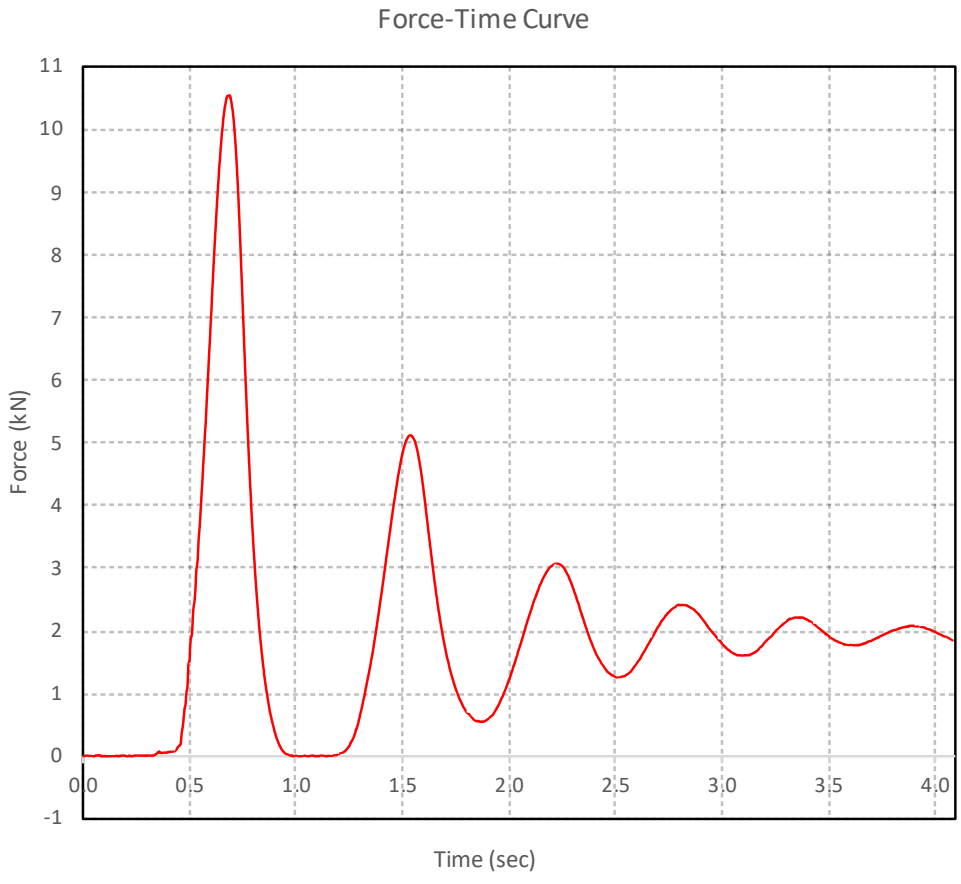
Results

Date	#	Max arrest force (kN)	Comments
19/09/21	1*	10.55	Caught load, 1cm slip at Prusik, slip at device 13.5cm, Prusik releasable
19/09/21	2	10.31	Caught load, 1cm slip at Prusik, slip at device 15.5cm, Prusik releasable
19/09/21	3	10.05	Caught load, 1.5cm slip at Prusik, slip at device 16cm, Prusik releasable
Average		10.30	

* Sample 19/09/21 #1 of the testing shown on the following pages.

OVER·THE·EDGE RESCUE

Test Date:	Sunday, 19 September, 2021
Test #:	1
Product Name:	7mm 6on1 BW VT Prusik, single rope, Fig-8 device on 60cm extension
Material:	10mm Korda's Dana
Test type:	1m drop 3m of rope, 200kg
Max arrest force (kN):	10.55kN



Tested by: Grant Prattley

Signed:


#: 1 Date: 19/09/21
Test: Drop test, 1m drop, 9m rope, 200kg, single rope
Type: Figure-8 device in front of 7mm BlueWater VT 6-on-1
Rope: 10mm Kordas Dana
Force: 10.55kN

7mm VT Prusik 6-on-1 single rope

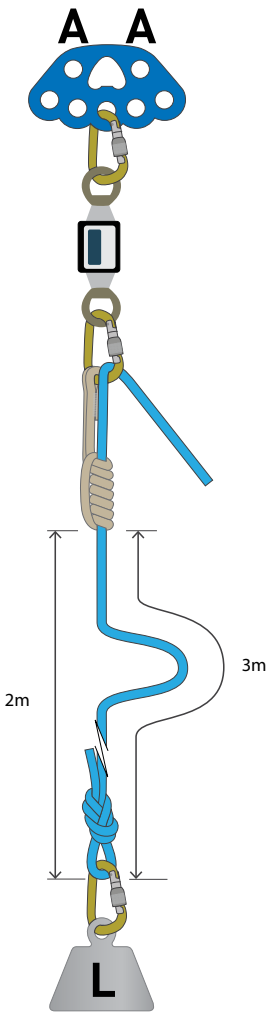
~~Slow Pull Test~~	~~Friction Test~~	**Drop Test**

Materials

- Korda's 10mm Dana (27kN)
- BlueWater 8mm VT (22.6kN)

Test setup

- 7mm VT sewn
- 6-on-1 Schwabisch asymmetric Prusik
- Figure-8 on a bight on one end



Test parameters

- 1m drop on 3m of rope (3m measured from Prusik)
- 200kg mass
- Single rope
- Tested between 12mm steel carabiners

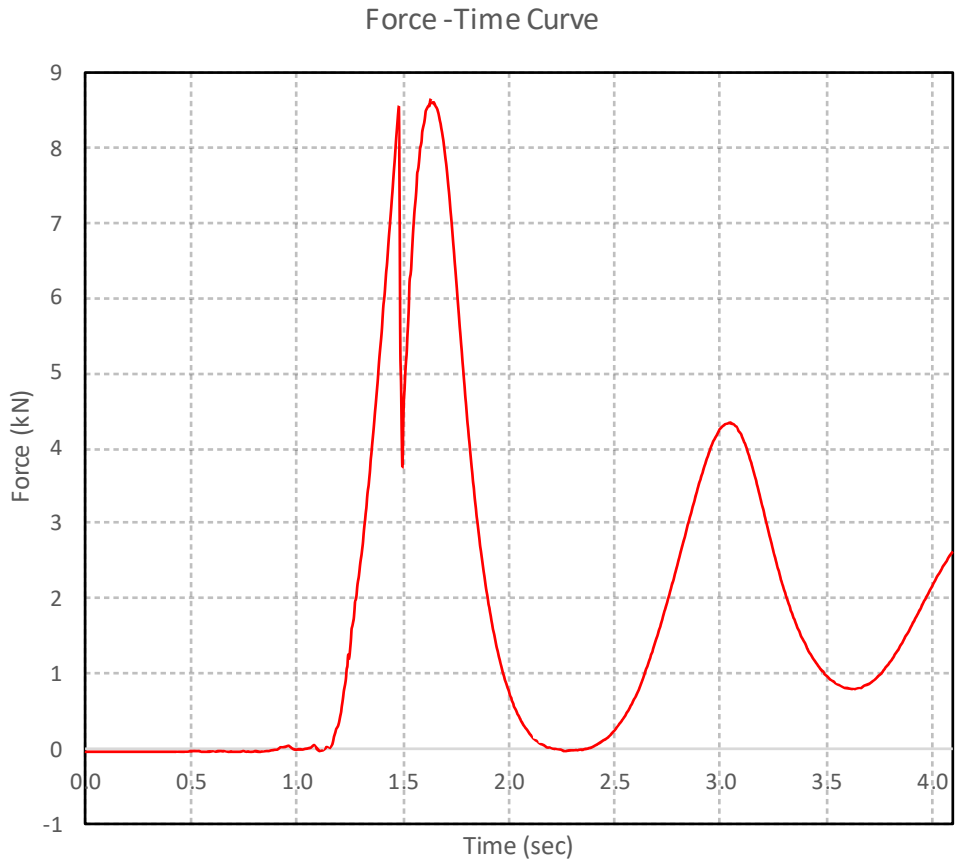
Results

Date	#	Max arrest force (kN)	Comments
27/11/19	1	8.32	Caught load, 19cm slip at Prusik, Prusik fused
27/11/19	2	7.52	Caught load, 67cm slip at Prusik, Prusik fused
9/06/20	2*	8.66	Caught load, 33cm slip at Prusik, Prusik fused
Average		8.17	

* Sample 9/06/20 #2 of the testing shown on the following pages.

OVER·THE·EDGE RESCUE

Test Date:	Tuesday, 9 June, 2020
Test #:	2
Product Name:	7mm 6on1 BW VT Prusik, single rope
Material:	10mm Korda's Dana
Test type:	1m drop 3m of rope, 200kg
Max arrest force (kN):	8.66kN



Tested by: Grant Prattley

Signed: Grant Prattley


#: 2 Date: 9/6/20
Test: Drop test, 1m drop, 3m rope, 200kg, single rope
Type: 7mm 6-on-1
Rope: 10mm Korda's Dana
Force: 8.66kN

8mm VT Prusik 5-on-1 single rope

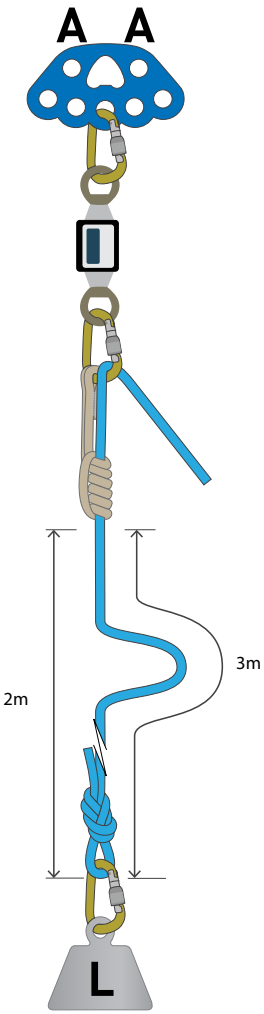
~~Slow Pull Test~~	~~Friction Test~~	**Drop Test**

Materials

- Korda's 10mm Dana (27kN)
- BlueWater 8mm VT (29.5kN)

Test setup

- 8mm VT sewn
- 5-on-1 Schwabisch asymmetric Prusik
- Figure-8 on a bight on one end



Test parameters

- 1m drop on 3m of rope (3m measured from Prusik)
- 200kg mass
- Single rope
- Tested between 12mm steel carabiners

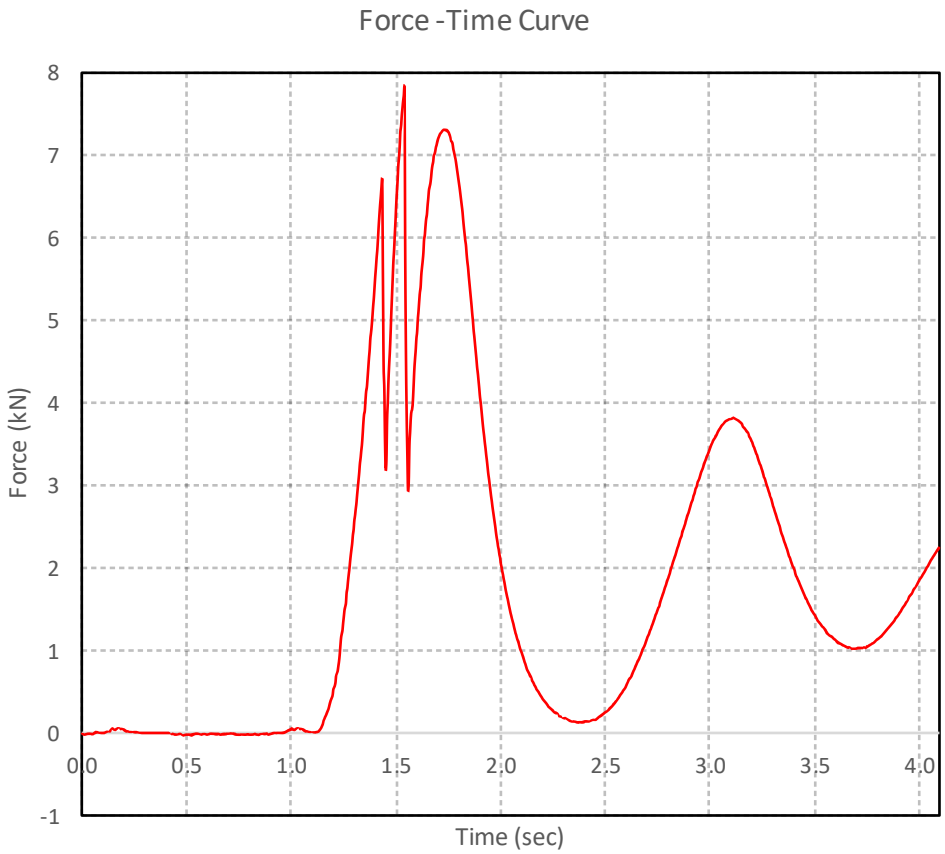
Results

Date	#	Max arrest force (kN)	Comments
13/11/19	1	6.58	Caught load, 106cm slip at Prusik, Prusik fused
13/11/19	2	6.44	Caught load, 107cm slip at Prusik, Prusik fused
8/06/20	3*	7.84	Caught load, 34.5cm slip at Prusik, Prusik fused.
Average		6.95	

* Sample 8/06/20 #3 of the testing shown on the following pages.

OVER·THE·EDGE RESCUE

Test Date:	Monday, 8 June, 2020
Test #:	3
Product Name:	8mm 5on1 BW VT Prusik, single rope
Material:	10mm Korda's Dana
Test type:	1m drop 3m of rope, 200kg
Max arrest force (kN):	7.84kN



Tested by: Grant Prattley

Signed:


#: 3 Date: 8/6/20
Test: Drop test, 1m drop, 3m rope, 200kg, single rope
Type: 8mm 5-on-1
Rope: 10mm Korda's Dana
Force: 7.84kN

Petzl Micro Traxion single rope

~~Slow Pull Test~~	~~Friction Test~~	**Drop Test**

Materials

- Korda's 10mm Dana (27kN)
- Petzl Micro Traxion

Test setup

- Figure-8 on a bight on one end

Test parameters

- 1m drop on 3m of rope (3m measured from the Micro Traxion)
- 200kg mass
- Single rope
- Tested between 12mm steel carabiners

Results

Date	#	Max arrest force (kN)	Comments
13/11/19	3*	6.38	Caught load, 99cm slip at Microtraxion, Stripped sheath
13/11/19	4	6.05	Load hit the ground. Cut rope.
Average		6.22	

* Sample 13/11/19 #3 of the testing shown on the following pages.


13.11.19
6.38kN/99cm slip
Microtraxion
1m drop 3m of rope
Kordas Dana 10mm

8mm VT Prusik 6-on-1 single rope (factor 0.5)

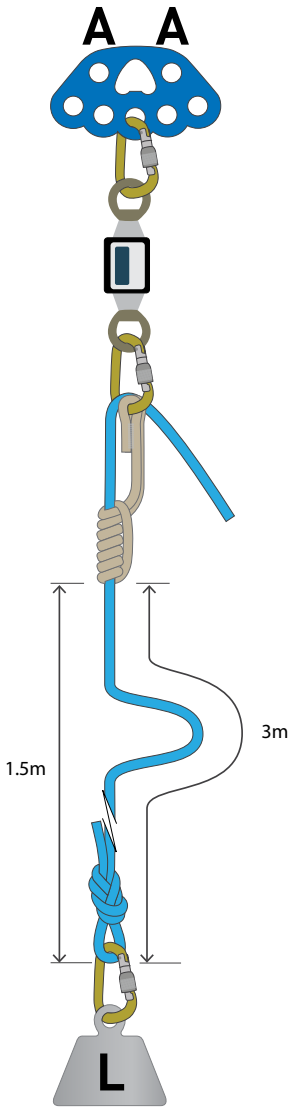
~~Slow Pull Test~~	~~Friction Test~~	**Drop Test**

Materials

- Korda's 10mm Dana (27kN)
- BlueWater 8mm VT (29.5kN)

Test setup

- 8mm VT sewn
- 6-on-1 Schwabisch asymmetric Prusik
- Figure-8 on a bight on one end



Test parameters

- 1.5m drop on 3m of rope (3m measured from Prusik)
- 200kg mass
- Single rope
- Tested between 12mm steel carabiners

Results

Date	#	Max arrest force (kN)	Comments
26/08/21	1*	9.04	Caught load, 35cm slip at Prusik, Prusik fused.
26/08/21	2	8.62	Caught load, 20cm slip at Prusik, Prusik fused.
26/08/21	3	7.70	Caught load, 78.5cm slip at Prusik, Prusik fused.
Average		**8.45**	

* Sample 26/08/21 #1 of the testing shown on the following pages.

OVER·THE·EDGE RESCUE

Test Date: Thursday, 26 August, 2021

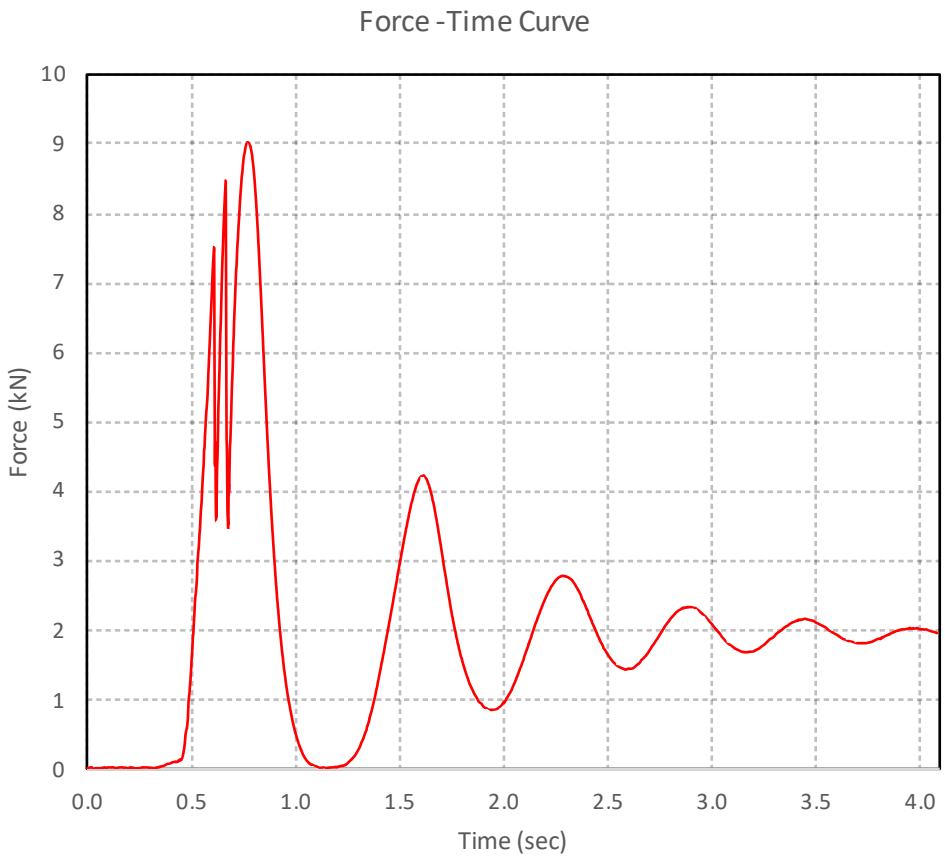
Test #: 1

Product Name: 8mm 6on1 BlueWater VT Prusik

Material: 10mm Kordas Dana

Test type: 1.5m drop 3m of rope, 200kg

Max arrest force (kN): 9.04kN



Tested by: Grant Prattley

Signed:


#: 1 Date: 26/08/21
Test: Drop test, 1.5m drop, 3m rope, 200kg, single rope
Type: 8mm BW VT 6-on-1
Rope: 10mm Kordas Dana
Force: 9.04kN

Fig-8 device with 8mm VT Prusik 6-on-1 in front two rope

~~Slow Pull Test~~	~~Friction Test~~	**Drop Test**

Materials

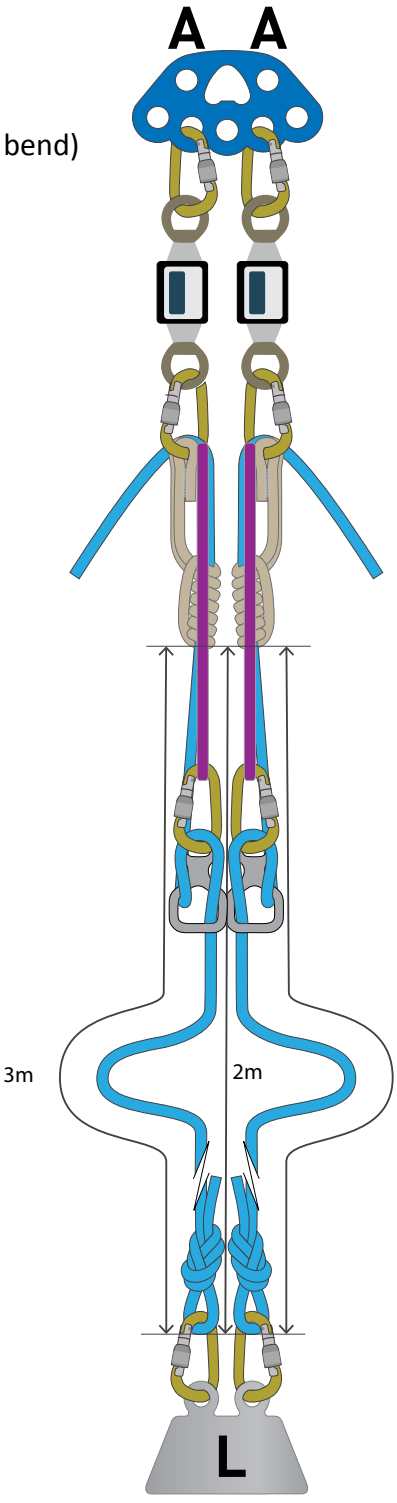
- Korda's 10mm Dana (27kN)
- BlueWater 8mm VT (29.5kN)
- Petzl Huit
- Aspiring 16mm webbing (12.5kN)

Test setup

- 6-on-1 Schwabisch asymmetric Prusik
- Figure-8 device low friction on a 60cm extension 16mm webbing (tape bend)
- Figure-8 knot on a bight on one end

Test parameters

- 1m drop on 3m of rope (3m measured from Prusik)
- 200kg mass
- Two rope
- Tested between 12mm steel carabiners



Results

Date	#	Rope 1 kN	Rope 2 kN	Total kN	Comments
21/07/20	1*	5.96	5.34	11.30	R1: Caught load, 2cm slip at Prusik, Prusik releasable, 13cm slip at device. R2: Caught load, 1cm slip at Prusik, Prusik releasable, 13cm slip at device.
21/07/20	2	6.02	5.34	11.36	R1: Caught load, 1cm slip at Prusik, Prusik releasable, 10cm slip at device. R2: Caught load, 1.5cm slip at Prusik, Prusik releasable, 10.5cm slip at device.
21/07/20	3	5.74	5.5	11.24	R1: Caught load, 1cm slip at Prusik, Prusik releasable, 12cm slip at device. R2: Caught load, 1cm slip at Prusik, Prusik releasable, 14.5cm slip at device.
Average		**5.91**	**5.39**	**11.30**	

* Sample 21/07/20 #1 of the testing shown on the following pages.

OVER·THE·EDGE RESCUE

Test Date: Tuesday, 21 July, 2020

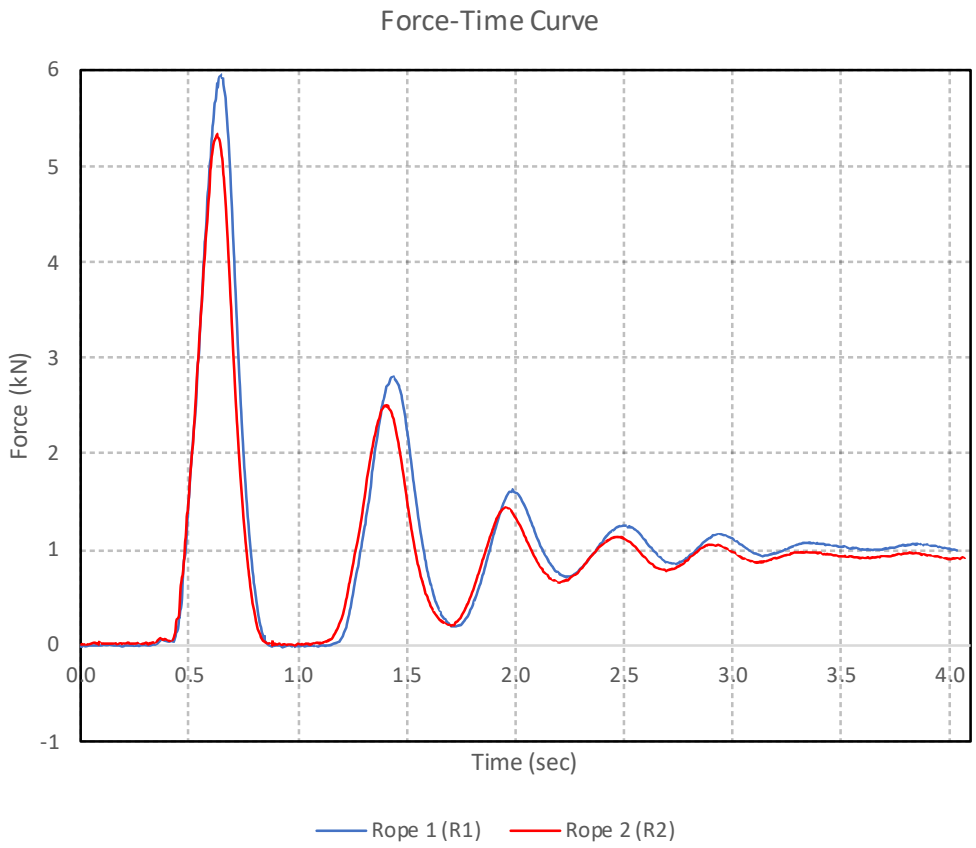
Test #: 1

Product Name: Fig-8 device in front of 6-on-1 8mm BW VT Prusik, two rope

Material: 10mm Kordas Dana

Test type: 1m drop 3m of rope, 200kg

Max arrest force (kN): 11.30kN (R1 = 5.96, R2 = 5.34)



Tested by: Grant Prattley

Signed: Grant Prattley


#: 1 Date: 21/7/20
Test: Drop test, 1m drop,
3m rope, 200kg, two ropes
Type: Fig-8 device, 8mm VT 6-on-1
Rope: 10mm Kordas Dana
Force: 11.3kN (R1=5.96, R2=5.34)


#: 1 Date: 21/7/20
Test: Drop test, 1m drop,
3m rope, 200kg, two ropes
Type: Fig-8 device, 8mm V1 6-on-1
Rope: 10mm Kordas Dana
Force: 11.3kN (R1=5.96, R2=5.34)

8mm VT Prusik 6-on-1 two rope

~~Slow Pull Test~~	~~Friction Test~~	**Drop Test**

Materials

- Korda's 10mm Dana (27kN)
- BlueWater 8mm VT (29.5kN)

Test setup

- 6-on-1 Schwabisch asymmetric Prusik
- Figure-8 on a bight on one end

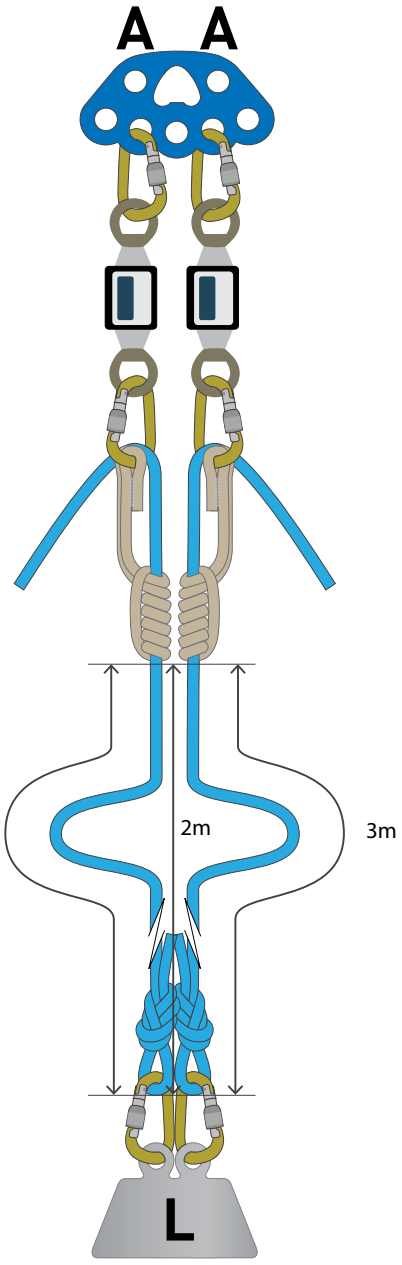
Test parameters

- 1m drop on 3m of rope (3m measured from Prusik)
- 200kg mass
- Two rope
- Tested between 12mm steel carabiners

Results

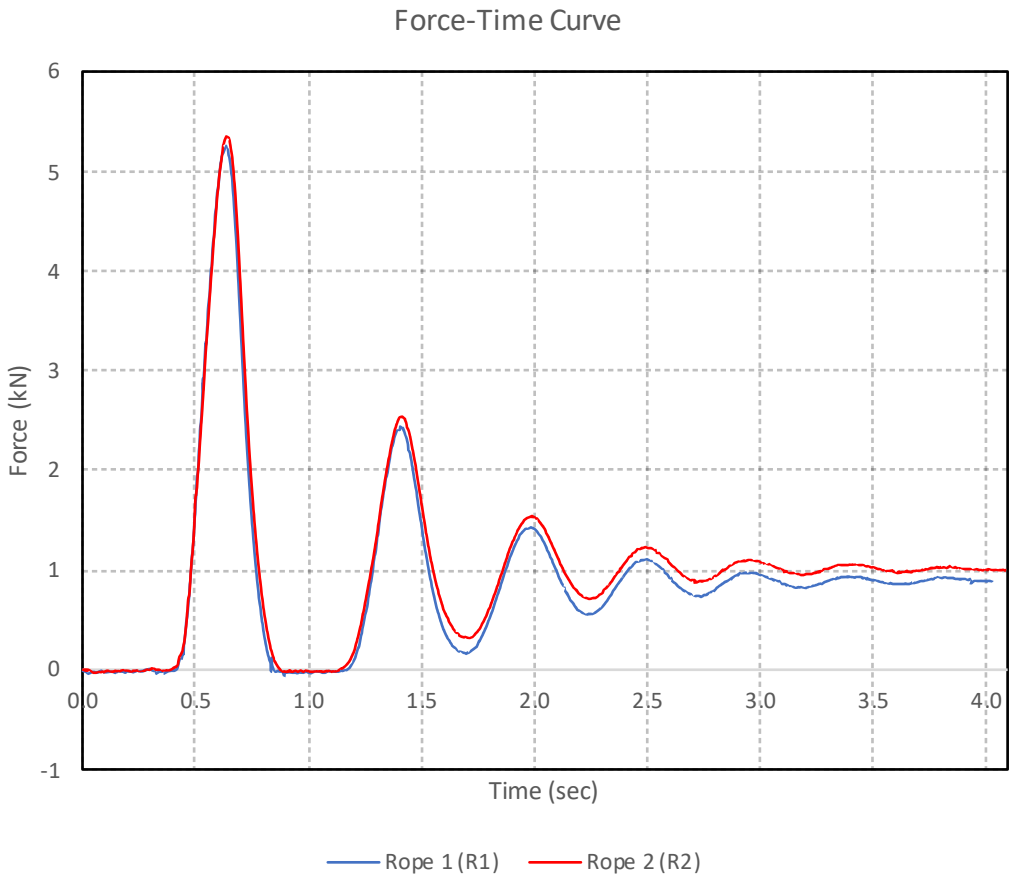
Date	#	Rope 1 (kN)	Rope 2 (kN)	Total (kN)	Comments
28/07/20	1*	5.28	5.34	10.62	R1: Caught load, 2cm slip at Prusik, Prusik releasable. R2: Caught load, 3cm slip at Prusik, Prusik releasable.
28/07/20	2	5.32	5.08	10.40	R1: Caught load, 2.5cm slip at Prusik, Prusik releasable. R2: Caught load, 2.5cm slip at Prusik, Prusik releasable.
28/07/20	3	5.4	5.08	10.48	R1: Caught load, 1.5cm slip at Prusik, Prusik releasable. R2: Caught load, 2cm slip at Prusik, Prusik releasable.
Average		**5.33**	**5.17**	**10.50**	

* Sample 28/07/20 #1 of the testing shown on the following pages.



OVER·THE·EDGE RESCUE

Test Date:	Tuesday, 28 July, 2020
Test #:	1
Product Name:	6-on-1 8mm VT Prusik, two rope
Material:	10mm Kordas Dana
Test type:	1m drop 3m of rope, 200kg
Max arrest force (kN):	10.62kN (R1 = 5.28, R2 = 5.34)



Tested by: Grant Prattley

Signed: Grant Prattley


#: 1 Date: 28/7/20
Test: Drop test, 1m drop,
3m rope, 200kg, two ropes
Type: 8mm VT 6-on-1
Rope: 10mm Kordas Dana
Force: 10.62kN (R1=5.28, R2=5.34)

7mm VT Prusik 6-on-1 two rope

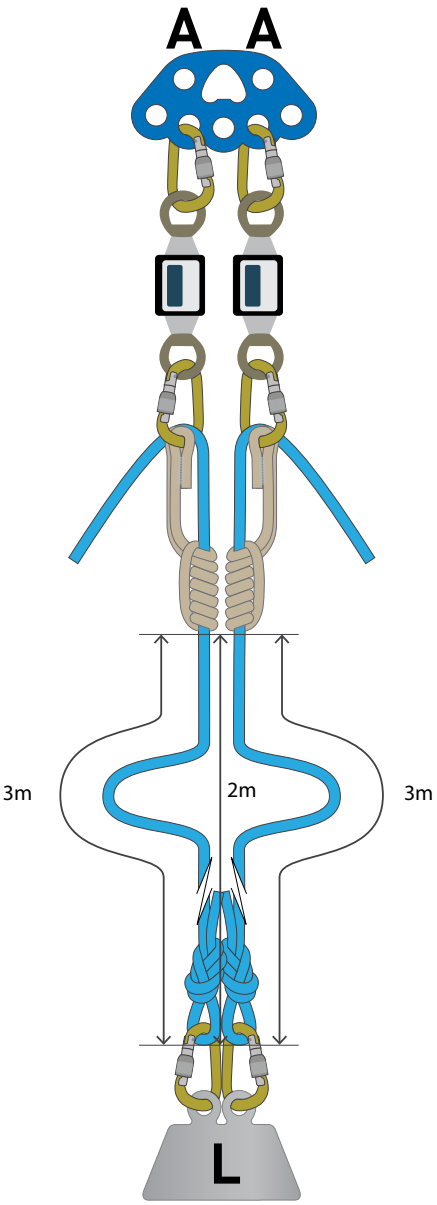
~~Slow Pull Test~~	~~Friction Test~~	**Drop Test**

Materials

- Korda's 10mm Dana (27kN)
- BlueWater 7mm VT (22.6kN)

Test setup

- 6-on-1 Schwabisch asymmetric Prusik
- Figure-8 on a bight on one end



Test parameters

- 1m drop on 3m of rope (3m measured from Prusik)
- 200kg mass
- Two rope
- Tested between 12mm steel carabiners

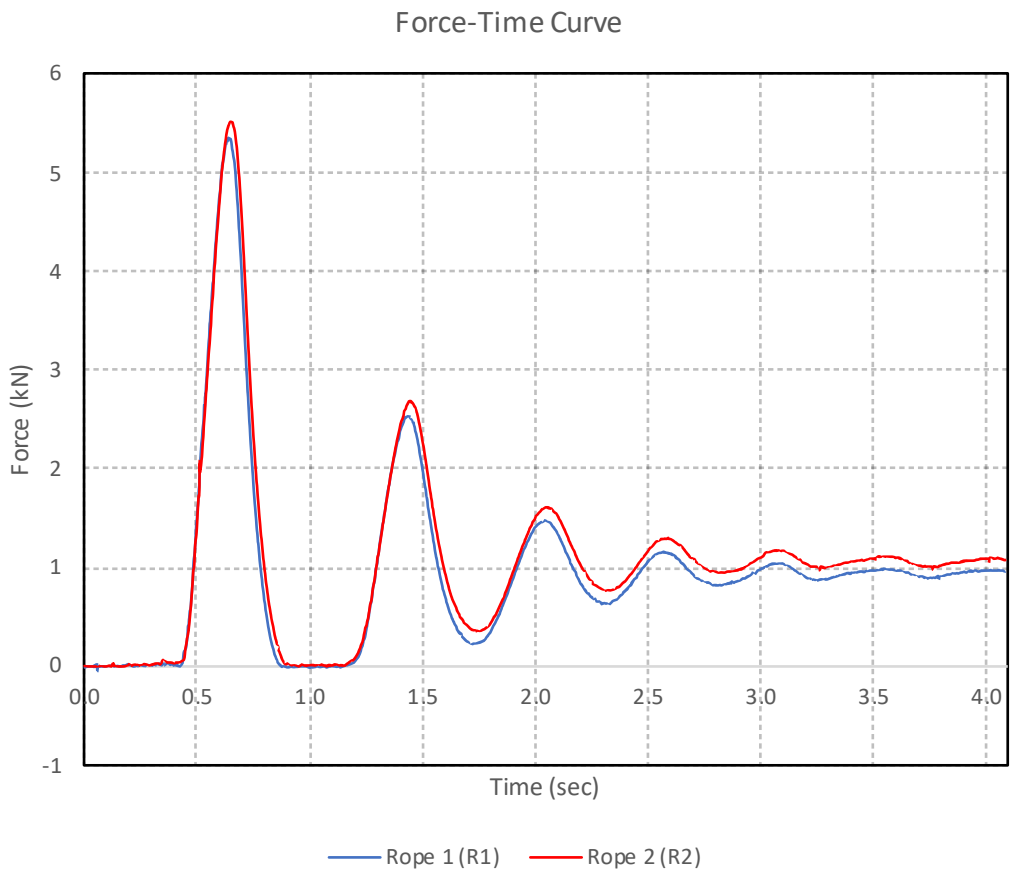
Results

Date	#	Rope 1 (kN)	Rope 2 (kN)	Total (kN)	Comments
28/03/20	1*	5.38	5.52	10.90	R1: Caught load, 2.5cm slip at Prusik, Prusik releasable. R2: Caught load, 3.5cm slip at Prusik, Prusik releasable.
22/03/21	1	5.82	5.4	11.22	R1: Caught load, 3cm slip at Prusik, Prusik releasable. R2: Caught load, 2cm slip at Prusik, Prusik releasable.
22/03/21	2	5.66	5.26	10.92	R1: Caught load, 2cm slip at Prusik, Prusik releasable. R2: Caught load, 2cm slip at Prusik, Prusik releasable.
Average		**5.62**	**5.39**	**11.01**	

* Sample 28/03/20 #1 of the testing shown on the following pages.

OVER·THE·EDGE RESCUE

Test Date:	Saturday, 28 March, 2020
Test #:	1
Product Name:	6-on-1 7mm VT Prusik, two rope, Prusik on each rope
Material:	10mm Kordas Dana
Test type:	1m drop 3m of rope, 200kg
Max arrest force (kN):	10.90kN (R1 = 5.38, R2 = 5.52)



Tested by: Grant Prattley

Signed:


#: 1 Date: 28/3/20
Test: Drop test, 1m drop,
3m rope, 200kg, two ropes
Type: 7mm VT 6-on-1, Schwabisch
Rope: 10mm Kordas Dana
Force: 10.9kN (R1=5.38, R2=5.52)

8mm VT Prusik 5-on-1 two rope

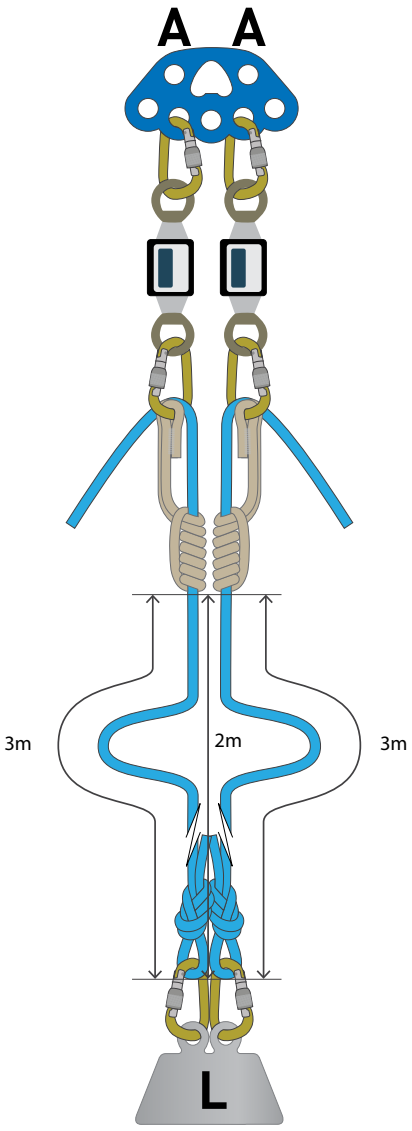
~~Slow Pull Test~~	~~Friction Test~~	**Drop Test**

Materials

- Korda's 10mm Dana (27kN)
- BlueWater 8mm VT (29.5kN)

Test setup

- 8mm VT sewn
- 5-on-1 Schwabisch asymmetric Prusik
- Figure-8 on a bight on one end



Test parameters

- 1m drop on 3m of rope (3m measured from Prusik)
- 200kg mass
- Two rope
- Tested between 12mm steel carabiners

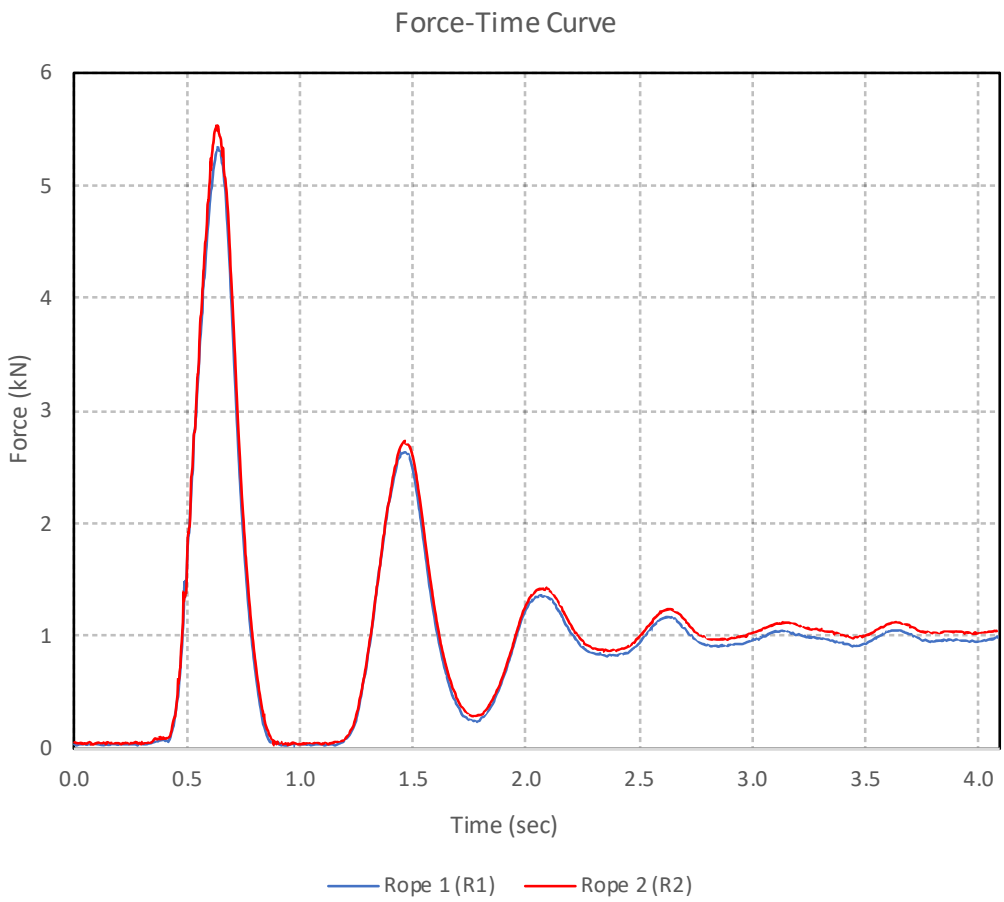
Results

Date	#	Rope 1 (kN)	Rope 2 (kN)	Total (kN)	Comments
18/04/21	1	5.52	5.6	11.12	R1: Caught load, 2cm slip at Prusik, Prusik releasable. R2: Caught load, 2cm slip at Prusik, Prusik releasable.
22/03/21	3*	5.34	5.54	10.88	R1: Caught load, 2cm slip at Prusik, Prusik releasable. R2: Caught load, 2cm slip at Prusik, Prusik releasable.
22/03/21	4	5.32	5.5	10.82	R1: Caught load, 2cm slip at Prusik, Prusik releasable. R2: Caught load, 2cm slip at Prusik, Prusik releasable.
Average		**5.39**	**5.55**	**10.94**	

* Sample 22/03/21 #3 of the testing shown on the following pages.

OVER·THE·EDGE RESCUE

Test Date:	Monday, 22 March 2021
Test #:	3
Product Name:	8mm 5on1 Blue Water VT Prusik, two rope
Material:	10mm Kordas Dana
Test type:	1m drop 3m of rope, 200kg
Max Arrest Force (kN):	10.88kN (R1 = 5.34, R2 = 5.54)



Tested by: Grant Prattley

Signed: Grant Prattley


#: 3 Date: 22/03/21
Test: Drop test, 1m drop,
3m rope, 200kg, two ropes
Type: 8mm VT 5-on-1
Rope: 10mm Kordas Dana
Force: 10.88kN (R1=5.34, R2=5.54)

Petzl Micro Traxion two rope

~~Slow Pull Test~~	~~Friction Test~~	**Drop Test**

Materials

- Korda's 10mm Dana (27kN)
- Petzl Micro Traxion

Test setup

- Figure-8 on a bight on one end

Test parameters

- 1m drop on 3m of rope (3m measured from device)
- 200kg mass
- Two rope
- Tested between 12mm steel carabiners

Results

Date	#	Rope 1 (kN)	Rope 2 (kN)	Total (kN)	Comments
13/11/19	5	6.00	5.84	11.84	Caught load, 99cm slip at Microtraxion, stripped sheath.


5. 13.11.19
6.0 / 5.84kN
1m drop 3m rope
Two ropes
Kordas Dana 10mm

8mm BW VT Prusik 6-on-1 0m drop on 3m rope

~~Slow Pull Test~~	~~Friction Test~~	**Drop Test**

Materials

- Korda's 10mm Dana (27kN)
- BlueWater 8mm VT (29.5kN)

Test setup

- 8mm VT sewn
- 6-on-1 Schwabisch asymmetric Prusik
- Figure-8 on a bight on one end

Test parameters

- 0m drop on 3m of rope (3m measured from Prusik)
- 200kg mass
- 50/50: Start two rope. 50% on tension on each rope. Released onto 1 rope.
- 100/0: Start two rope. 100% on tension on one rope. 0% on tension on the other rope. Released from the 100% tension rope to the 0%.
- Tested between 12mm steel carabiners

Results 50/50

Date	#	Max arrest force (kN)	Comments
25/08/21	1	3.14	1cm slip. Prusik releasable.
25/08/21	2	2.56	0.5cm slip. Prusik releasable.
25/08/21	3	2.60	0.5cm slip. Prusik releasable.
Average		**2.77**	

* Sample 25/08/21 #1 of the testing shown on the following pages.

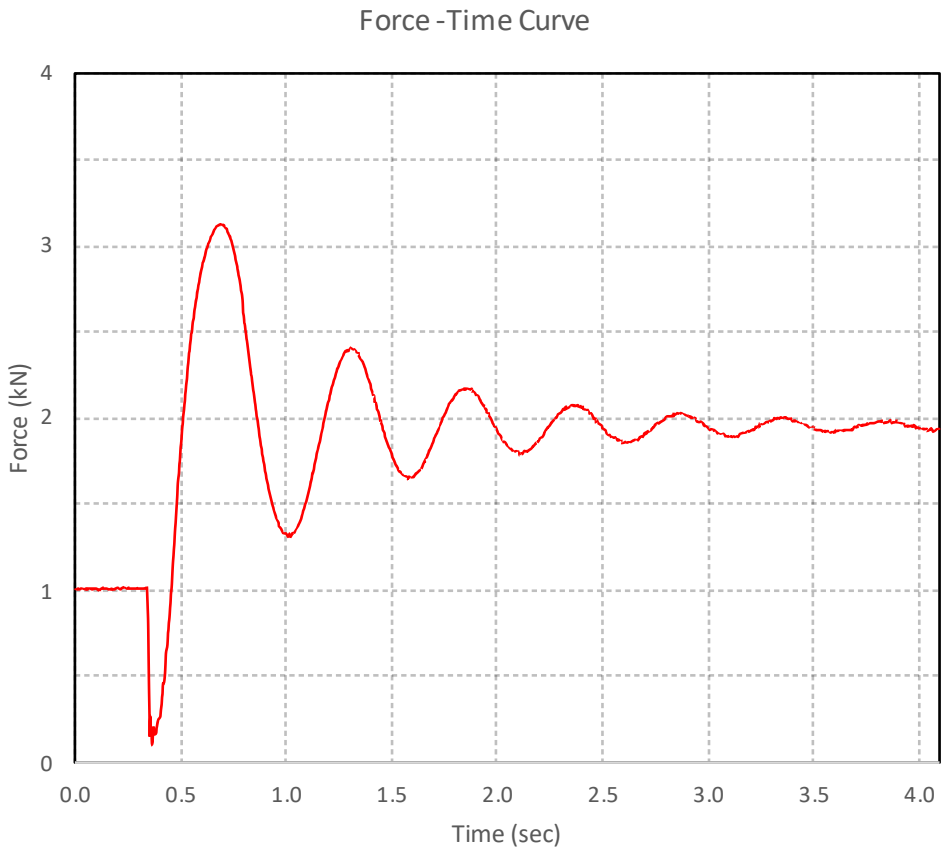
Results 100/0

Date	#	Max arrest force (kN)	Comments
25/08/21	4	3.94	1.0cm slip. Prusik releasable.
25/08/21	5	3.74	1.0cm slip. Prusik releasable.
25/08/21	6	4.36	0.5cm slip. Prusik releasable.
Average		**4.01**	

* Sample 25/08/21 #4 of the testing shown on the following pages.

OVER·THE·EDGE RESCUE

Test Date:	Wednesday, 25 August, 2021
Test #:	1
Product Name:	8mm 6on1 BlueWater VT Prusik, 50/50: 50% on each rope
Material:	10mm Kordas Dana
Test type:	0m drop 3m of rope, 200kg
Max arrest force (kN):	3.14kN



Tested by: Grant Prattley

Signed:

OVER·THE·EDGE RESCUE

Test Date: Wednesday, 25 August, 2021

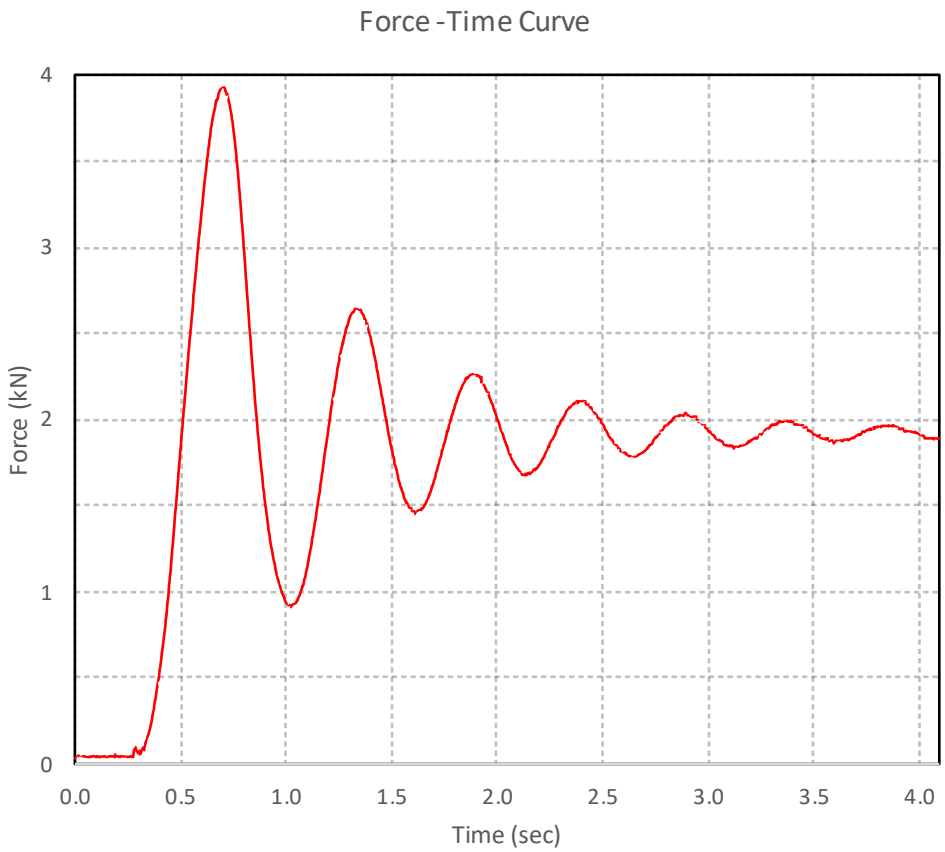
Test #: 4

Product Name: 8mm 6on1 BluwWater VT Prusik,
100/0: 100% on one rope, 0% on the other

Material: 10mm Kordas Dana

Test type: 0m drop 3m of rope, 200kg

Max arrest force (kN): 3.94kN



Tested by: Grant Prattley

Signed: Grant Prattley

Appendix 2: PMI Classic Sport 10mm

Figure-8 on a bight knot

Slow Pull Test	~~Friction Test~~	~~Drop Test~~

Materials

- PMI 10mm Classic Sport (27kN)

Test setup

- Tied a figure-8 on a bight on one end

Test parameters

- Slow pull speed 100mm/minute
- Tested between a 12mm pin and rope grab

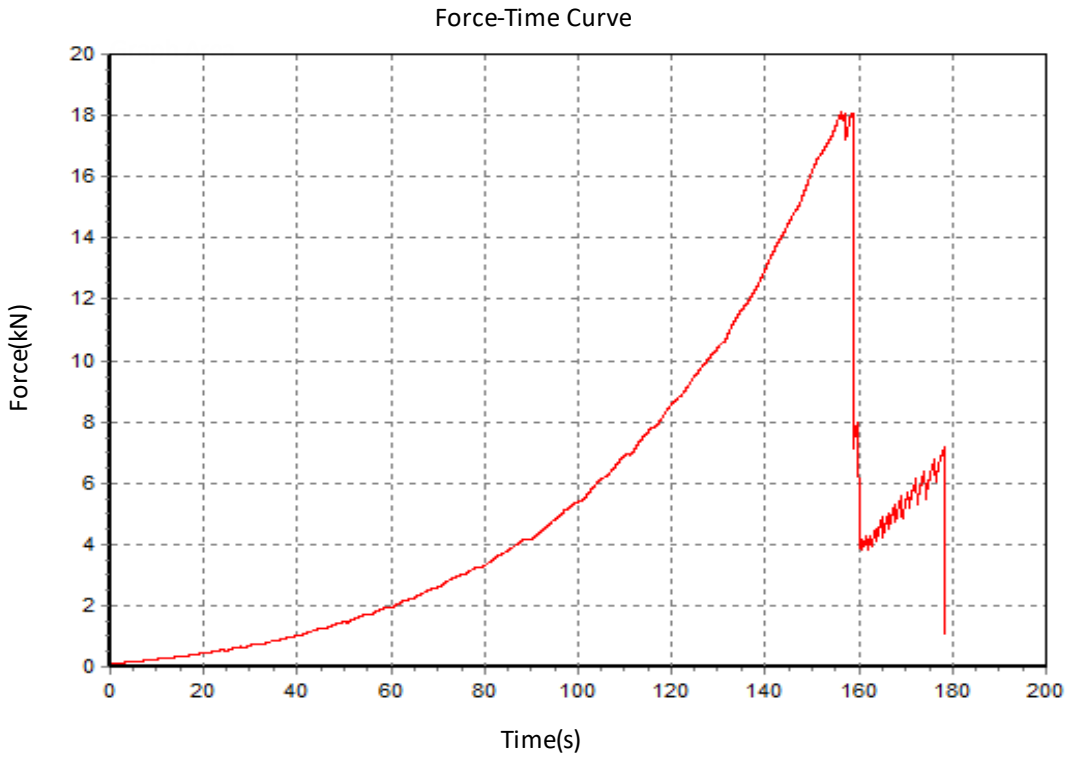
Results

Date	#	Max force (kN)	%	Comments
17/07/20	9*	18.14	67	Broke at the knot
17/07/20	10	18.71	69	Broke at the knot
17/07/20	11	17.66	65	Broke at the knot
Average		**18.17**	**67**	

* Sample 17/07/20 #9 of the testing shown on the following pages.

ASPIRING

Test Date:	Friday, 17 July 2020
Max Force (kN):	18.14
Product Name:	Figure-8 on a bight
Batch #:	9
Material:	10mm PMI Classic Sport



ECAAS ISO 9001 CERTIFIED QUALITY MANAGEMENT

Tested by: Grant Prattley

Signed: Grant Prattley

Machine has a current calibration certificate. www.aspiring.co.nz


#: 9 Date: 17/7/20
Test: Slow Pull 100mm/min
Type: Fig-8 OTB
Rope: 10mm Classic Sport PMI
Force: 18.14kN

Alpine butterfly knot

Slow Pull Test	~~Friction Test~~	~~Drop Test~~

Materials

- PMI 10mm Classic Sport (27kN)

Test setup

- Tied an alpine butterfly on one end

Test parameters

- Slow pull speed 100mm/minute
- Tested between a 12mm pin and rope grab

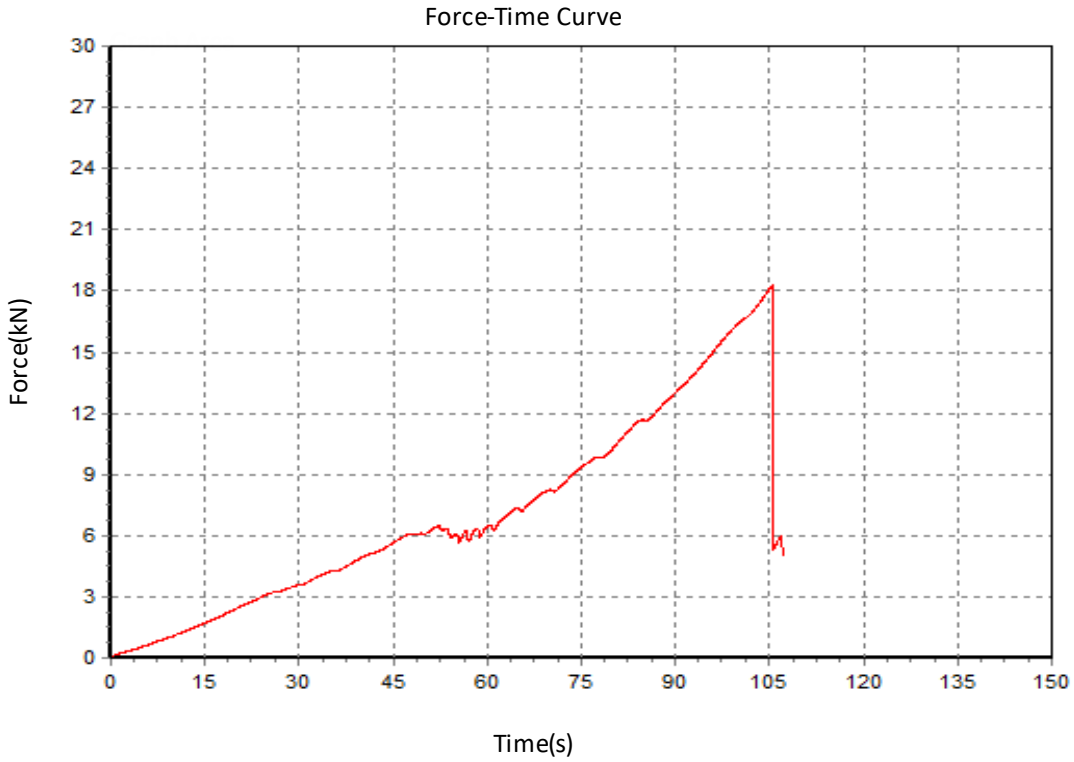
Results

Date	#	Max force (kN)	%	Comments
19/08/20	1*	18.25	68	Broke at the knot
19/08/20	2	20.35	75	Broke at the knot
19/08/20	3	19.7	73	Broke at the knot
Average		**19.43**	**72**	

* Sample 19/08/20 #1 of the testing shown on the following pages.

ASPIRING

Test Date:	Wednesday, 19 August 2020
Max Force (kN):	18.25
Product Name:	Alpine Butterfly
Batch #:	1
Material:	10mm PMI Classic Sport



ECAAS ISO 9001 CERTIFIED QUALITY MANAGEMENT

Tested by: Grant Prattley

Signed: Grant Prattley

Machine has a current calibration certificate. www.aspiring.co.nz


#: 1 Date: 19/08/20
Test: Slow Pull 100mm/min
Type: Alpine butterfly knot
Rope: 10mm PMI Classic Sport
Force: 18.25kN (68%)

Bowline knot

Slow Pull Test	~~Friction Test~~	~~Drop Test~~

Materials

- PMI 10mm Classic Sport (27kN)

Test setup

- Bowline and rope grab

Test parameters

- Slow pull speed 100mm/minute
- Tested between a 12mm pin and rope grab

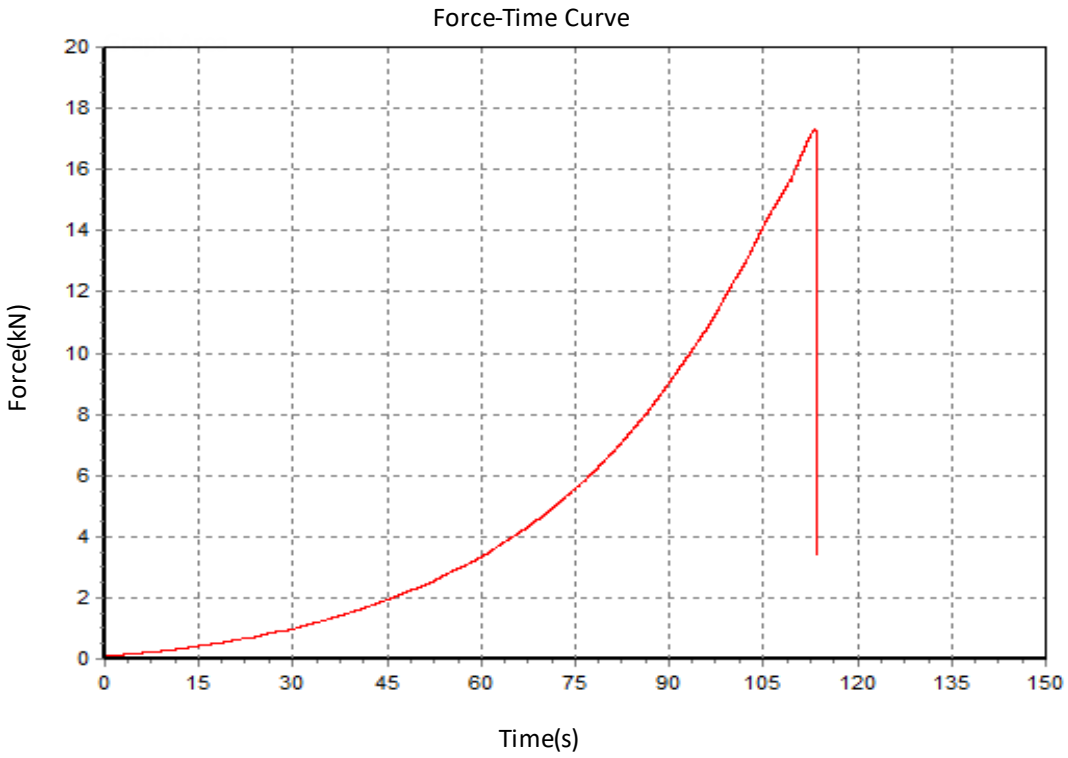
Results

Date	#	Max force (kN)	%	Comments
19/08/20	4*	17.32	64	Broke at the knot
19/08/20	5	17.00	63	Broke at the knot
19/08/20	6	18.24	68	Broke at the knot
Average		**17.52**	**65**	

* Sample 19/08/20 #4 of the testing shown on the following pages.

ASPIRING

Test Date:	Wednesday, 19 August 2020
Max Force (kN):	17.32
Product Name:	Bowline
Batch #:	4
Material:	10mm PMI Classic Sport



ECAAS ISO 9001 CERTIFIED QUALITY MANAGEMENT

Tested by: Grant Prattley

Signed: Grant Prattley

Machine has a current calibration certificate. www.aspiring.co.nz


#: 4 Date: 19/08/20
Test: Slow Pull 100mm/min
Type: Bowline knot
Rope: 10mm PMI Classic Sport
Force: 17.32kN (64%)

Figure-8 rethread bend

Slow Pull Test	~~Friction Test~~	~~Drop Test~~

Materials

- PMI 10mm Classic Sport (27kN)

Test setup

- Rope grab on both ends with figure-8 rethread bend in the middle

Test parameters

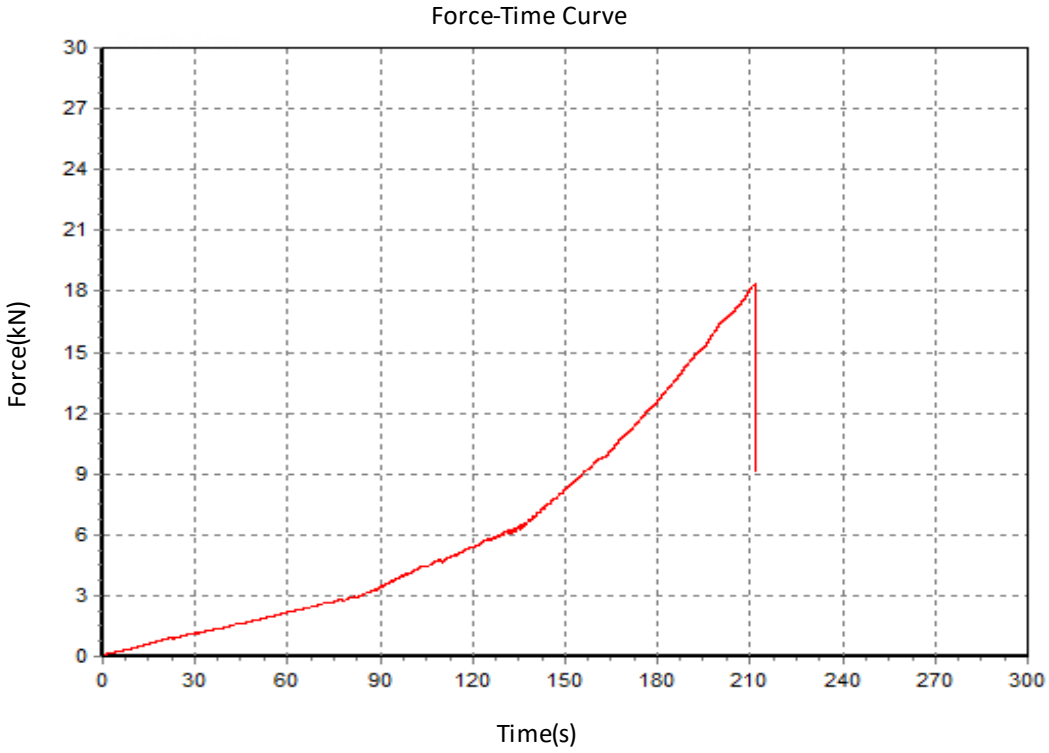
- Slow pull speed 100mm/minute
- Tested between rope grabs

Results

Date	#	Max force (kN)	%	Comments
16/11/20	4*	18.36	68	Broke at the bend
16/11/20	5	18.29	68	Broke at the bend
16/11/20	6	17.74	66	Broke at the bend
Average		**18.13**	**67**	

* Sample 16/11/20 #4 of the testing shown on the following pages.

Test Date:	Monday, 16 November 2020
Max Force (kN):	18.36
Product Name:	Fig-8 rethread bend
Batch #:	4
Material:	10mm PMI Classic Sport



Tested by: Grant Prattley

Signed:

Machine has a current calibration certificate. www.aspiring.co.nz


#: 4 Date: 16/11/20
Test: Slow Pull 100mm/min
Type: Fig-8 rethread bend
Rope: 10mm PMI Classic Sport
Force: 18.36kN (68%)

8mm Aspiring VT Prusik 6-on-1

Slow Pull Test	~~Friction Test~~	~~Drop Test~~

Materials

- PMI 10mm Classic Sport (27kN)
- Aspiring 8mm VT (20kN)

Test setup

- 8mm VT sewn
- 6-on-1 Schwabisch asymmetric Prusik
- Figure-8 on a bight on one end and rope grab on one end

Test parameters

- Slow pull speed 100mm/minute
- Tested between 12mm pins

Results

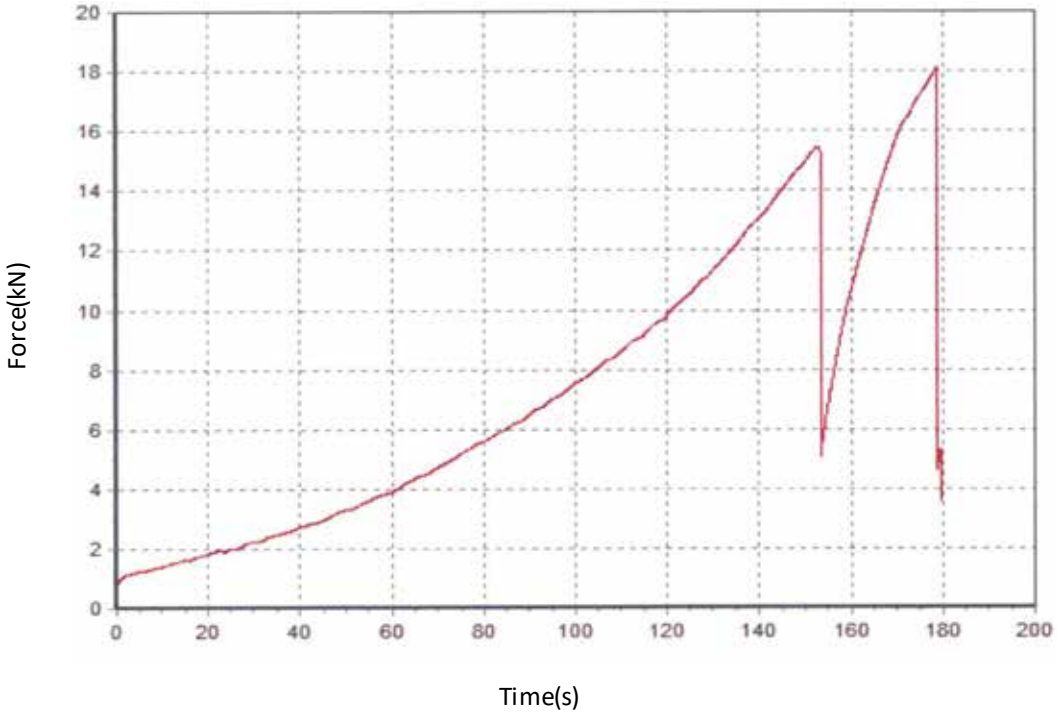
Date	#	First slip (kN)	Max force (kN)	Comments
7/08/19	3*	15.3	18.12	Slipped 6cm, glazed sheath, sheath under the Prusik remained intact, fig-8 knot showed damage
7/08/19	4	16	19.03	Slipped 5cm, glazed sheath, sheath under the Prusik remained intact, broke fig-8 knot
11/03/21	13	7.37	15.95	Initial slip then regripped, kept on slipping
Average		**12.89**	**17.70**	

* Sample 7/08/19 #3 of the testing shown on the following pages.

ASPIRING

Test Date:	Wednesday, 7 August 2019
Max Force (kN):	18.12
Product Name:	8mm VT BW 6on1 Asymetric
Batch #:	3
Material:	10mm PMI Classic Sport

Force-Time Curve



ECAAS ISO 9001 CERTIFIED QUALITY MANAGEMENT

Tested by: Grant Prattley

Signed:

Machine has a current calibration certificate. www.aspiring.co.nz


③ 7.8.19
15.3kN first slip
18.12kN
6on1 UT
PMI Ezi Bend 10

8mm Aspiring VT Prusik 5-on-1

Slow Pull Test	~~Friction Test~~	~~Drop Test~~

Materials

- PMI 10mm Classic Sport (27kN)
- Aspiring 8mm VT (20kN)

Test setup

- 8mm VT sewn
- 5-on-1 Schwabisch asymmetric Prusik
- Figure-8 on a bight on one end

Test parameters

- Slow pull speed 100mm/minute
- Tested between 12mm pins, 12mm steel carabiner and rope grab

Results

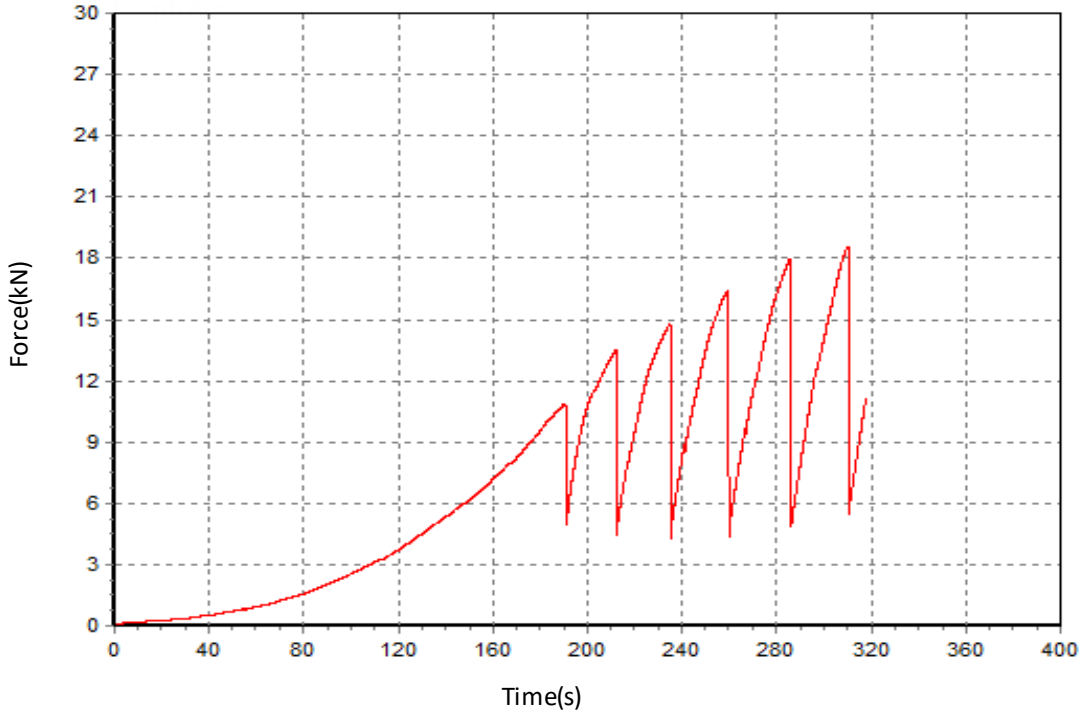
Date	#	First slip kN	Max force (kN)	Comments
12/11/19	3*	10.2	18.55	Slipped and regripped, kept on slipping
12/11/19	4	11.1	17.96	Slipped and regripped, kept on slipping
11/03/21	12	8.31	9.76	Slipped and regripped, kept on slipping
Average		**9.87**	**15.42**	

* Sample 12/11/19 #3 of the testing shown on the following pages.

ASPIRING

Test Date:	Tuesday, 12 November 2019
Max Force (kN):	18.55
Product Name:	5on1 8mm VT Aspiring
Batch #:	3
Material:	10mm PMI Ezi Bend

Force-Time Curve



ECAAS ISO 9001 CERTIFIED QUALITY MANAGEMENT

Tested by: Grant Prattley

Signed:

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#: 3 Date: 12/11/19
Test: Slow Pull 100mm/min
Type: 5-on-1 8mm ASP VT
Rope: 10mm PMI Classic Sport
Break: 18.55kN

Petzl Shunt

Slow Pull Test	~~Friction Test~~	~~Drop Test~~

Materials

- PMI 10mm Classic Sport (27kN)
- Petzl Shunt

Test setup

- Single/Double rope
- Figure-8 on a bight on one end

Test parameters

- Slow pull speed 100mm/minute
- Tested between 12mm pins

Results single rope

Date	#	First slip (kN)	Max force (kN)	Comments
24/10/19	4*	2.20	2.29	Kept on slipping
24/10/19	5	2.20	2.31	Kept on slipping
11/02/21	5	2.12	2.34	Kept on slipping
Average		**2.17**	**2.31**	

* Sample 24/10/19 #4 of the testing shown on the following pages.

Results double rope

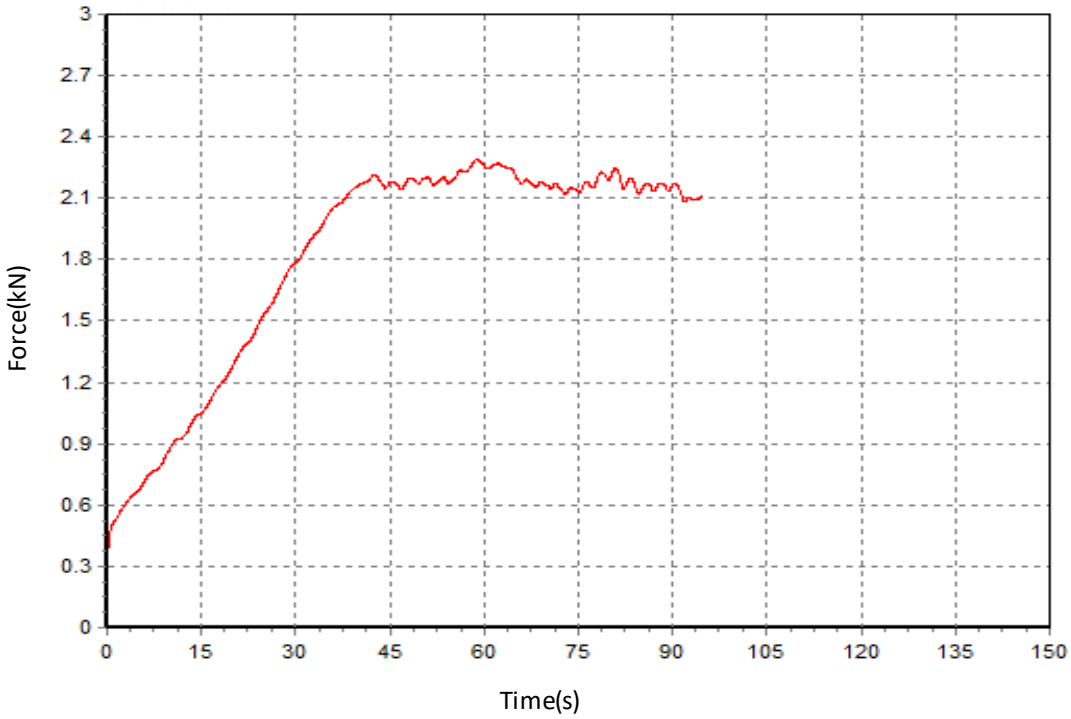
Date	#	Max force (kN)	Comments
24/10/19	6*	5.99	Didn't slip, both ropes came out of device as it spread open, damaged sheath both ropes around 50% on the cam side.

* Sample 24/10/19 #6 of the testing shown on the following pages.

ASPIRING

Test Date:	Thursday, 24 October 2019
Max Force (kN):	2.29
Product Name:	Petzl Shunt single rope
Batch #:	4
Material:	10mm PMI Classic Sport

Force-Time Curve



ECAAS ISO 9001 CERTIFIED Quality Management

Tested by: Grant Prattley

Signed:

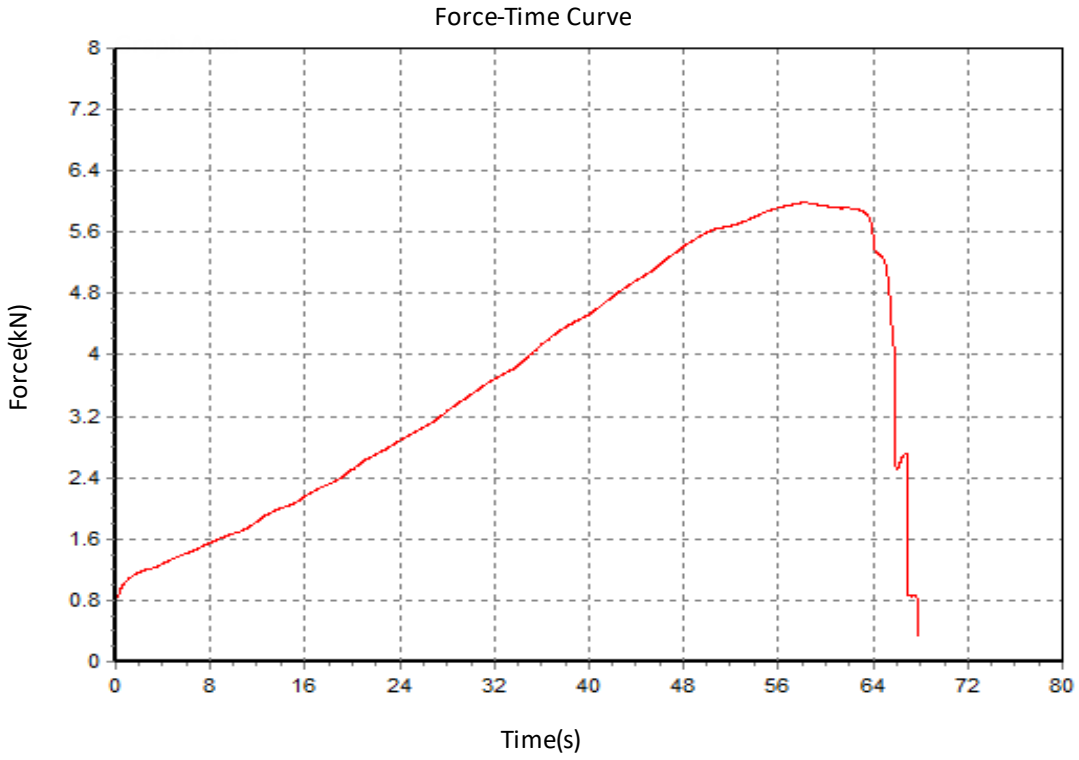
Machine has a current calibration certificate. www.aspiring.co.nz


④ 24.10.19
2.29kN
Petzl Shuntsingle
PMI Ez Bend 10mm


SHUNT
UP

ASPIRING

Test Date:	Thursday, 24 October 2019
Max Force (kN):	5.99
Product Name:	Petzl Shunt double rope
Batch #:	6
Material:	10mm PMI Classic Sport



ECAAS ISO 9001 CERTIFIED Quality Management

Tested by: Grant Prattley

Signed:

Machine has a current calibration certificate. www.aspiring.co.nz


⑥ 24.10.19
5.99 kN
Petzl Shunt double
PMI Ez Bend 10mm

Petzl Micro Traxion

Slow Pull Test	~~Friction Test~~	~~Drop Test~~

Materials

- PMI 10mm Classic Sport (27kN)
- Petzl Micro Traxion

Test setup

- Rope grab on a bight on one end

Test parameters

- Slow pull speed 100mm/minute
- Tested between 12mm pin and 12mm steel carabiner

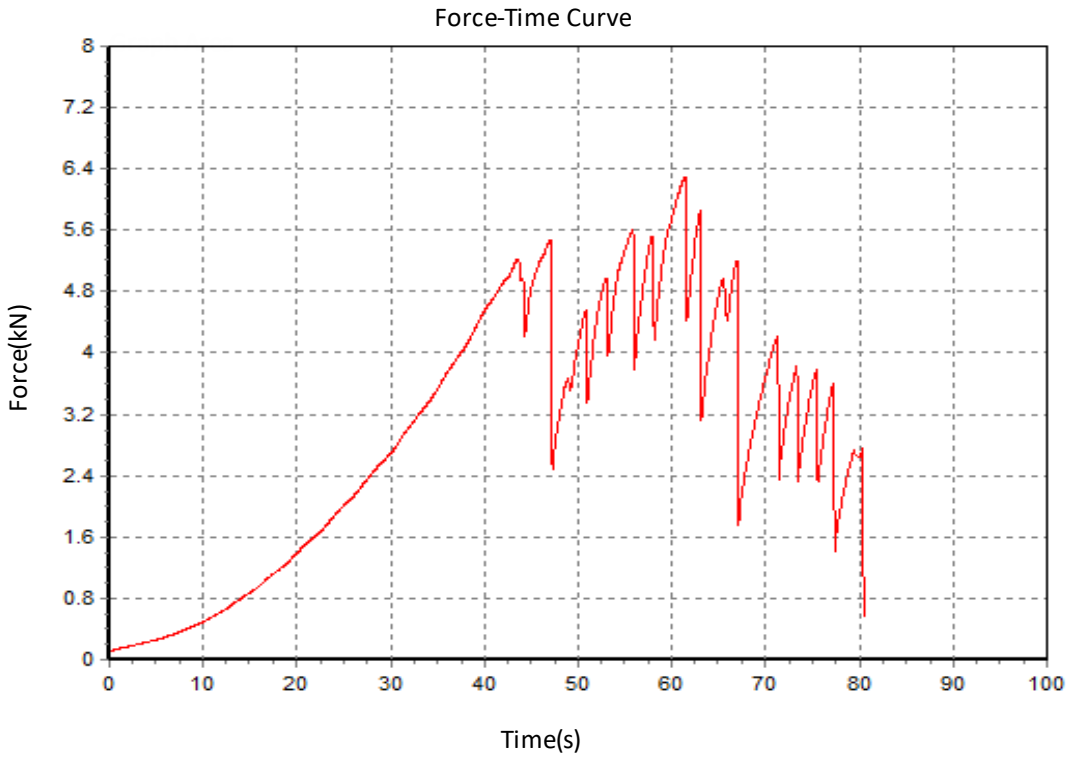
Results

Date	#	Max force (kN)	Comments
9/04/21	3	5.74	Stripped sheath of rope
9/04/21	4	5.67	Stripped sheath of rope
9/04/21	5*	6.29	Stripped sheath of rope
Average		**5.90**	

* Sample 9/04/21 #5 of the testing shown on the following pages.

ASPIRING

Test Date:	Friday, 9 April 2021
Max Force (kN):	6.29
Product Name:	Petzl Micro Traxion
Batch #:	5
Material:	10mm PMI Classic Sport



ECAAS ISO 9001 CERTIFIED Quality Management

Tested by: Grant Prattley

Signed: Grant Prattley

Machine has a current calibration certificate. www.aspiring.co.nz


#: 5 Date: 09/04/21
Test: Slow Pull 100mm/min
Product: Petzl Micro Traxion
Rope: 10mm PMI Classic Sport
Force: 6.29kN

Petzl Tibloc

Slow Pull Test	~~Friction Test~~	~~Drop Test~~

Materials

- PMI 10mm Classic Sport (27kN)
- Petzl Tibloc

Test setup

- Figure-8 on a bight on one end

Test parameters

- Slow pull speed 100mm/minute
- Tested between 12mm pin and 12mm steel carabiner

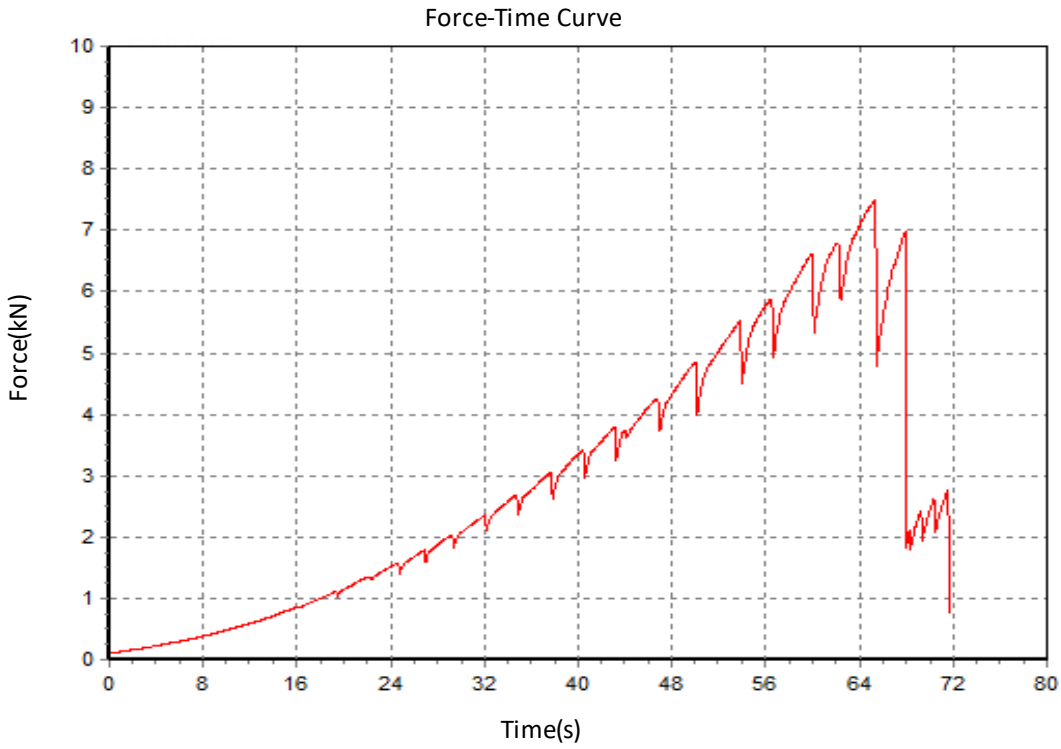
Results

Date	#	Max force (kN)	Comments
11/03/21	7	7.39	Stripped sheath
11/03/21	8	6.65	Stripped sheath
11/03/21	9*	7.48	Stripped sheath
Average		**7.02**	

* Sample 11/03/21 #9 of the testing shown on the following pages.

ASPIRING

Test Date:	Thursday, 11 March 2021
Max Force (kN):	7.48
Product Name:	Petzl Tibloc
Batch #:	9
Material:	10mm PMI Classic Sport



ECAAS ISO 9001 CERTIFIED Quality Management

Tested by: Grant Prattley

Signed: Grant Prattley

Machine has a current calibration certificate. www.aspiring.co.nz


#: 9 Date: 11/03/21
Test: Slow Pull 100mm/min
Product: Petzl Tibloc
Rope: 10mm PMI Classic Sport
Force: 7.48kN

Petzl Basic

Slow Pull Test	~~Friction Test~~	~~Drop Test~~

Materials

- PMI 10mm Classic Sport static rope (27kN)
- Petzl Basic Ascender

Test setup

- Clipped in with steel carabiner

Test parameters

- Slow pull speed 100mm/minute
- Tested between 12mm pin and rope grab

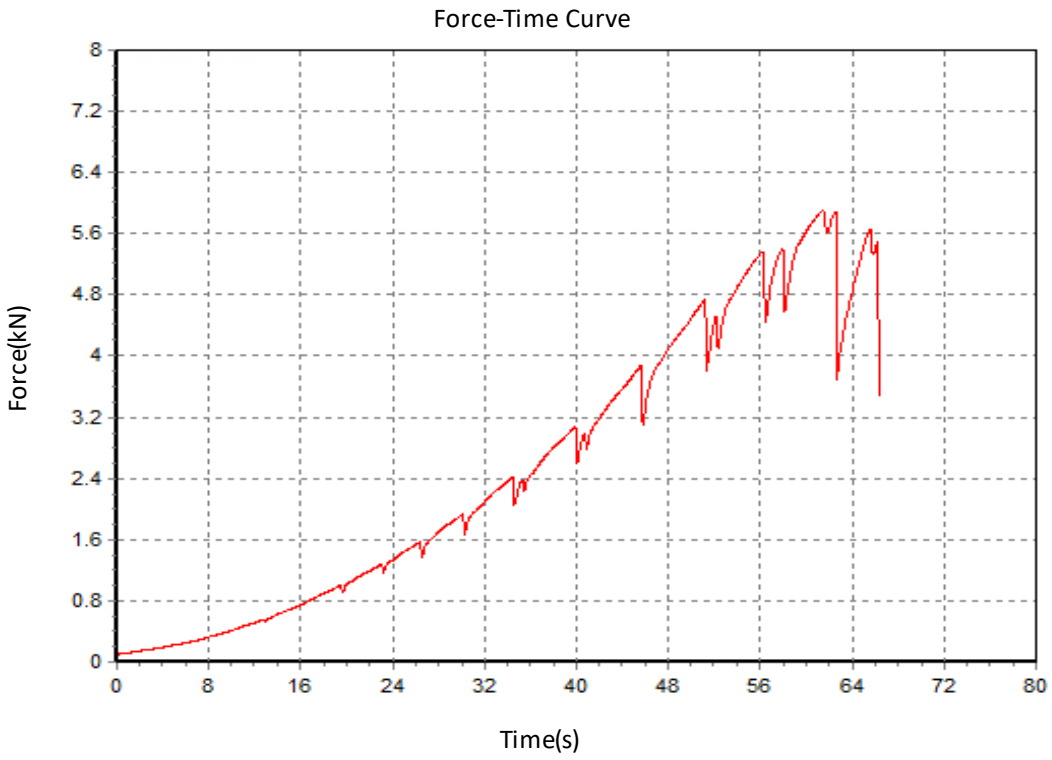
Results

Date	#	Max force (kN)	Comments
19/08/20	7*	5.90	Stripped sheath of the rope
19/08/20	8	6.22	Stripped sheath of the rope
19/08/20	9	5.89	Device broke in half. Minor rope damage. Device had been used with minor wear.
Average		**6.00**	

* Sample 19/08/20 #7 of the testing shown on the following pages.

ASPIRING

Test Date:	Wednesday, 19 August 2020
Max Force (kN):	5.9
Product Name:	Petzl Basic
Batch #:	7
Material:	10mm PMI Classic Sport



ECAAS ISO 9001 CERTIFIED QUALITY MANAGEMENT

Tested by: Grant Prattley

Signed: Grant Prattley

Machine has a current calibration certificate. www.aspiring.co.nz


#: 7 Date: 19/08/20
Test: Slow Pull 100mm/min
Type: Petzl Basic
Rope: 10mm PMI Classic Sport
Force: 5.90kN

Biner block

Slow Pull Test	~~Friction Test~~	~~Drop Test~~

Materials

- PMI 10mm Classic Sport (27kN)
- CT Snappy 12mm Steel (50kN)

Test setup

- Figure-8 on a bight on one end
- Rope threaded through 8mm oval rapide
- Clove hitch on spine of carabiner

Test parameters

- Slow pull speed 100mm/minute
- Tested between 12mm pin and 12mm steel carabiner

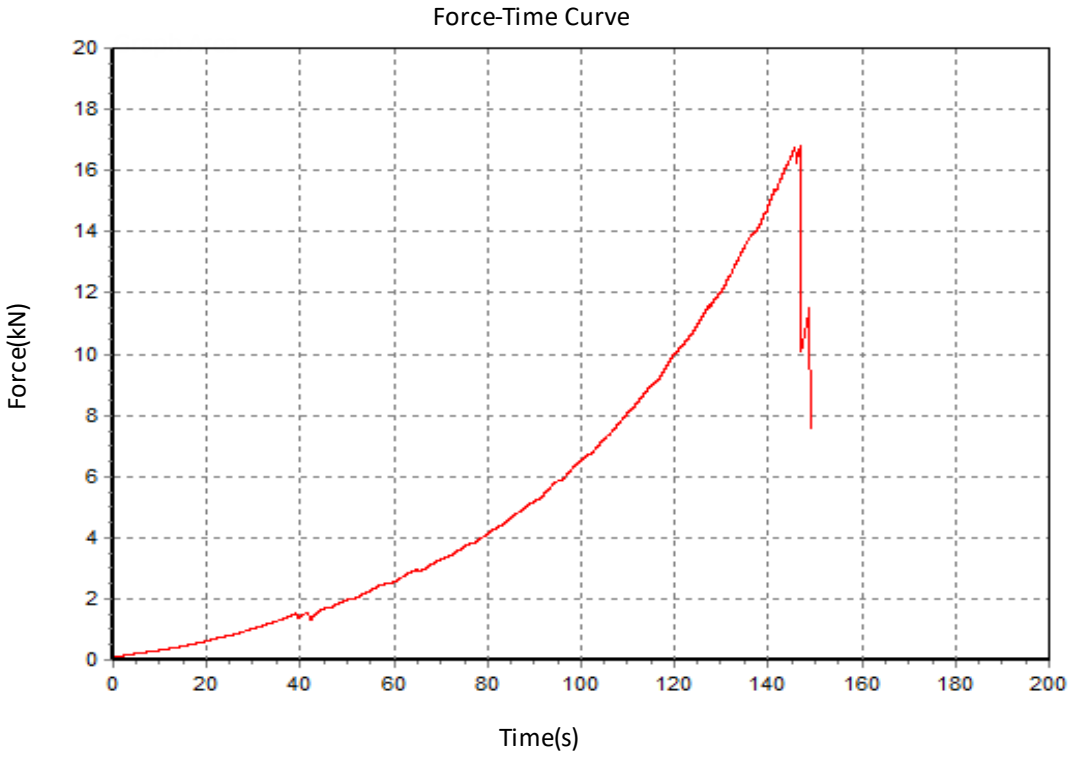
Results

Date	#	Max force (kN)	%	Comments
11/03/21	1*	16.80	62	Broke at the rope as it exited the clove hitch threaded through the 8mm rapide
31/03/21	1	14.29	53	Broke at the rope as it exited the clove hitch threaded through the 8mm rapide
31/03/21	2	15.67	58	Broke at the rope as it exited the clove hitch threaded through the 8mm rapide
Average		**15.59**	**58**	

* Sample 11/03/21 #1 of the testing shown on the following pages.

ASPIRING

Test Date:	Thursday, 11 March 2021
Max Force (kN):	16.8
Product Name:	Biner Block
Batch #:	1
Material:	10mm PMI Classic Sport



ECAAS ISO 9001 CERTIFIED QUALITY MANAGEMENT

Tested by: Grant Prattley

Signed: Grant Prattley

Machine has a current calibration certificate. www.aspiring.co.nz


#: 1 Date: 11/03/21
Test: Slow Pull 100mm/min
Product: Biner block clove hitch
Rope: 10mm PMI Classic Sport
Force: 16.80kN (62%)

Italian / Munter hitch

~~Slow Pull Test~~	**Friction Test**	~~Drop Test~~

Materials

- PMI 10mm Classic Sport (27kN)

Test setup

- Figure-8 on a bight on load end
- First slip is thumb/finger holding
- Limiting friction is max one gloved dominant hand holding

Test parameters

- Slow pull speed 100mm/minute
- Tested between 12mm pin and 12mm steel carabiner

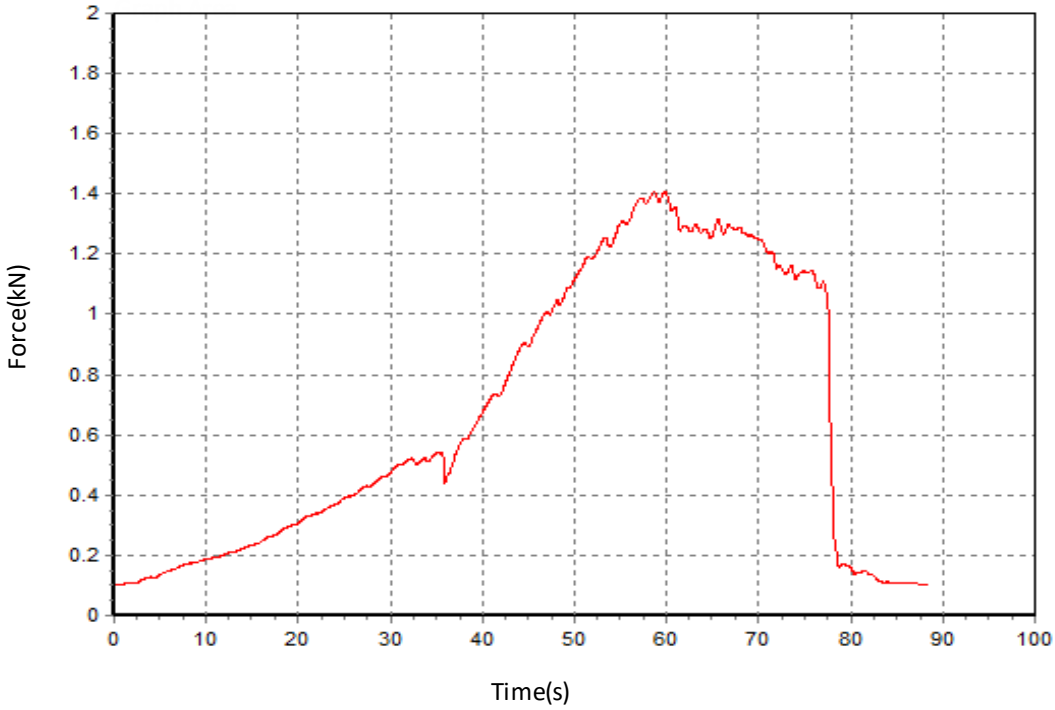
Results

Date	#	Type	First Slip (kN)	Limiting friction (kN)
2/07/20	6	Munter / Italian	0.54	1.41
2/07/20	7	Double Munter / Italian	1.37	3.85
14/09/20	5	Munter / Italian + redirect carabiner	0.69	1.29
14/09/20	6	Double Munter / Italian + redirect carabiner	1.55	4.08

ASPIRING

Test Date:	Thursday, 2 July 2020
Limiting Friction (kN):	1.41
Product Name:	Single Munter One gloved hand
Batch #:	6
Material:	10mm PMI Sport Classic

Force-Time Curve



ECAAS ISO 9001 CERTIFIED QUALITY MANAGEMENT

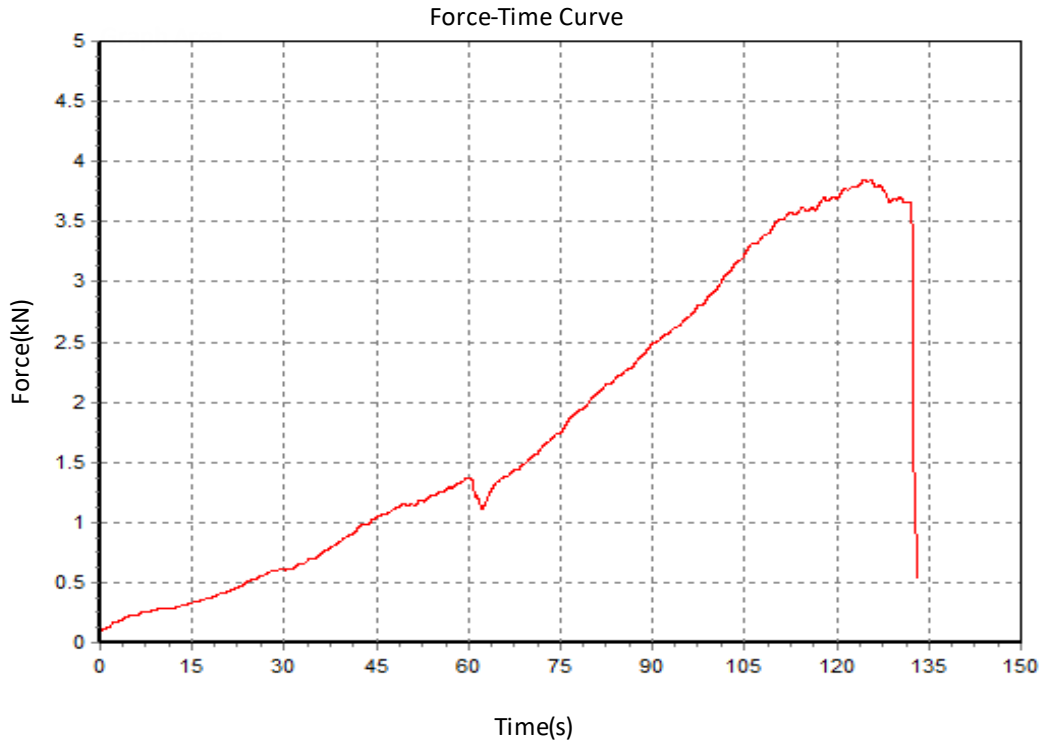
Tested by: Grant Prattley

Signed: Grant Prattley

Machine has a current calibration certificate. www.aspiring.co.nz

ASPIRING

Test Date:	Thursday, 2 July 2020
Limiting Friction (kN):	3.85
Product Name:	Double Munter One gloved hand
Batch #:	7
Material:	10mm PMI Sport Classic



ECAAS ISO 9001 CERTIFIED QUALITY MANAGEMENT

Tested by: Grant Prattley

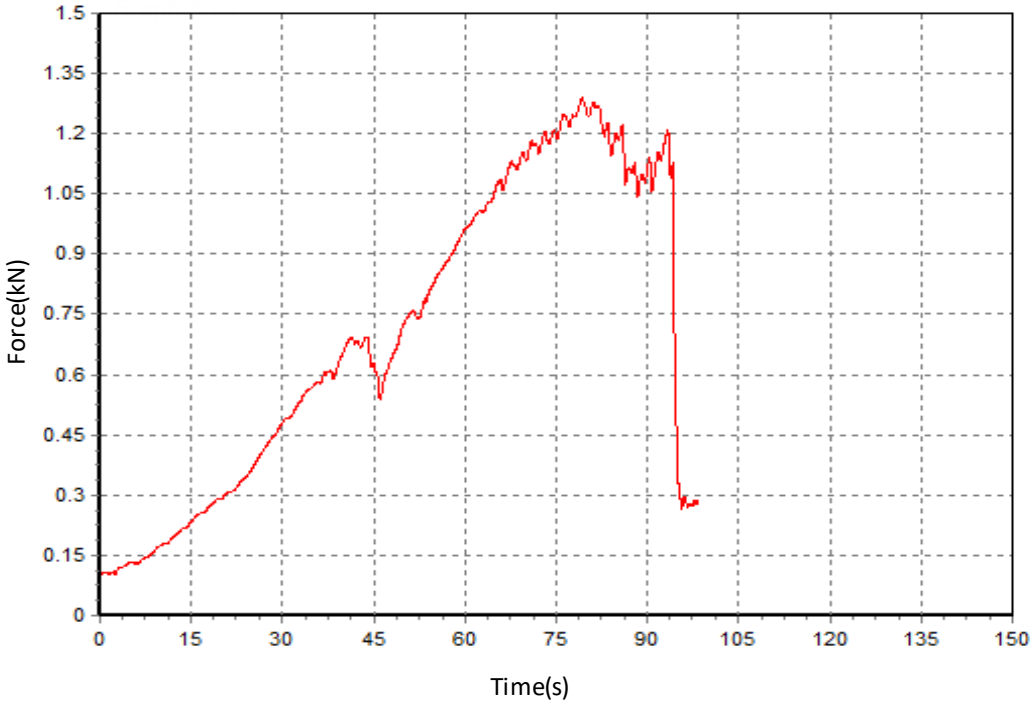
Signed: Grant Prattley

Machine has a current calibration certificate. www.aspiring.co.nz

ASPIRING

Test Date:	Monday, 14 September 2020
Limiting Friction (kN):	1.29
Product Name:	Single Munter + Redirect Carabiner
Batch #:	5
Material:	10mm PMI maxwear rope

Force-Time Curve



ECAAS ISO 9001 CERTIFIED QUALITY MANAGEMENT

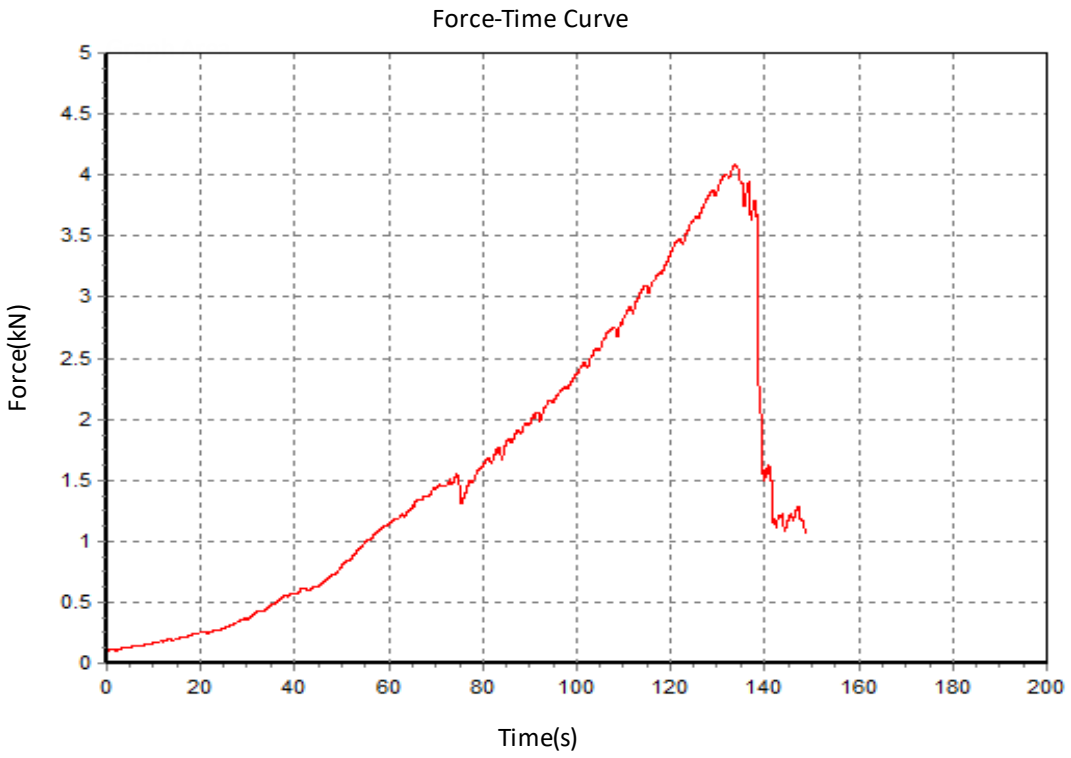
Tested by: Grant Pratley

Signed: Grant Pratley

Machine has a current calibration certificate. www.aspiring.co.nz

ASPIRING

Test Date:	Monday, 14 September 2020
Limiting Friction (kN):	4.08
Product Name:	Double munter + redirect carabiner
Batch #:	6
Material:	10mm PMI maxwear rope



ECAAS ISO 9001 CERTIFIED QUALITY MANAGEMENT

Tested by: Grant Pratley

Signed: Grant Pratley

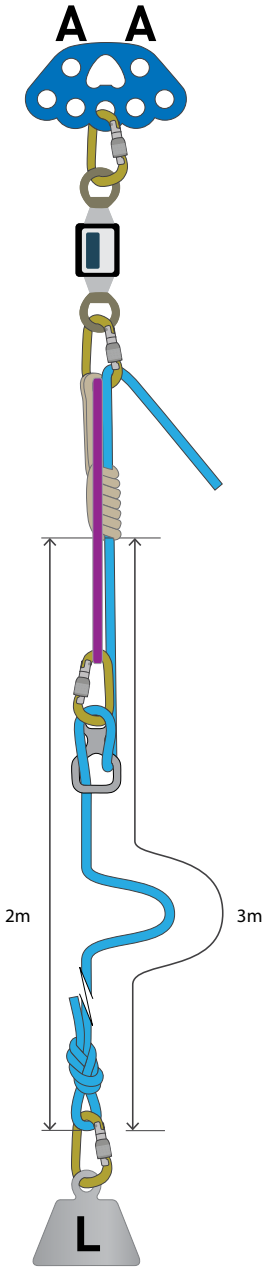
Machine has a current calibration certificate. www.aspiring.co.nz

Figure-8 in front of 8mm VT Prusik 6-on-1

~~Slow Pull Test~~	~~Friction Test~~	**Drop Test**

Materials

- PMI 10mm Classic Sport (27kN)
- Aspiring 8mm VT (20kN)
- Petzl Huit figure-8 device
- Aspiring 16mm webbing (12.5kN)



Test setup

- 8mm VT sewn
- 6-on-1 Schwabisch asymmetric Prusik
- Figure-8 on a bight on one end

Test parameters

- 1m drop on 3m of rope (3m measured from Prusik)
- 200kg mass
- Single rope
- Tested between 12mm steel carabiners

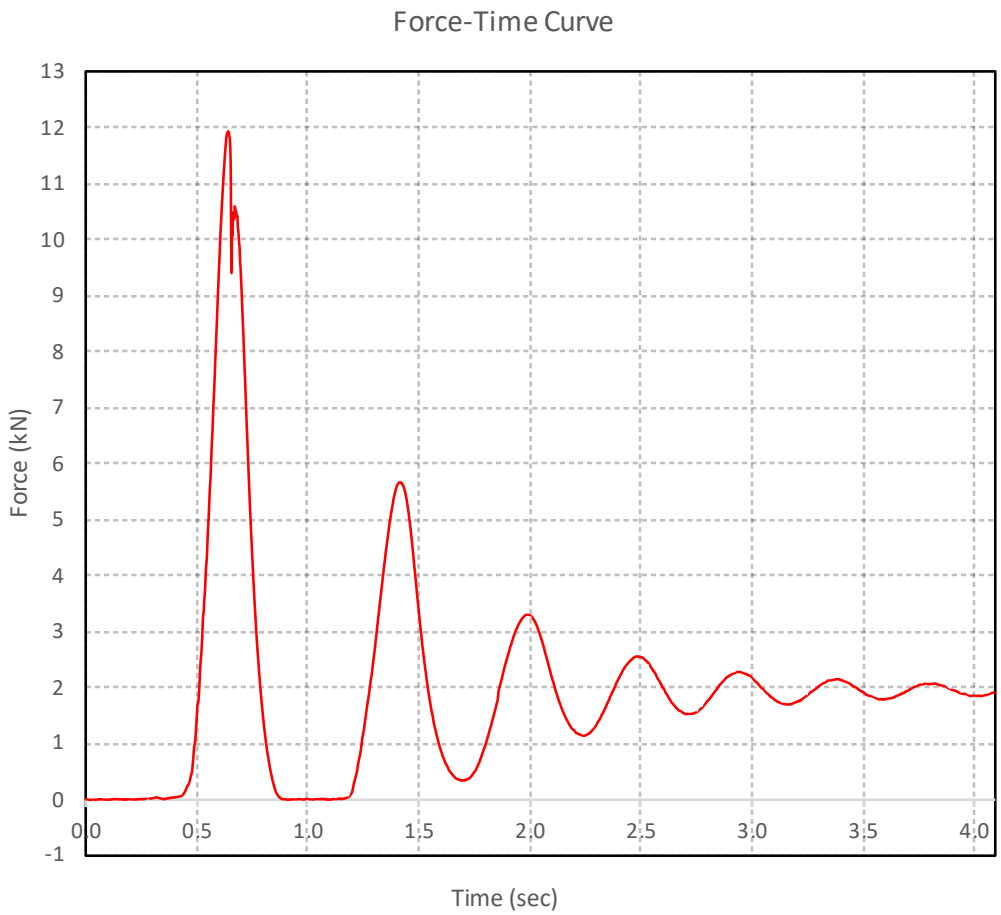
Results

Date	#	Max arrest force (kN)	Comments
19/09/21	4	11.94	Caught load, 1cm slip at Prusik, slip at device 20cm, Prusik releasable
19/09/21	6	12.32	Caught load, 2cm slip at Prusik, slip at device 16cm, Prusik releasable
23/09/21	1	12.17	Caught load, 3cm slip at Prusik, slip at device 18cm, Prusik releasable
Average		12.14	

* Sample 19/09/21 #4 of the testing shown on the following pages.

OVER·THE·EDGE RESCUE

Test Date:	Sunday, 19 September, 2021
Test #:	4
Product Name:	8mm 6on1 ASP VT Prusik, single rope, Fig-8 device on 60cm extension
Material:	10mm PMI Classic Sport
Test type:	1m drop 3m of rope, 200kg
Max arrest force (kN):	11.94kN



Tested by: Grant Prattley

Signed: Grant Prattley


#: 4 Date: 19/09/21
Test: Drop test, 1m drop, 3m rope, 200kg, single rope
Type: Figure-8 device in front of 8mm Aspiring VT 6-on-1
Rope: 10mm PMI Classic Sport
Force: 11.94kN

8mm VT Prusik 6-on-1

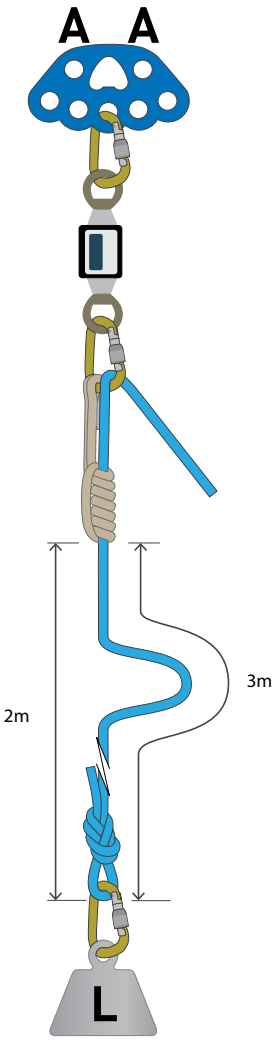
~~Slow Pull Test~~	~~Friction Test~~	**Drop Test**

Materials

- PMI 10mm Classic Sport (27kN)
- Aspiring 8mm VT (20kN)

Test setup

- 8mm VT sewn
- 6-on-1 Schwabisch asymmetric Prusik
- Figure-8 on a bight on one end



Test parameters

- 1m drop on 3m of rope (3m measured from Prusik)
- 200kg mass
- Single rope
- Tested between 12mm steel carabiners

Results

Date	#	Max arrest force (kN)	Comments
9/08/19	5	10.10	Caught load, 14.5cm slip at Prusik, Prusik fused
9/08/19	6	10.38	Caught load, 9cm slip at Prusik, Prusik fused
18/04/21	2*	10.42	Caught load, 17cm slip at Prusik, Prusik fused.
Average		10.30	

* Sample 18/04/21 #2 of the testing shown on the following pages.

OVER·THE·EDGE RESCUE

Test Date: Wednesday, 18 April, 2021

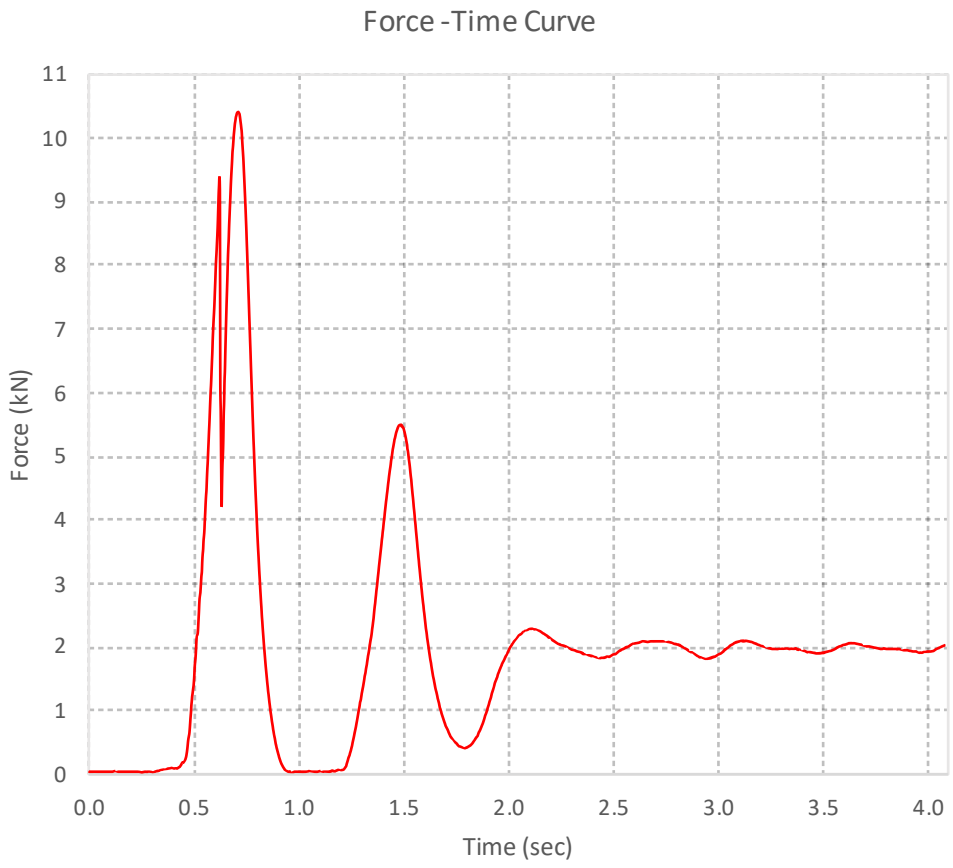
Test #: 2

Product Name: 8mm 6on1 Aspiring VT Prusik, single rope

Material: 10mm PMI Classic Sport

Test type: 1m drop 3m of rope, 200kg

Max arrest force (kN): 10.42kN



Tested by: Grant Prattley

Signed:


#: 2 Date: 18/04/21
Test: Drop test, 1m drop,
3m rope, 200kg, single rope
Type: 8mm Asp 6-on-1
Rope: 10mm PMI Classic Sport
Force: 10.42kN

8mm Aspiring VT Prusik 5-on-1 single rope

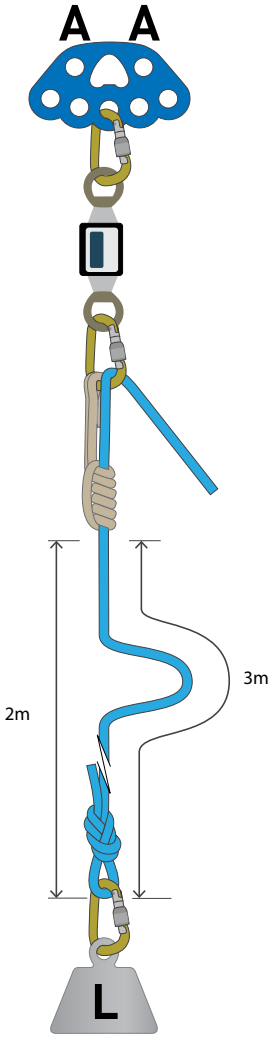
~~Slow Pull Test~~	~~Friction Test~~	**Drop Test**

Materials

- PMI 10mm Classic Sport (27kN)
- Aspiring 8mm VT (20kN)

Test setup

- 8mm VT sewn
- 5-on-1 Schwabisch asymmetric Prusik
- Figure-8 on a bight on one end



Test parameters

- 1m drop on 3m of rope (3m measured from Prusik)
- 200kg mass
- Single rope
- Tested between 12mm steel carabiners

Results

Date	#	Max arrest force (kN)	Comments
29/03/20	3*	9.68	Caught load, 51cm slip at Prusik, Prusik fused.
18/04/21	3	9.14	Caught load, 35.5cm slip at Prusik, Prusik fused. Start length 25 end 36cm diff 11cm
18/04/21	4	7.26	Caught load, 82cm slip at Prusik, Prusik fused.
Average		8.69	

* Sample 29/03/20 #3 of the testing shown on the following pages.

OVER·THE·EDGE RESCUE

Test Date: Sunday, 29 March, 2020

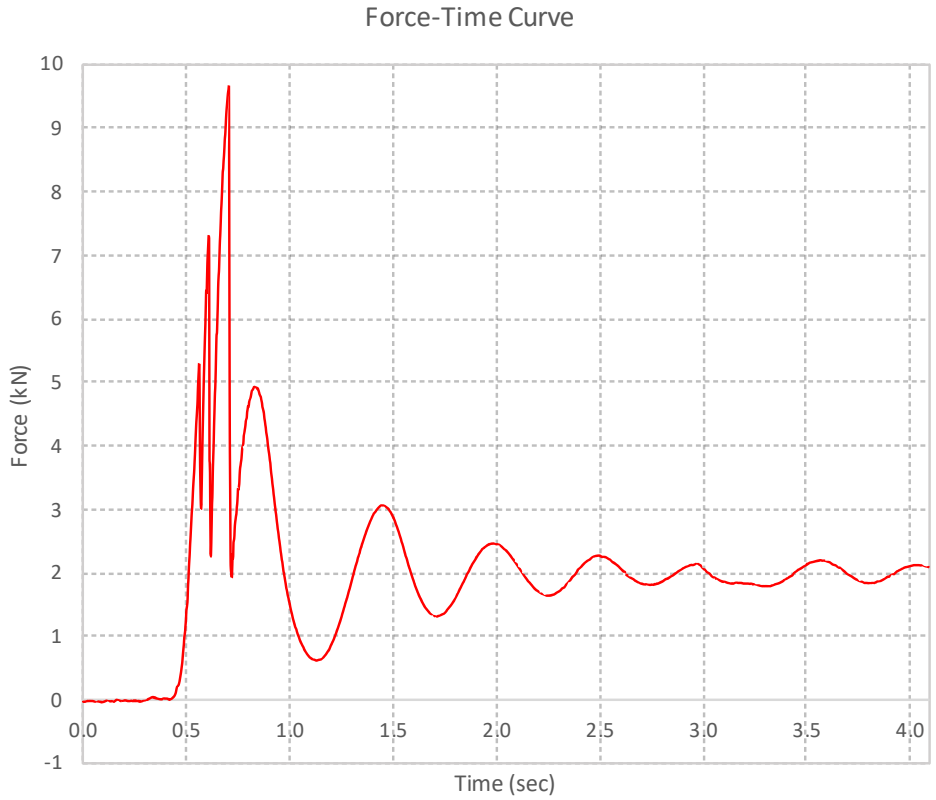
Test #: 3

Product Name: 5-on-1 8mm VT Prusik, single rope

Material: 10mm PMI Classic Sport

Test type: 1m drop 3m of rope, 200kg

Max arrest force (kN): 9.68kN



Tested by: Grant Prattley

Signed: Grant Prattley


#: 3 Date: 29/3/20
Test: Drop test, 1m drop, 3m rope, 200kg, single rope
Type: 8mm VT 5-on-1, Schwabisch
Rope: 10mm PMI Ezi Bend
Force: 9.68kN

Fig-8 device with 8mm VT Prusik 6-on-1 in front two rope

~~Slow Pull Test~~	~~Friction Test~~	**Drop Test**

Materials

- PMI 10mm Classic Sport (27kN)
- Aspiring 8mm VT (20kN)
- Petzl Huit
- Aspiring 16mm webbing (12.5kN)

Test setup

- 6-on-1 Schwabisch asymmetric Prusik
- Figure-8 device low friction on a 60cm extension 16mm webbing (tape bend)
- Figure-8 knot on a bight on one end

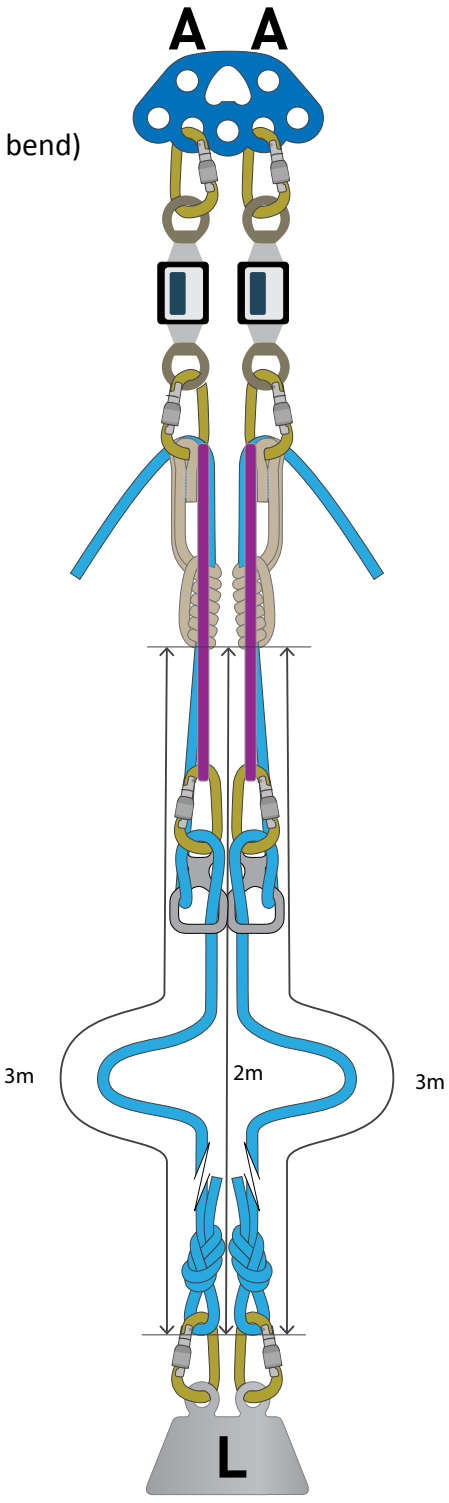
Test parameters

- 1m drop on 3m of rope (3m measured from Prusik)
- 200kg mass
- Two rope
- Tested between 12mm steel carabiners

Results

Date	#	Rope 1 (kN)	Rope 2 (kN)	Total (kN)	Comments
20/08/21	3	6.62	5.90	12.52	R1: Caught load, 1cm slip at Prusik, Prusik releasable, 13cm slip at device. R2: Caught load, 1cm slip at Prusik, Prusik releasable, 12.5cm slip at device.

* Sample 20/08/21 #3 of the testing shown on the following pages.



OVER·THE·EDGE RESCUE

Test Date: Friday, 20 August, 2021

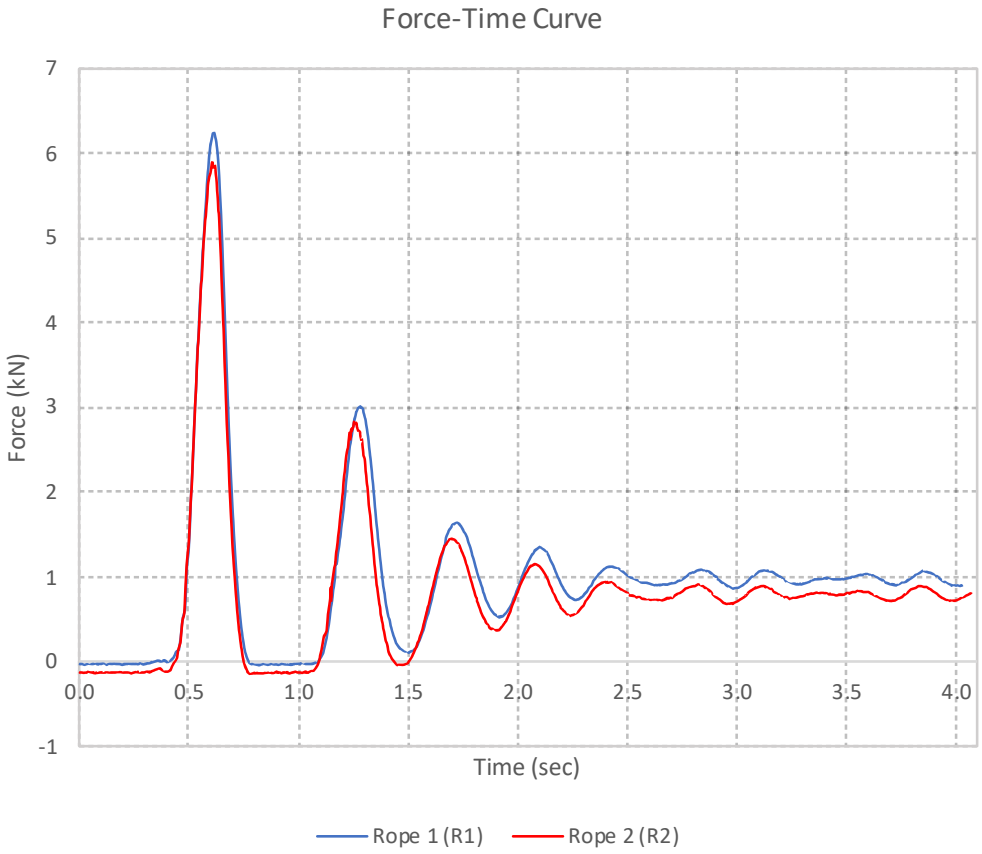
Test #: 3

Product Name: Fig-8 device in front of 6-on-1 8mm VT Prusik, two rope

Material: 10mm PMI Classic Sport

Test type: 1m drop 3m of rope, 200kg

Max arrest force (kN): 12.52kN (R1 = 6.62, R2 = 5.90)



Tested by: Grant Prattley

Signed:


#: 3 Date: 20/08/21
Test:
Type:
Rope: 10mm PMI Classic Sport
Force:

8mm VT Prusik 6-on-1 two rope

~~Slow Pull Test~~	~~Friction Test~~	**Drop Test**

Materials

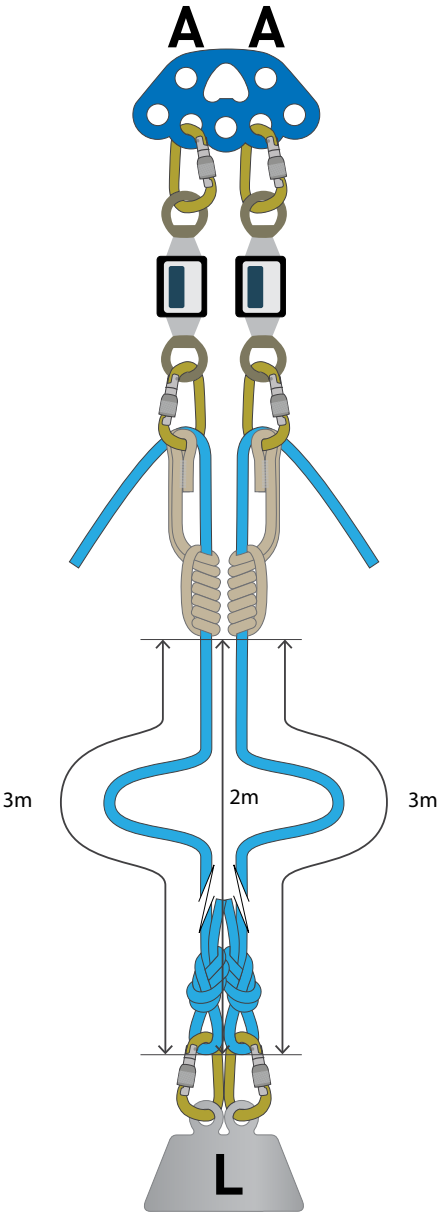
- PMI 10mm Classic Sport (27kN)
- Aspiring 8mm VT (20kN)

Test setup

- 8mm VT sewn
- 6-on-1 Schwabisch asymmetric Prusik
- Figure-8 on a bight on one end

Test parameters

- 1m drop on 3m of rope (3m measured from Prusik)
- 200kg mass
- Two rope
- Tested between 12mm steel carabiners



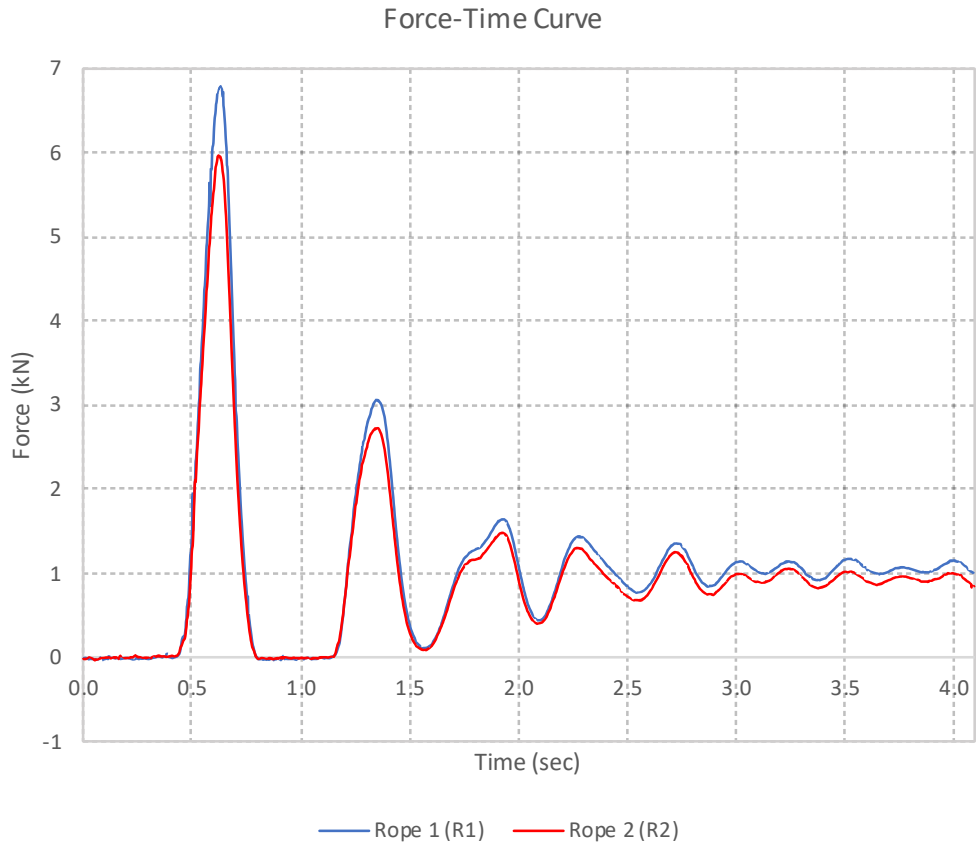
Results

Date	#	Rope 1 (kN)	Rope 2 (kN)	Total (kN)	Comments
29/03/20	2*	6.80	5.98	12.78	R1: Caught load, 4.5cm slip at Prusik, Prusik fused. R2: Caught load, 3cm slip at Prusik, Prusik fused.
20/08/21	1	6.36	6.20	12.56	R1: Caught load, 3cm slip at Prusik, Prusik fused. R2: Caught load, 3cm slip at Prusik, Prusik fused.
20/08/21	2	7.62	5.20	12.82	R1: Caught load, 3cm slip at Prusik, Prusik fused. R2: Caught load, 3cm slip at Prusik, Prusik fused.
Average		**6.93**	**5.79**	**12.72**	

* Sample 29/03/20 #2 of the testing shown on the following pages.

OVER·THE·EDGE RESCUE

Test date:	Sunday, 29 March, 2020
Test #:	2
Product name:	6-on-1 8mm VT Prusik, two rope, Prusik on each rope
Material:	10mm PMI Classic Sport
Test type:	1m drop 3m of rope, 200kg
Max arrest force (kN):	12.78kN (R1 = 6.8, R2 = 5.98)



Tested by: Grant Prattley

Signed:


#: 2 Date: 29/3/20
Test: Drop test, 1m drop, 3m rope, 200kg, two ropes
Type: 8mm VT 6-on-1, Schwabisch
Rope: 10mm PMI Ezi Bend
Force: 12.78kN (R1=6.8, R2=5.98)

8mm VT Prusik 5-on-1 two rope

~~Slow Pull Test~~	~~Friction Test~~	**Drop Test**

Materials

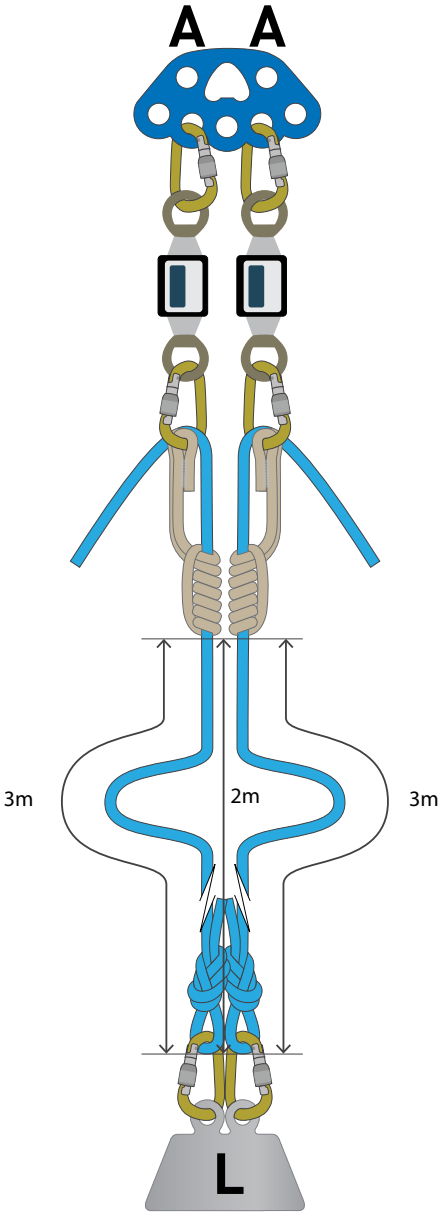
- PMI 10mm Classic Sport (27kN)
- Aspiring 8mm VT (20kN)

Test setup

- 8mm VT sewn
- 5-on-1 Schwabisch asymmetric Prusik
- Figure-8 on a bight on one end

Test parameters

- 1m drop on 3m of rope (3m measured from Prusik)
- 200kg mass
- Two rope
- Tested between 12mm steel carabiners

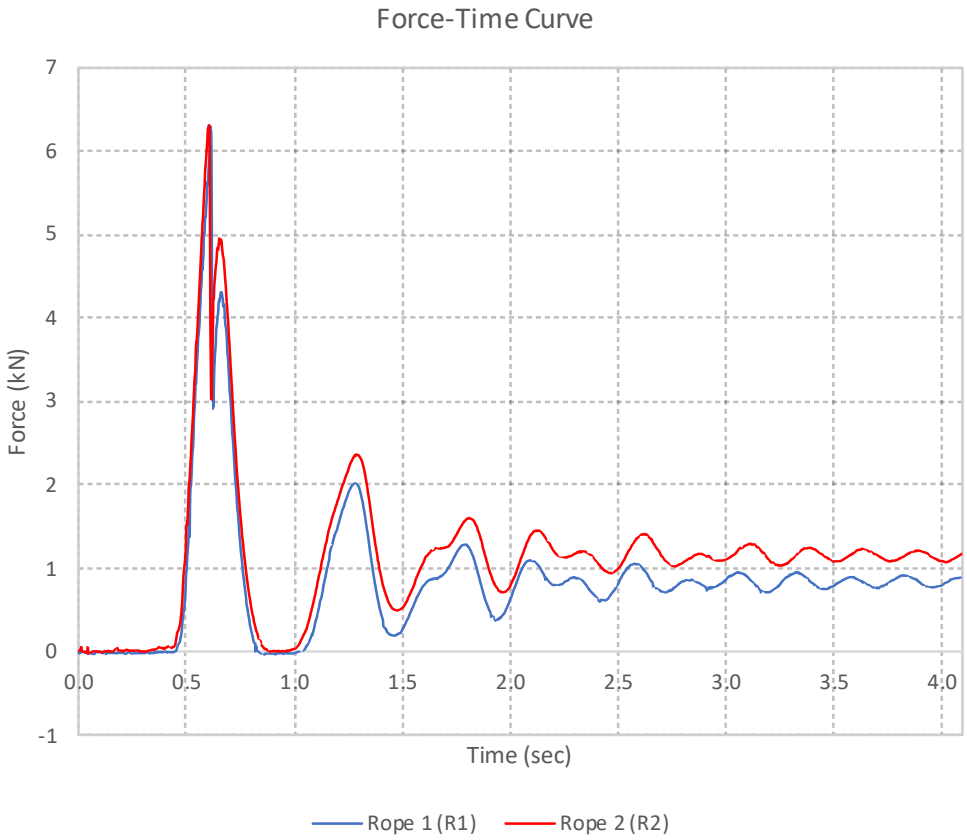


Results

Date	#	Rope 1 (kN)	Rope 2 (kN)	Total (kN)	Comments
29/03/20	1*	6.32	6.30	12.62	R1: Caught load, 10cm slip at Prusik, Prusik fused. R2: Caught load, 10cm slip at Prusik, Prusik fused.

* Sample 29/03/20 #1 of the testing shown on the following pages.

Test date:	Sunday, 29 March, 2020
Test #:	1
Product name:	5-on-1 8mm VT Prusik, two rope, Prusik on each rope
Material:	10mm PMI Classic Sport
Test type:	1m drop 3m of rope, 200kg
Max arrest force (kN):	12.62kN (R1 = 6.32, R2 = 6.30)



Tested by: Grant Prattley

Signed:


#: 1 Date: 29/3/20
Test: Drop test, 1m drop, 3m rope, 200kg, two ropes
Type: 8mm VT 5-on-1, Schwabisch
Rope: 10mm PMI Ezi Bend
Force: 12.62kN (R1=6.32, R2=6.3)

Appendix 3: PMI 8mm Accessory Cord

Loop – double fisherman's bend 8mm

Slow Pull Test	~~Friction Test~~	~~Drop Test~~

Materials

- PMI 8mm cord (14.3kN)

Test setup

- 8mm cord tied in a loop with a double fisherman's bend

Test parameters

- Slow pull speed 100mm/minute
- Tested between 12mm pins

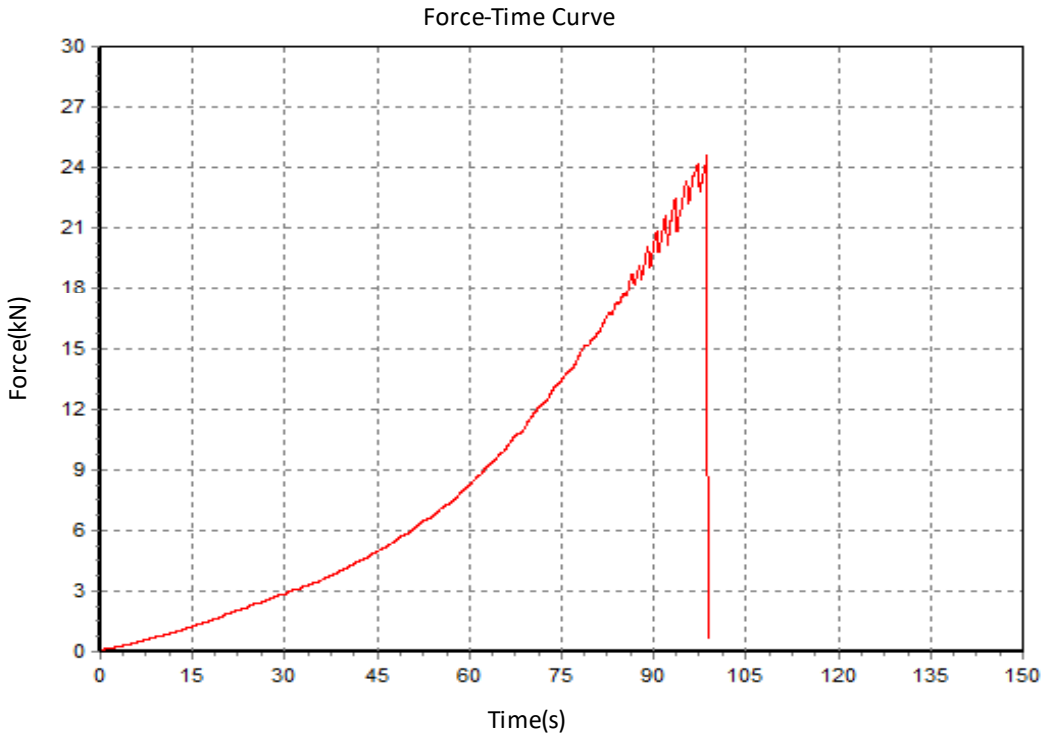
Results

Date	#	Max force (kN)	Comments
22/10/20	25*	24.60	Broke at the pin
22/10/20	26	22.43	Broke at the pin
22/10/20	27	24.44	Broke at the bend
Average		**23.82**	

* Sample 22/10/20 #25 of the testing shown on the following pages.

ASPIRING

Test Date:	Thursday, 22 October, 2020
Max Force (kN):	24.6
Product Name:	Double Fisherman's Loop
Batch #:	25
Material:	8mm PMI cord



ECAAS ISO 9001 CERTIFIED QUALITY MANAGEMENT

Tested by: Grant Prattley

Signed: Grant Prattley

Machine has a current calibration certificate. www.aspiring.co.nz


#: 25 Date: 22/10/20
Test: Slow Pull 100mm/min
Type: Loop, double fisherman's
Rope: 8mm PMI Cord
Force: 24.60kN

Loop – figure-8 rethread bend 8mm

Slow Pull Test	~~Friction Test~~	~~Drop Test~~

Materials

- PMI 8mm cord (14.3kN)

Test setup

- 8mm cord tied in a loop with a figure-8 rethread bend

Test parameters

- Slow pull speed 100mm/minute
- Tested between 12mm pins

Results

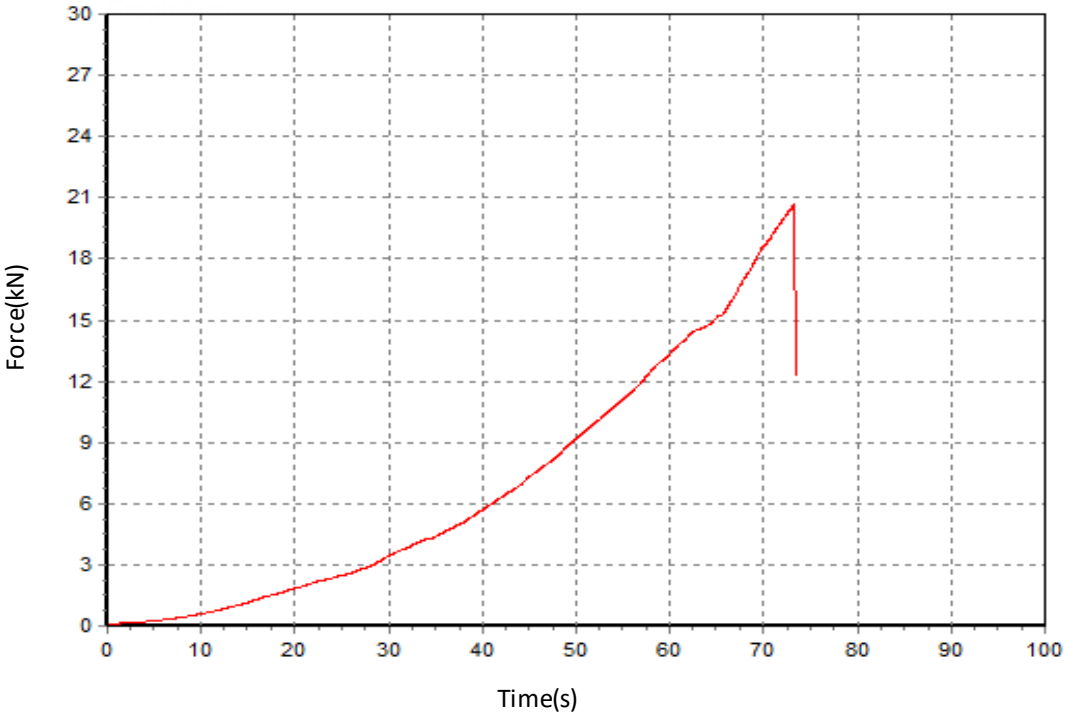
Date	#	Max force (kN)	Comments
16/11/20	10*	20.68	Broke at the bend
16/11/20	11	19.91	Broke at the bend
16/11/20	12	20.43	Broke at the bend
Average		**20.34**	

* Sample 16/11/20 #10 of the testing shown on the following pages.

ASPIRING

Test Date:	Monday, 16 November 2020
Max Force (kN):	20.68
Product Name:	Fig-8 rethread bend loop
Batch #:	10
Material:	8mm PMI Accessory Cord

Force-Time Curve



ECAAS ISO 9001 CERTIFIED QUALITY MANAGEMENT

Tested by: Grant Prattley

Signed: Grant Prattley

Machine has a current calibration certificate. www.aspiring.co.nz


#: 10 Date: 16/11/20
Test: Slow Pull 100mm/min
Type: Loop fig-8 rethread bend
Material: 8mm PMI cord
Force: 20.68kN

Wrap 3 Pull 2, 8mm cord

Slow Pull Test	~~Friction Test~~	~~Drop Test~~

Materials

- PMI 8mm cord (14.3kN)

Test setup

- 8mm cord tied as a wrap 3 pull 2 on a 30mm pin
- 8mm cord tied in a loop with a double fisherman's bend

Test parameters

- Slow pull speed 100mm/minute
- Tested between 30mm pin and a steel carabiner

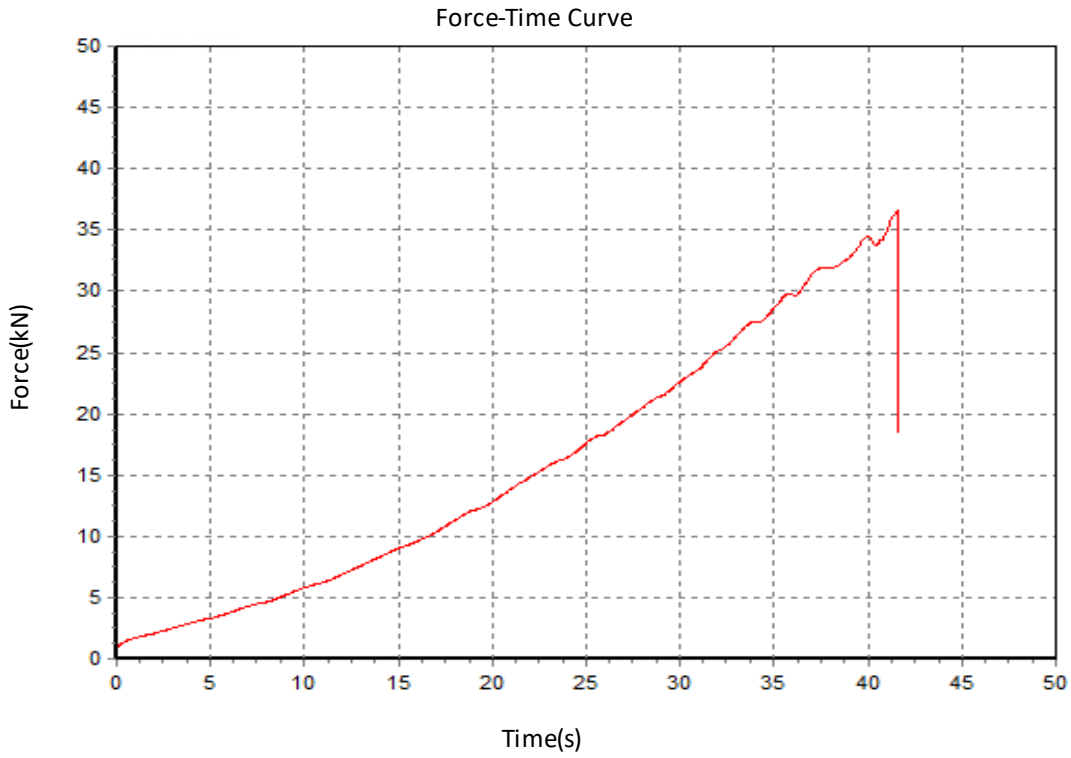
Results

Date	#	Max force (kN)	Comments
16/11/20	17*	36.59	Broke 1 strand at the carabiner
16/11/20	18	35.62	Broke 1 strand at the carabiner
16/11/20	19	33.68	Broke 1 strand at the carabiner
Average		**35.30**	

* Sample 16/11/20 #17 of the testing shown on the following pages.

ASPIRING

Test Date:	Monday, 16 November 2020
Max Force (kN):	36.59
Product Name:	W3P2 double fisherman's
Batch #:	17
Material:	8mm PMI Accessory Cord



ECAAS ISO 9001 CERTIFIED QUALITY MANAGEMENT

Tested by: Grant Prattley

Signed: Grant Prattley

Machine has a current calibration certificate. www.aspiring.co.nz


#: 17 Date: 16/11/20
Test: Slow Pull 100mm/min
Type: W3P2 double fisherman's bend
Material: 8mm PMI cord
Force: 36.59kN

Wrap 2 Pull 2, 8mm cord

Slow Pull Test	~~Friction Test~~	~~Drop Test~~

Materials

- PMI 8mm cord (14.3kN)

Test setup

- 8mm cord tied as a wrap 2 pull 2 on a 30mm pin
- 8mm cord tied in a loop with a double fisherman's bend

Test parameters

- Slow pull speed 100mm/minute
- Tested between 30mm pin and a steel carabiner

Results

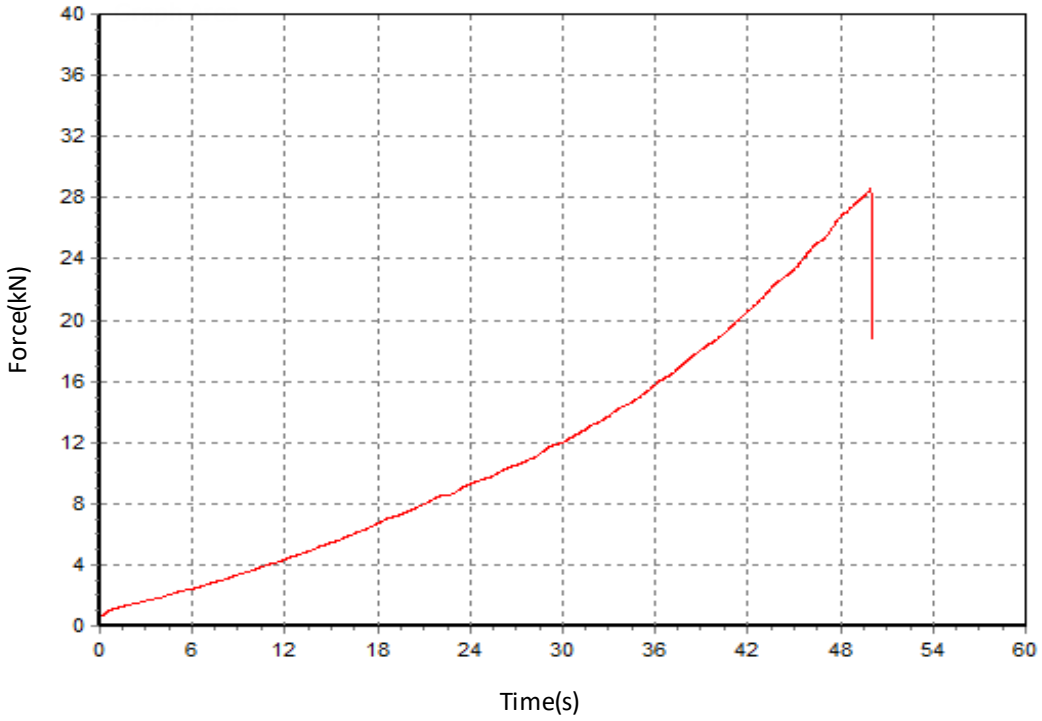
Date	#	Max force (kN)	Comments
16/11/20	21*	28.58	Broke 1 strand at the carabiner
16/11/20	22	29.10	Broke 1 strand at the carabiner
16/11/20	23	30.93	Broke 1 strand at the carabiner
Average		**29.54**	

* Sample 16/11/20 #21 of the testing shown on the following pages.

ASPIRING

Test Date:	Monday, 16 November 2020
Max Force (kN):	28.58
Product Name:	W2P2 double fisherman's
Batch #:	21
Material:	8mm PMI Accessory Cord

Force-Time Curve



ECAAS ISO 9001 CERTIFIED QUALITY MANAGEMENT

Tested by: Grant Prattley

Signed: Grant Prattley

Machine has a current calibration certificate. www.aspiring.co.nz


#: 21 Date: 16/11/20
Test: Slow Pull 100mm/min
Type: W2P2 double fisherman's bend
Material: 8mm PMI cord
Force: 28.58kN

2-point anchor fixed focal, overhand knot, 8mm cord

Slow Pull Test	~~Friction Test~~	~~Drop Test~~

Materials

- PMI 8mm cord (14.3kN)

Test setup

- Focal point tied with an overhand knot
- 8mm cord tied in a loop with a double fisherman's bend
- Double strand anchor legs

Test parameters

- Slow pull speed 100mm/minute
- Tested between 12mm steel carabiner attached 10mm rapides the outside holes of a medium sized rigging plate

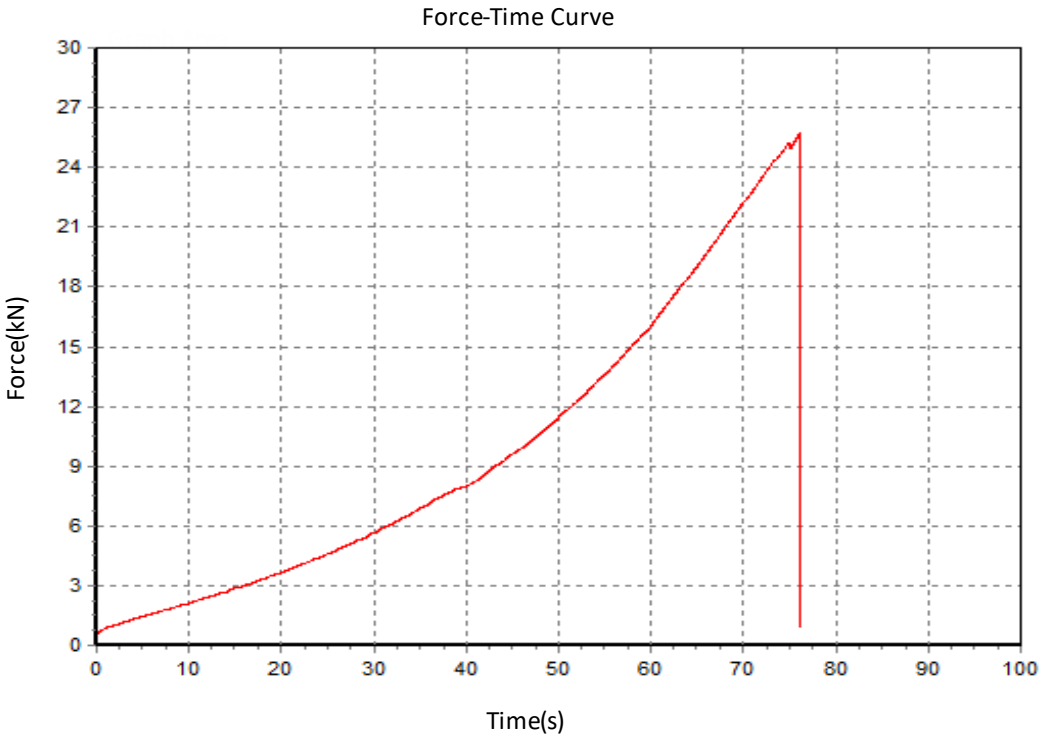
Results

Date	#	Max force (kN)	Comments
22/10/20	7*	25.73	Broke at fixed overhand, top side 1 strand, leg without bend
22/10/20	8	23.45	Broke at fixed overhand, top side 1 strand, leg without bend
22/10/20	9	24.24	Broke at fixed overhand, top side 1 strand, leg without bend
Average		**24.47**	

* Sample 22/10/20 #7 of the testing shown on the following pages.

ASPIRING

Test Date:	Thursday, 22 October, 2020
Max Force (kN):	25.73
Product Name:	2pt fixed anchor overhand
Batch #:	7
Material:	8mm PMI cord



ECAAS ISO 9001 CERTIFIED QUALITY MANAGEMENT

Tested by: Grant Prattley

Signed: Grant Prattley

Machine has a current calibration certificate. www.aspiring.co.nz


#: 7 Date: 22/10/20
Test: Slow Pull 100mm/min
Type: 2 point fixed, 2 strand,
1 biner, double fisherman's
Rope: 8mm PMI Cord
Force: 25.73kN

2-point anchor, floating focal, 1 strand, 1 carabiner

~~Side to Side Tests~~	~~Drop Test~~	**Slow Pull Test**

Materials

- PMI 8mm nylon accessory cord

Test setup

- Loops joined with a double fisherman's bend in cord.
- Tied two overhand limiting knots at 20cm apart..

Test parameters

- 2-point anchor attached to the outside holes of a 5 hole rigging plate.
- Tested between 12mm steel carabiner and 10mm rapides.
- Slow pull speed 100mm/minute.

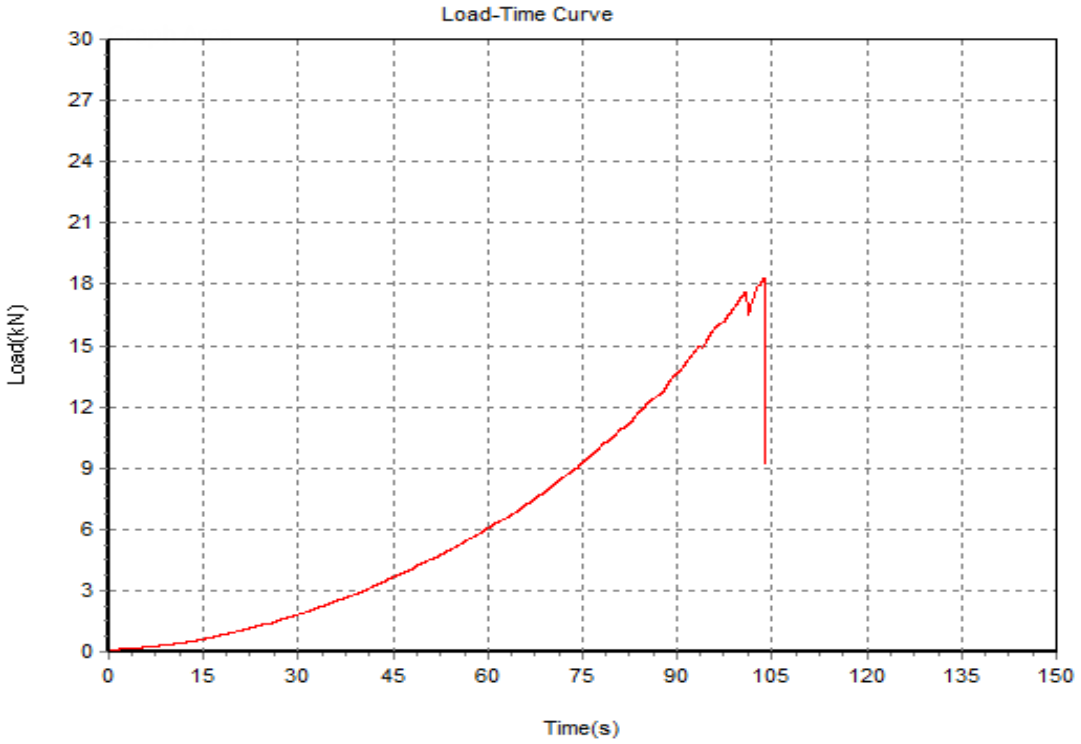
Results

Date	#	Breaking force (kN)	Comments
22/10/20	10*	18.32	Broke at limiting overhand, bottom side, leg without bend
22/10/20	11	18.45	Broke at limiting overhand, bottom side, leg without bend
22/10/20	12	18.30	Broke at limiting overhand, bottom side, leg without bend
Average		**18.36**	

* Sample 22/10/20 #10 of the testing shown on the following pages.

ASPIRING

Test Date:	Thursday, 22 October, 2020
Break Force (kN):	18.32
Product Name:	2pt anchor floating single strand
Batch #:	10
Material:	8mm PMI cord



ECAAS ISO 9001 CERTIFIED QUALITY MANAGEMENT

Tested by: Grant Prattley

Signed: Grant Prattley

Machine has a current calibration certificate. www.aspiring.co.nz


#: 10 Date: 22/10/20
Test: Slow Pull 100mm/min
Type: 2 point floating, 1 strand, 1 biner, double fisherman's
Rope: 8mm PMI Cord
Force: 18.32kN

2-point anchor, floating focal, 2 strands, 2 carabiner

~~Side to Side Tests~~	~~Drop Test~~	**Slow Pull Test**

Materials

- PMI 8mm nylon accessory cord

Test setup

- Loops joined with a double fisherman's bend in cord.
- Tied two overhand limiting knots at 20cm apart..

Test parameters

- 2-point anchor attached to the outside holes of a 5 hole rigging plate.
- Tested between 12mm steel carabiners and 10mm rapides.
- Slow pull speed 100mm/minute.

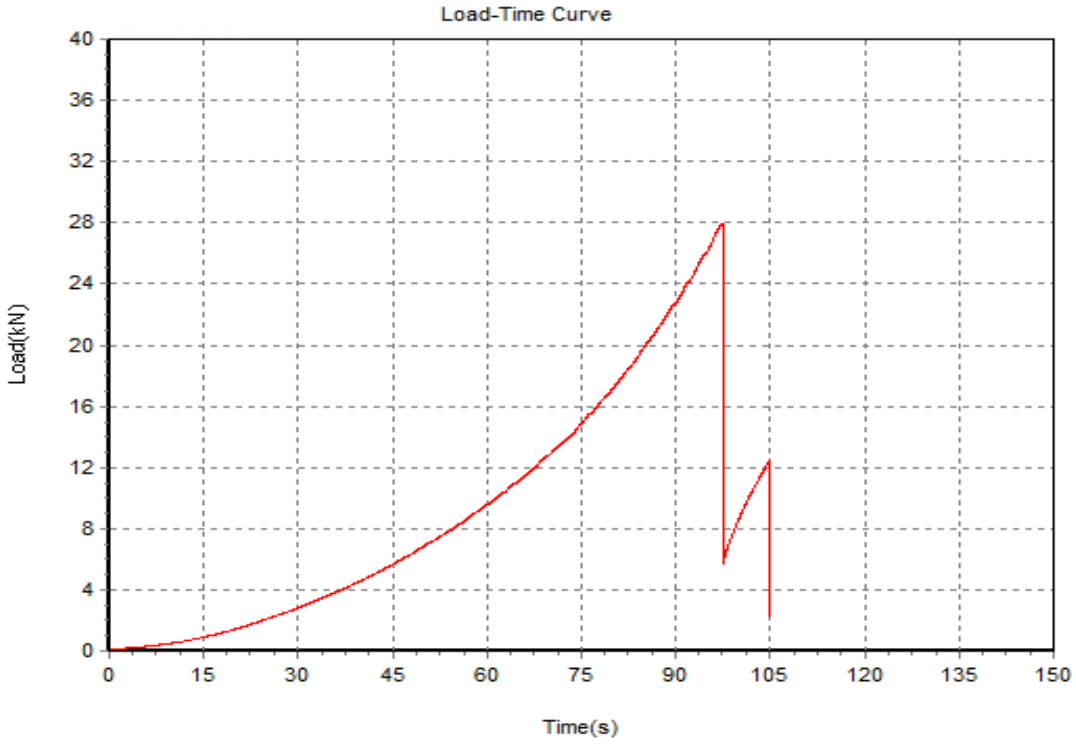
Results

Date	#	Breaking force (kN)	Comments
22/10/20	13*	27.96	Broke at limiting overhand, bottom and top, leg without bend
22/10/20	14	30.74	Broke at limiting overhand, bottom and top, leg without bend
22/10/20	15	30.14	Broke at limiting overhand, bottom and top, leg without bend
Average		**29.61**	

* Sample 22/10/20 #13 of the testing shown on the following pages.

ASPIRING

Test Date:	Thursday, 22 October, 2020
Break Force (kN):	27.96
Product Name:	2pt anchor floating 2 strand 2 biners
Batch #:	13
Material:	8mm PMI cord



ECAAS ISO 9001 CERTIFIED QUALITY MANAGEMENT

Tested by: Grant Prattley

Signed: Grant Prattley

Machine has a current calibration certificate. www.aspiring.co.nz


#: 13 Date: 22/10/20
Test: Slow Pull 100mm/min
Type: 2 point floating, 2 strand, 2 biner, double fisherman's
Rope: 8mm PMI Cord
Force: 27.96kN

Fixed focal, 1 carabiner, 2 strands clipped, 90cm sling

~~Side to Side Tests~~	**Drop Test**	~~Slow Pull Test~~

Materials

- PMI 8mm nylon cord

Test setup

- Loops joined with double fisherman's bend in cord.
- Tied overhand knot at focal point.
- 200kg mass (approx 1.96kN).
- 0cm drop.

Test parameters

- Tested between 12mm steel carabiners.
- Dropped on the side of the bend and side without the bend.
- Ext. = Extension of the RHS from start length with the load in place pre-drop to finish length post-drop with the load still hanging, including the leg and loop.

Results – side with bend

Date	#	Start RHS (cm)	End RHS (cm)	Ext. RHS (cm)	Predrop LHS (kN)	Predrop RHS (kN)	Post drop RHS (kN)	Diff. RHS (kN)
16/10/20	7*	30.50	33.50	3.00	1.00	0.86	2.58	1.72
16/10/20	8	30.50	34.50	4.00	1.00	0.86	2.62	1.76
16/10/20	9	32.00	36.00	4.00	0.94	0.94	2.58	1.64
Average				**3.67**			**2.59**	**1.71**

* Sample #7 of the testing shown on the following 2 pages.

Results – side without bend

Date	#	Start RHS (cm)	End RHS (cm)	Ext. RHS (cm)	Predrop LHS (kN)	Predrop RHS (kN)	Post drop RHS (kN)	Diff. RHS (kN)
3/12/20	7*	32.00	34.50	2.50	0.98	1.10	2.90	1.80
3/12/20	8	32.00	34.00	2.00	1.00	1.06	2.64	1.58
3/12/20	9	32.00	34.00	2.00	1.04	1.06	2.82	1.76
Average				**2.17**			**2.79**	**1.71**

* Sample 3/12/20 #7 of the testing shown on the following pages.

Test Date: Friday, 16 October, 2020

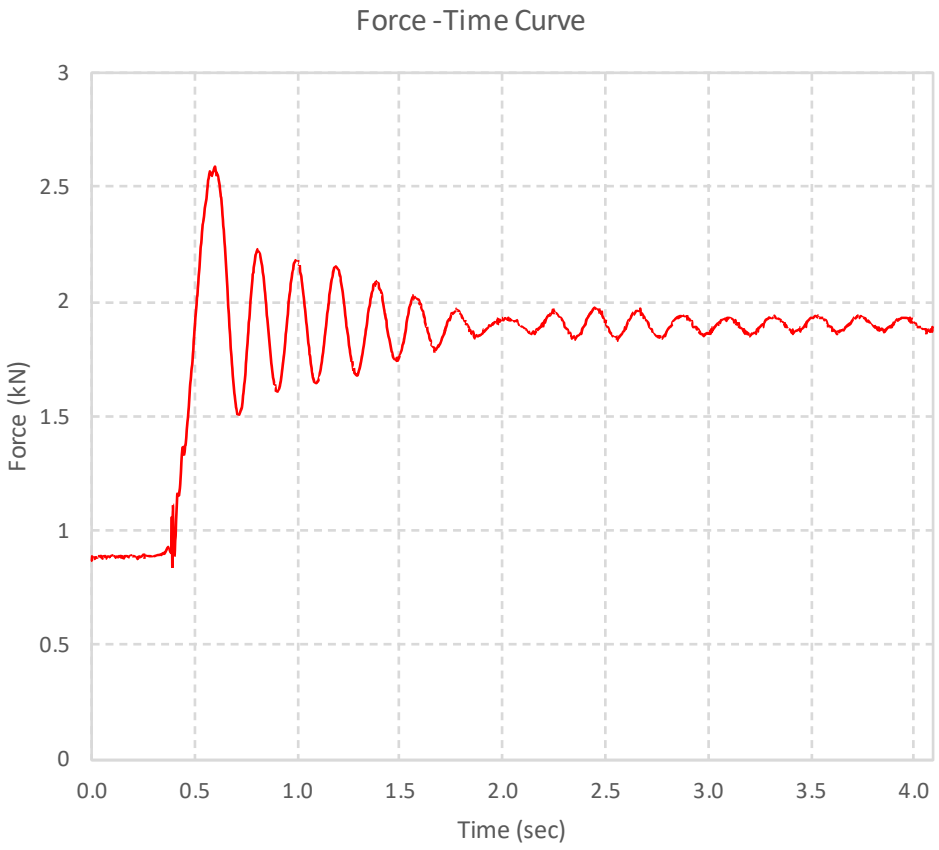
Test #: 7

Product Name: 2-point fixed anchor, overhand knot, double fisherman's bend, 90cm sling

Material: 8mm PMI cord

Test type: Drop 0cm, side with bend, 200kg

Max arrest force (kN): 2.58kN



Tested by: Grant Prattley

Signed:


#: 7 Date: 16/10/20
Test: 0cm drop, 200kg, fail 1 side
Type: 2-point fixed anchor, overhand focal, bend side
Rope: 8mm PMI Cord
Force: 2.58kN

OVER·THE·EDGE RESCUE

Test Date: Thursday, 3 December, 2020

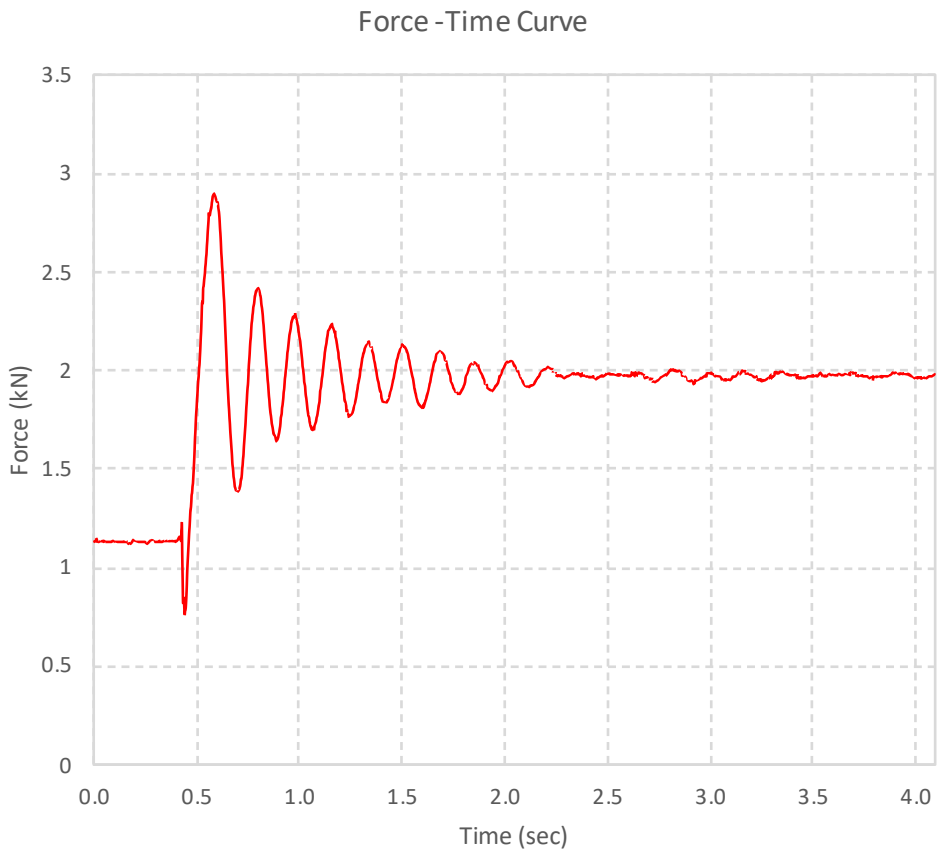
Test #: 7

Product Name: 2-point fixed anchor, overhand knot, double fisherman's bend, 90cm sling

Material: 8mm PMI cord

Test type: Drop 0cm, side without bend, 200kg

Max arrest force (kN): 2.90kN



Tested by: Grant Prattley

Signed:


#: 7 Date: 3/12/20
Test: 0cm drop, 200kg, fail 1 side
Type: 2-point fixed anchor, overhand limiting, w/o bend
Rope: 8mm PMI Cord
Force: 2.90kN

2-point, floating focal, 1 carabiner, 1 strand clipped

~~Side to Side Tests~~	**Drop Test**	~~Slow Pull Test~~

Materials

- PMI 8mm nylon cord

Test setup

- 90cm sling
- Loops joined with double fisherman's bend in cord.
- Tied two overhand limiting knots at 20cm apart.
- 200kg mass (approx 1.96kN).
- 10cm drop.

Test parameters

- Tested between 12mm steel carabiners.
- Dropped on the side of the bend and side without the bend.
- Ext. = Extension of the RHS from start length with the load in place pre-drop to finish length post-drop with the load still hanging, including the leg and loop.

Results – side with bend

Date	#	Start RHS (cm)	End RHS (cm)	Ext. RHS (cm)	Predrop LHS (kN)	Predrop RHS (kN)	Post drop RHS (kN)	Diff. RHS (kN)
20/10/20	10*	41.00	62.00	21.00	1.06	0.88	4.40	3.52
20/10/20	11	42.00	64.00	22.00	1.12	0.84	5.24	4.40
20/10/20	12	42.00	63.00	21.00	1.08	0.86	5.24	4.38
Average				**21.33**			**4.96**	**4.10**

* Sample 20/10/20 #10 of the testing shown on the following pages.

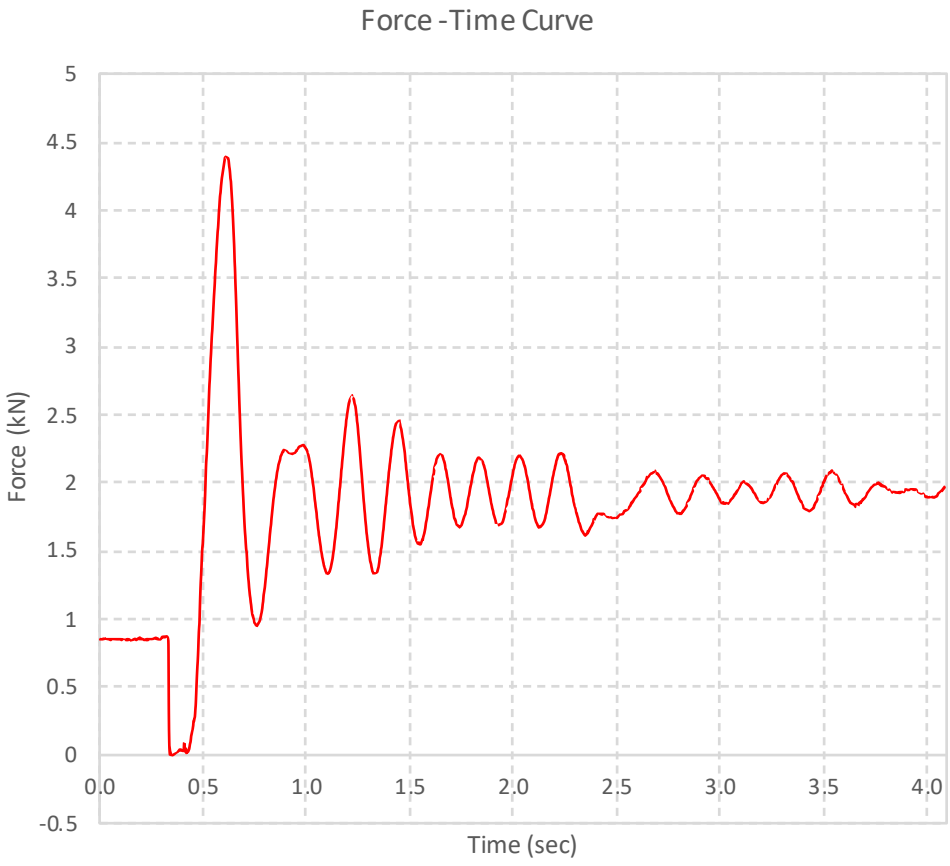
Results – side without bend

Date	#	Start RHS (cm)	End RHS (cm)	Ext. RHS (cm)	Predrop LHS (kN)	Predrop RHS (kN)	Post drop RHS (kN)	Diff. RHS (kN)
1/11/20	1	37.00	53.00	16.00	0.96	0.98	5.96	4.98
1/11/20	2*	38.00	55.00	17.00	0.94	0.96	5.76	4.80
1/11/20	3	39.00	55.00	16.00	0.94	0.94	4.64	3.70
Average				**16.33**			**5.45**	**4.49**

* Sample 1/11/20 #2 of the testing shown on the following pages.

OVER·THE·EDGE RESCUE

Test Date:	Tuesday, 20 October, 2020
Test #:	10
Product Name:	2-point floating, 1 strand,1 biner, overhand limiting knots, d. fisherman's
Material:	8mm PMI cord
Test type:	Drop 10cm, fail onto bend side, 200kg
Max arrest force (kN):	4.40kN



Tested by: Grant Prattley

Signed: Grant Prattley


#: 10 Date: 20/10/20
Test: 10cm drop, 200kg, fail 1 side
Type: 2-point floating, 1 biner, 1 strand, oh limiting, bend side
Rope: 8mm PMI Cord
Force: 4.40kN

OVER·THE·EDGE RESCUE

Test Date: Sunday, 1 November, 2020

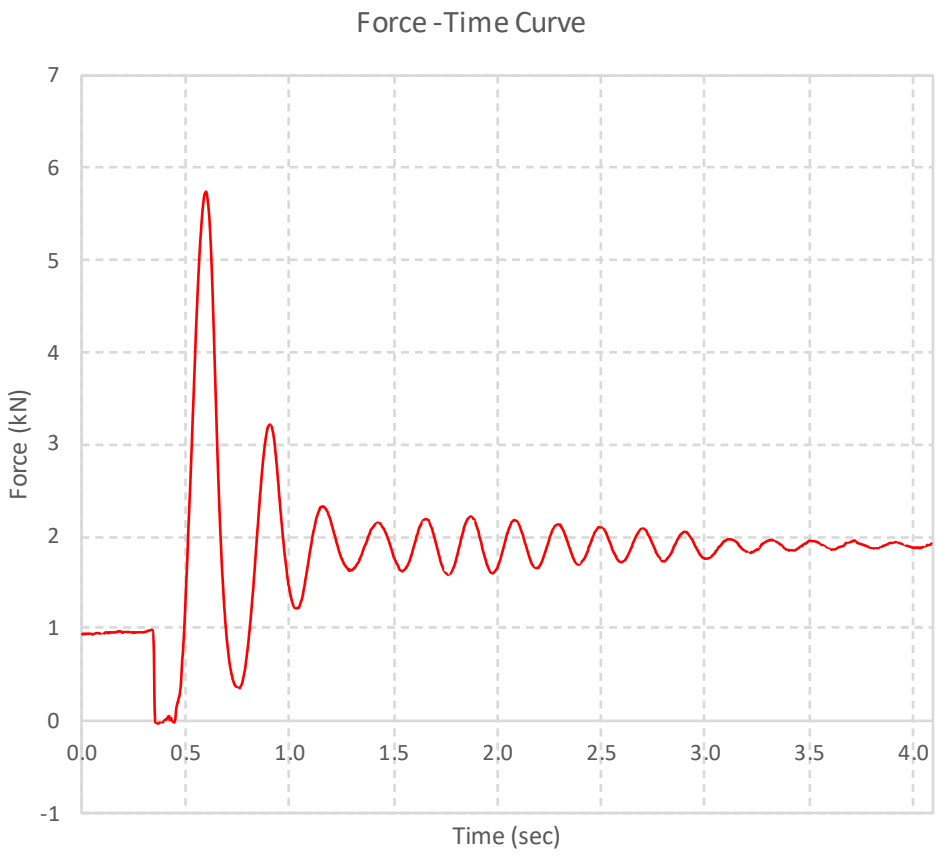
Test #: 2

Product Name: 2-point floating, 1 strand, 1 biner, o/h limiting knots, d. fish. bend, 90cm sling

Material: 8mm PMI cord

Test type: Drop 10cm, side without bend, 200kg

Max arrest force (kN): 5.76kN



Tested by: Grant Prattley

Signed: Grant Prattley


#: 2 Date: 1/10/20
Test: 10cm drop, 200kg, fall 1 side
Type: 2-point floating anchor, overhand limiting, w/o bend side
Rope: 8mm PMI Cord
Force: 5.76kN

Appendix 4: Edelrid 25mm Tubular Webbing

Single strand: Overhand on a bight

Slow Pull Test	~~Friction Test~~	~~Drop Test~~

Materials

- Edelrid tubular webbing 25mm (20kN)

Test setup

- 25mm webbing tied with an overhand on a bight knot

Test parameters

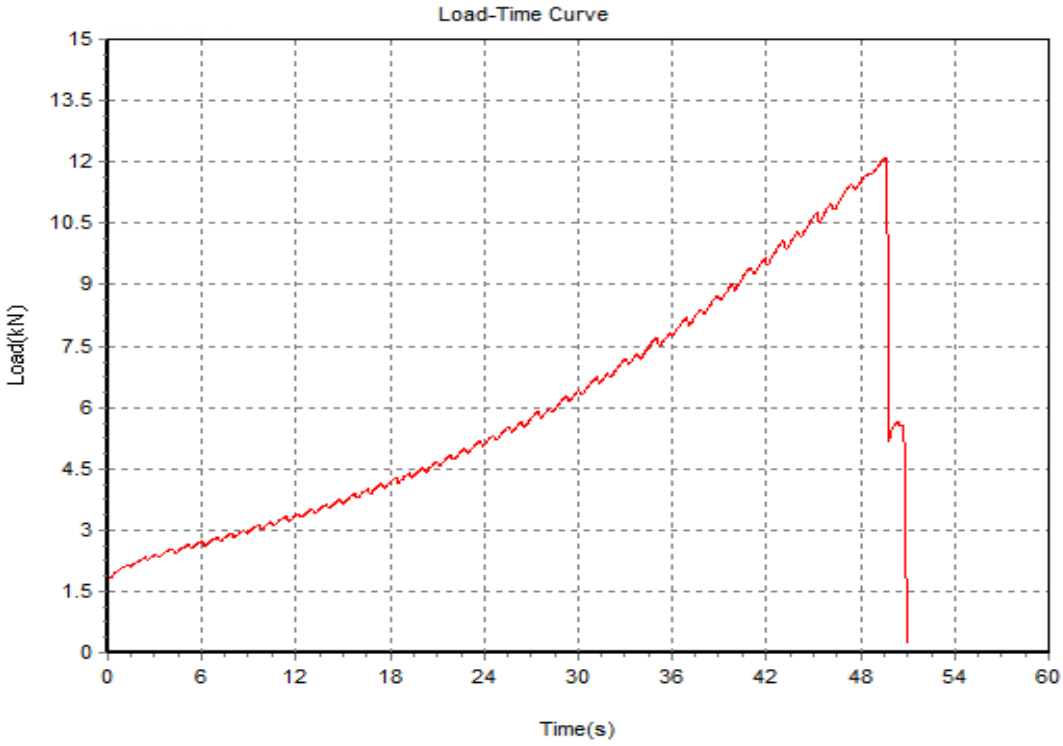
- Slow pull speed 100mm/minute
- Tested between 12mm pins

Results

Date	#	Breaking strength (kN)	Comments
28/8/19	1*	12.11	Broke at overhand
28/8/19	2	11.14	Broke at overhand
28/8/19	3	11.77	Broke at overhand
Average		11.67	

* Sample 20/08/19 #1 of the testing shown on the following pages.

Test Date:	Wednesday, 28 August, 2019
Peak Load (kN):	12.11
Product Name:	Overhand on a bight 1 strand
Batch #:	1
Material:	Edelrid 25mm webbing



Tested by: Grant Prattley

Signed:

Machine has a current calibration certificate. www.aspiring.co.nz


①
23/8/19
12.11kN
Edelrid 25mm
Single strand

Loop: Tape bend

Slow Pull Test	~~Friction Test~~	~~Drop Test~~

Materials

- Edelrid 25mm tubular webbing (20kN)

Test setup

- 25mm webbing tied into a sling with a Tape bend

Test parameters

- Slow pull speed 100mm/minute
- Tested between 12mm pins

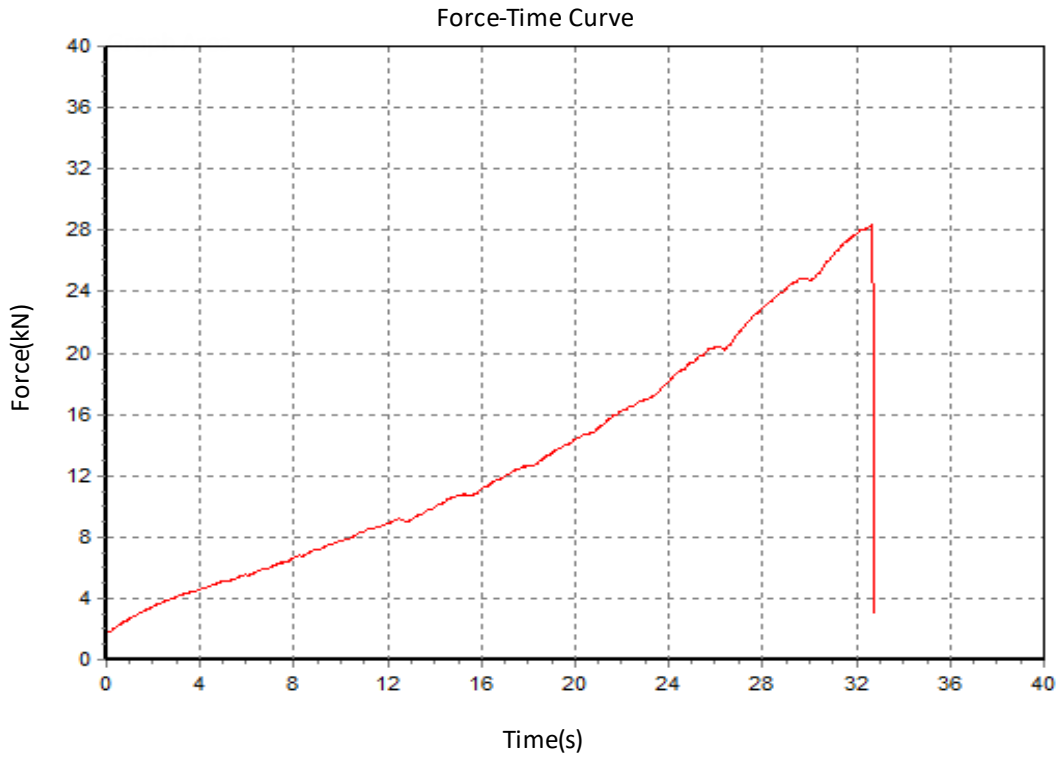
Results

Date	#	Breaking strength (kN)	Comments
20/08/19	13*	28.34	Broke at tape/overhand bend
20/08/19	14	27.44	Broke at tape/overhand bend
20/08/19	15	27.71	Broke at tape/overhand bend
Average		**27.83**	

* Sample 20/08/19 #13 of the testing shown on the following pages.

ASPIRING

Test Date:	Tuesday, 20 August 2019
Max Force (kN):	28.34
Product Name:	Loop - Tape bend
Batch #:	13
Material:	25mm Edelrid Webbing



ECAAS ISO 9001 CERTIFIED Quality Management

Tested by: Grant Prattley

Signed: Grant Prattley

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13
20.8.19
28.34kN
Edelrid 25mm
Tape Bend Loop

Wrap 3 Pull 2, 25mm webbing

Slow Pull Test	~~Friction Test~~	~~Drop Test~~

Materials

- Edelrid 25mm X tube (20kN) webbing

Test setup

- 25mm webbing tied as a wrap 3 pull 2 on a 30mm pin
- 25mm webbing tied in a loop with a tape/overhand rethread bend

Test parameters

- Slow pull speed 100mm/minute
- Tested between 30mm pin and a steel carabiner

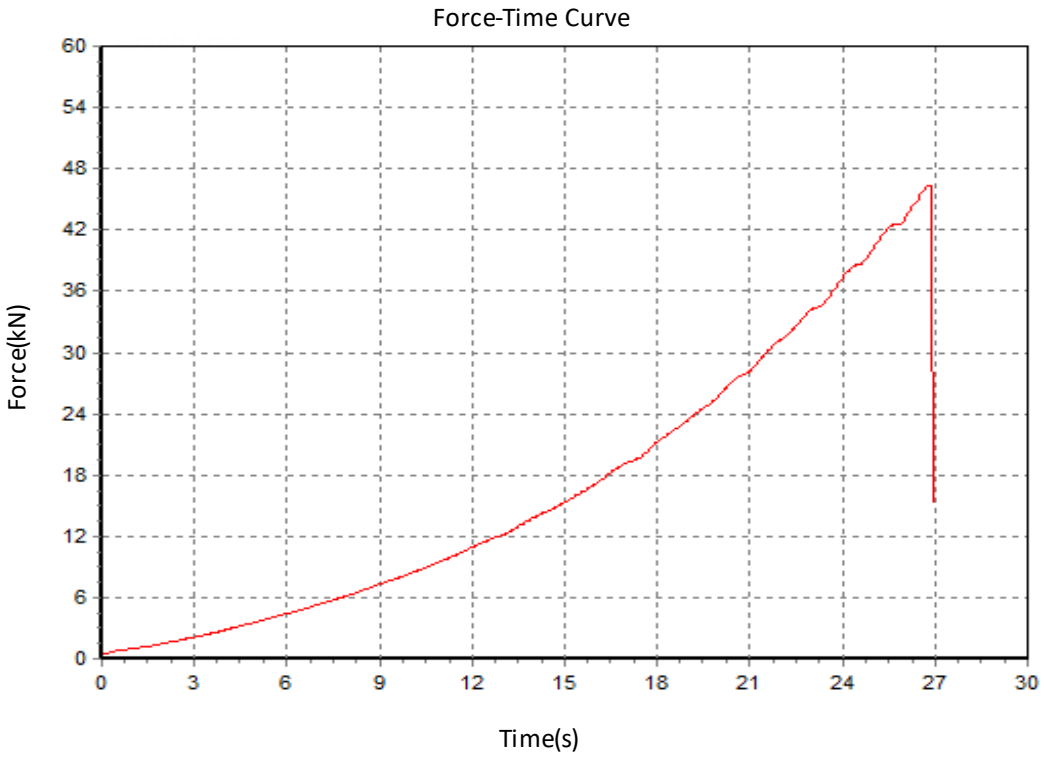
Results

Date	#	Max force (kN)	Comments
16/11/20	24*	46.36	Broke 1 strand at the carabiner
16/11/20	25	39.51	Broke 1 strand at the carabiner
16/11/20	26	34.37	Broke 1 strand at the carabiner
Average		**40.08**	

* Sample 16/11/20 #24 of the testing shown on the following pages.

ASPIRING

Test Date:	Monday, 16 November 2020
Max Force (kN):	46.36
Product Name:	W3P2 tape bend
Batch #:	24
Material:	25mm Edelrid Webbing



ECAAS ISO 9001 CERTIFIED QUALITY MANAGEMENT

Tested by: Grant Prattley

Signed: Grant Prattley

Machine has a current calibration certificate. www.aspiring.co.nz


#: 24 Date: 16/11/20
Test: Slow Pull 100mm/min
Type: W3P2 tape bend
Webbing: 25mm Edelrid
Force: 46.36kN

Wrap 2 Pull 2, 25mm webbing

Slow Pull Test	~~Friction Test~~	~~Drop Test~~

Materials

- Edelrid 25mm X tube (20kN) webbing

Test setup

- 25mm webbing tied as a wrap 2 pull 2 on a 30mm pin
- 25mm webbing tied in a loop with a tape/overhand rethread bend

Test parameters

- Slow pull speed 100mm/minute
- Tested between 30mm pin and a steel carabiner

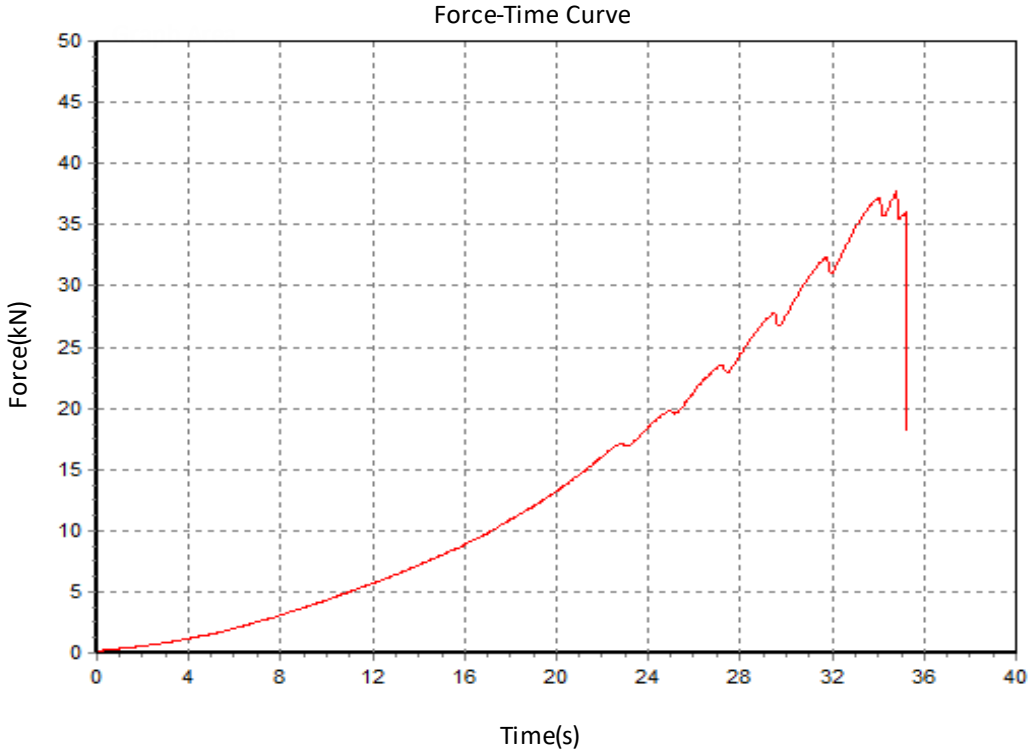
Results

Date	#	Max force (kN)	Comments
16/11/20	27*	37.39	Broke 1 strand at the carabiner
16/11/20	28	38.46	Broke 1 strand at the carabiner
16/11/20	29	37.94	Broke 1 strand at the carabiner
Average		**37.93**	

* Sample 16/11/20 #27* of the testing shown on the following pages.

ASPIRING

Test Date:	Monday, 16 November 2020
Max Force (kN):	37.79
Product Name:	W2P2 tape bend
Batch #:	27
Material:	25mm Edelrid Webbing



ECAAS ISO 9001 CERTIFIED QUALITY MANAGEMENT

Tested by: Grant Prattley

Signed: Grant Prattley

Machine has a current calibration certificate. www.aspiring.co.nz


#: 27 Date: 16/11/20
Test: Slow Pull 100mm/min
Type: W2P2 tape bend
Webbing: 25mm Edelrid
Force: 37.39kN

2-point anchor fixed focal, overhand knot, 25mm webbing

Slow Pull Test	~~Friction Test~~	~~Drop Test~~

Materials

- Edelrid 25mm X tube (20kN) webbing

Test setup

- Focal point tied with an overhand knot
- 25mm webbing tied in a loop with a tape/overhand rethread bend
- Double strand anchor legs

Test parameters

- Slow pull speed 100mm/minute
- Tested between 12mm steel carabiner attached 10mm rapides the outside holes of a medium sized rigging plate

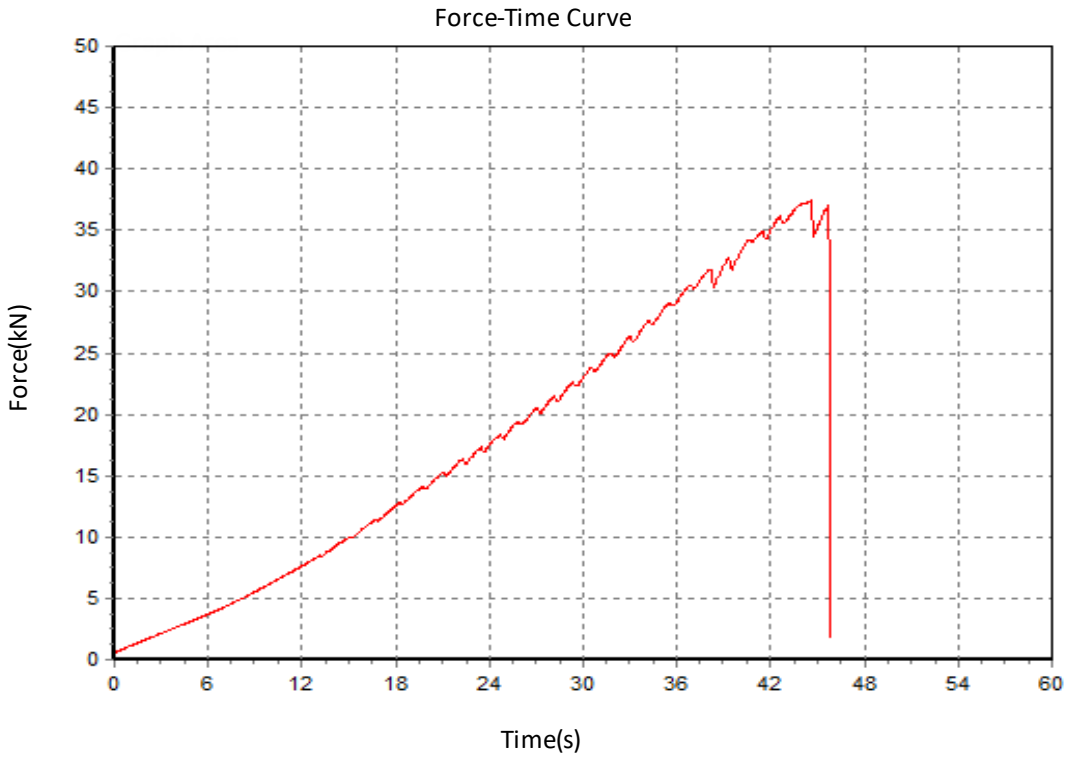
Results

Date	#	Max force (kN)	Comments
20/08/19	32	34.89	Broke 12mm steel carabiner
20/08/19	33*	37.46	Broke at fixed overhand, 1 strand, leg without bend
20/08/19	34	36.34	Broke at fixed overhand, 1 strand, leg without bend
Average		**36.23**	

* Sample 20/08/19 #33 of the testing shown on the following pages.

ASPIRING

Test Date:	Tuesday, 20 August 2019
Max Force (kN):	37.46
Product Name:	2pt load sharing overhand
Batch #:	33
Material:	25mm Edelrid webbing



ECAAS ISO 9001 CERTIFIED Quality Management

Tested by: Grant Prattley

Signed: Grant Prattley

Machine has a current calibration certificate. www.aspiring.co.nz


#: 33 Date: 20/08/19
Test: Slow Pull 100mm/min
Type: 2-pt fixed anchor
Webbing: 25mm Edelrid
Force: 37.46kN

Appendix 5: CT 8.2mm Dynamic Rope

Loop

Slow Pull Test	~~Friction Test~~	~~Drop Test~~

Materials

- CT 8.2mm nylon dynamic half rope.

Test setup

- Loops sewn.

Test parameters

- Tested between 12mm pins.
- Slow pull speed 100mm/minute.

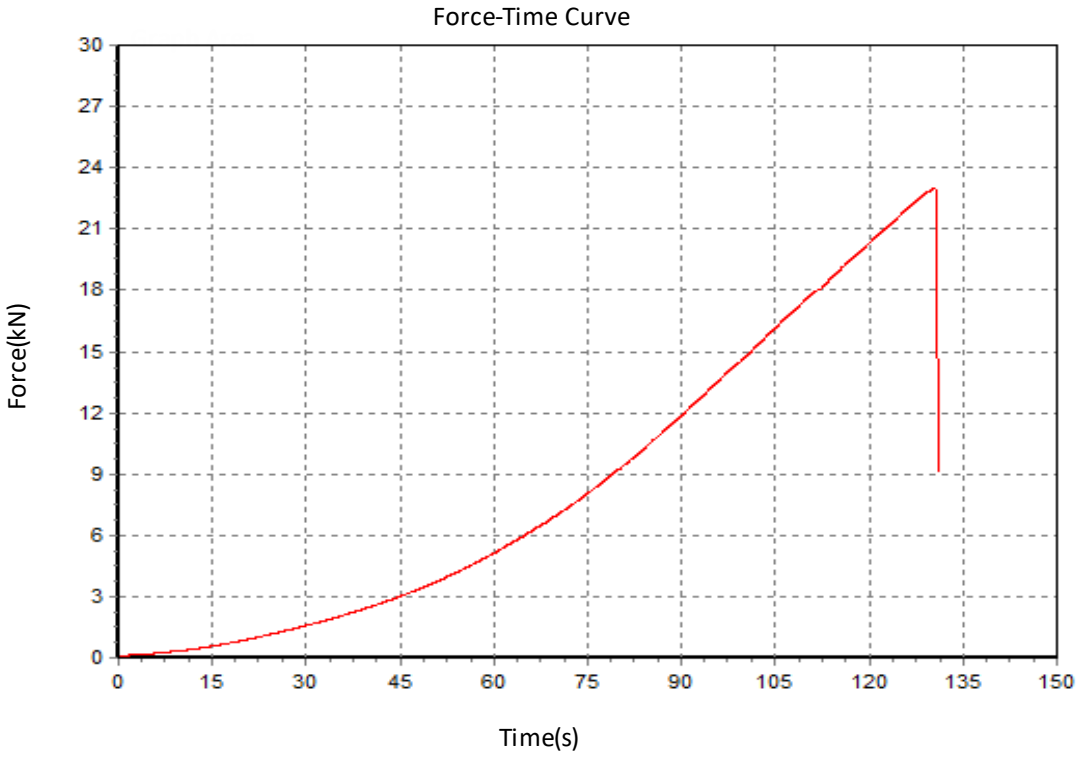
Results

Date	#	Breaking strength (kN)	Comments
22/10/20	22*	23.00	Broke at stitching
22/10/20	23	21.98	Broke at stitching
22/10/20	24	22.42	Broke at stitching
Average		**22.47**	

* Sample 22/10/20 #22 of the testing shown on the following pages

ASPIRING

Test Date:	Thursday, 22 October, 2020
Max Force (kN):	23.00
Product Name:	Loop sewn
Batch #:	22
Material:	8.2mm CT Dynamic cord



ECAAS ISO 9001 CERTIFIED QUALITY MANAGEMENT

Tested by: Grant Prattley

Signed: Grant Prattley

Machine has a current calibration certificate. www.aspiring.co.nz


#: 22 Date: 22/10/20
Test: Slow Pull 100mm/min
Type: Loop, sewn
Rope: 8.2mm CT Dynamic
Force: 23.00kN

2 point anchor, fixed focal, 2 strands, 1 carabiner

Slow Pull Test	~~Friction Test~~	~~Drop Test~~

Materials

- CT 8.2mm nylon dynamic rope.

Test setup

- Loops sewn.
- Tied overhand focal knot.

Test parameters

- 2-point anchor attached to the outside holes of a 5 hole rigging plate.
- Tested between 12mm pin and 10mm rapides.
- Slow pull speed 100mm/minute.

Results

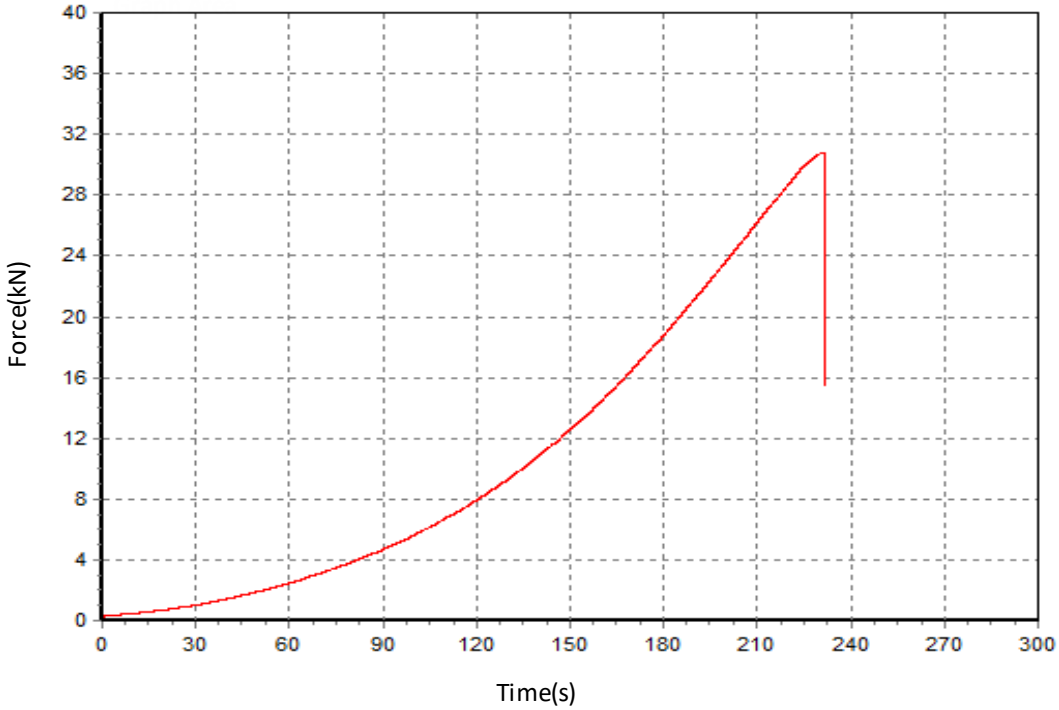
Date	#	Breaking force (kN)	Comments
22/10/20	1*	30.08	Broke at fixed overhand, both strands, bottom leg
22/10/20	2	29.66	Broke at fixed overhand, both strands, bottom leg
22/10/20	3	30.97	Broke at fixed overhand, both strands, bottom leg
Average		**30.24**	

* Sample 22/10/20 #1 of the testing shown on the following pages

ASPIRING

Test Date:	Thursday, 22 October, 2020
Max Force (kN):	30.80
Product Name:	2pt anchor fixed overhand
Batch #:	1
Material:	8.2mm CT Dynamic

Force-Time Curve



ECAAS ISO 9001 CERTIFIED QUALITY MANAGEMENT

Tested by: Grant Prattley

Signed: Grant Prattley

Machine has a current calibration certificate. www.aspiring.co.nz


#: 1 Date: 22/10/20
Test: Slow Pull 100mm/min
Type: 2 point fixed anchor,
2 strand, 1 biner, sewn
Rope: 8.2mm CT Dynamic
Force: 30.08kN

2 point anchor, floating focal, 1 strand, 1 carabiner

Slow Pull Test	~~Friction Test~~	~~Drop Test~~

Materials

- CT 8.2mm nylon dynamic rope.

Test setup

- Loops sewn.
- Tied two overhand limiting knots at 20cm apart

Test parameters

- 2-point anchor attached to the outside holes of a 5 hole rigging plate.
- Tested between 12mm pin and 10mm rapides.
- Slow pull speed 100mm/minute.

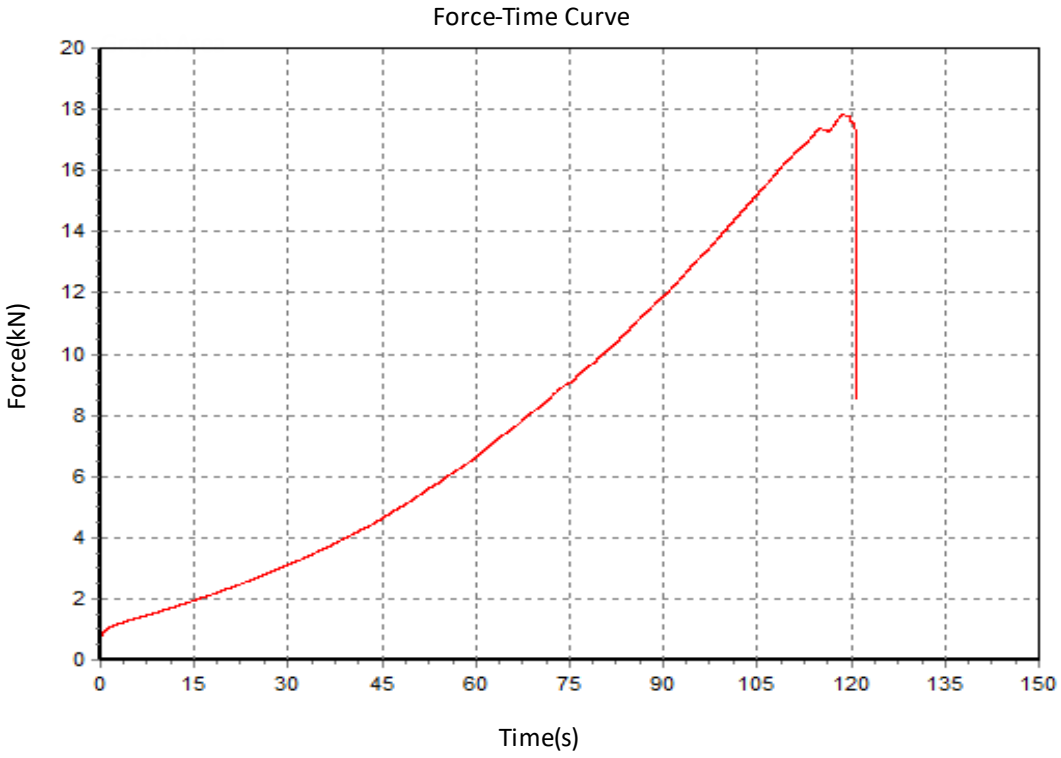
Results

Date	#	Max force (kN)	Comments
24/05/19	12	18.73	Broke at limiting overhand, 1 strand, on the sewn leg
17/10/19	13*	17.84	Broke at limiting overhand, 1 strand, on the sewn leg
17/10/19	14	17.63	Broke at limiting overhand, 1 strand, on the sewn leg
Average		**18.07**	

* Sample 17/10/19 #13 of the testing shown on the following pages.

ASPIRING

Test Date:	Thursday, 17 October 2019
Max Force (kN):	17.84
Product Name:	Two point floating 1 stand clipped 1 biner
Batch #:	13
Material:	8.2mm CT Dymanic half



ECAAS ISO 9001 CERTIFIED QUALITY MANAGEMENT

Tested by: Grant Prattley

Signed: Grant Prattley

Machine has a current calibration certificate. www.aspiring.co.nz


(13.) 17.10.19
17.84kN
2pt floating
Clip 1 strand
8.2mm Dynamic half

2 point anchor, floating focal, 2 strand, 2 carabiners

Slow Pull Test	~~Friction Test~~	~~Drop Test~~

Materials

- CT 8.2mm nylon dynamic rope.

Test setup

- Loops sewn.
- Tied two overhand limiting knots at 20cm apart

Test parameters

- 2-point anchor attached to the outside holes of a 5 hole rigging plate.
- Tested between 12mm pin and 10mm rapides.
- Slow pull speed 100mm/minute.

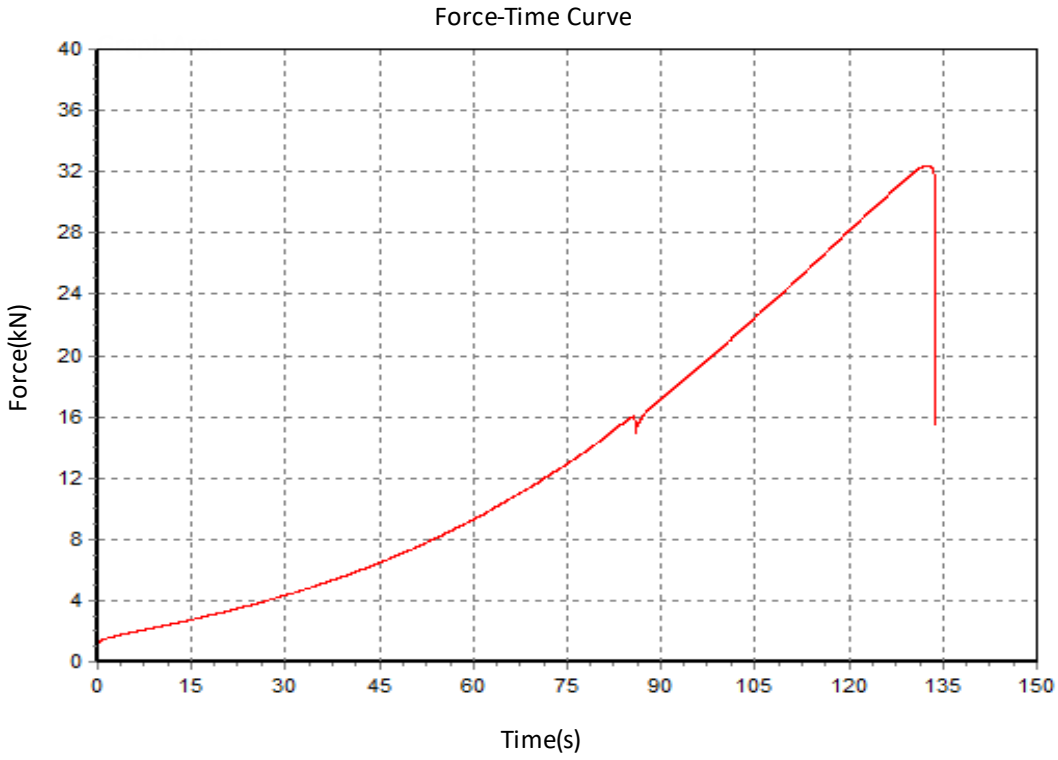
Results

Date	#	Max force (kN)	Comments
17/10/19	15*	32.41	Broke at limiting overhand, both strands, on the sewn leg
17/10/19	16	30.36	Broke at limiting overhand, both strands, on the sewn leg
17/10/19	17	31.81	Broke at limiting overhand, both strands, on the sewn leg
Average		**31.53**	

* Sample 17/10/19 #15 of the testing shown on the following pages.

ASPIRING

Test Date:	Thursday, 17 October 2019
Max Force (kN):	32.41
Product Name:	Two point floating 2 stand clipped 2 biner
Batch #:	15
Material:	8.2mm CT Dymanic half



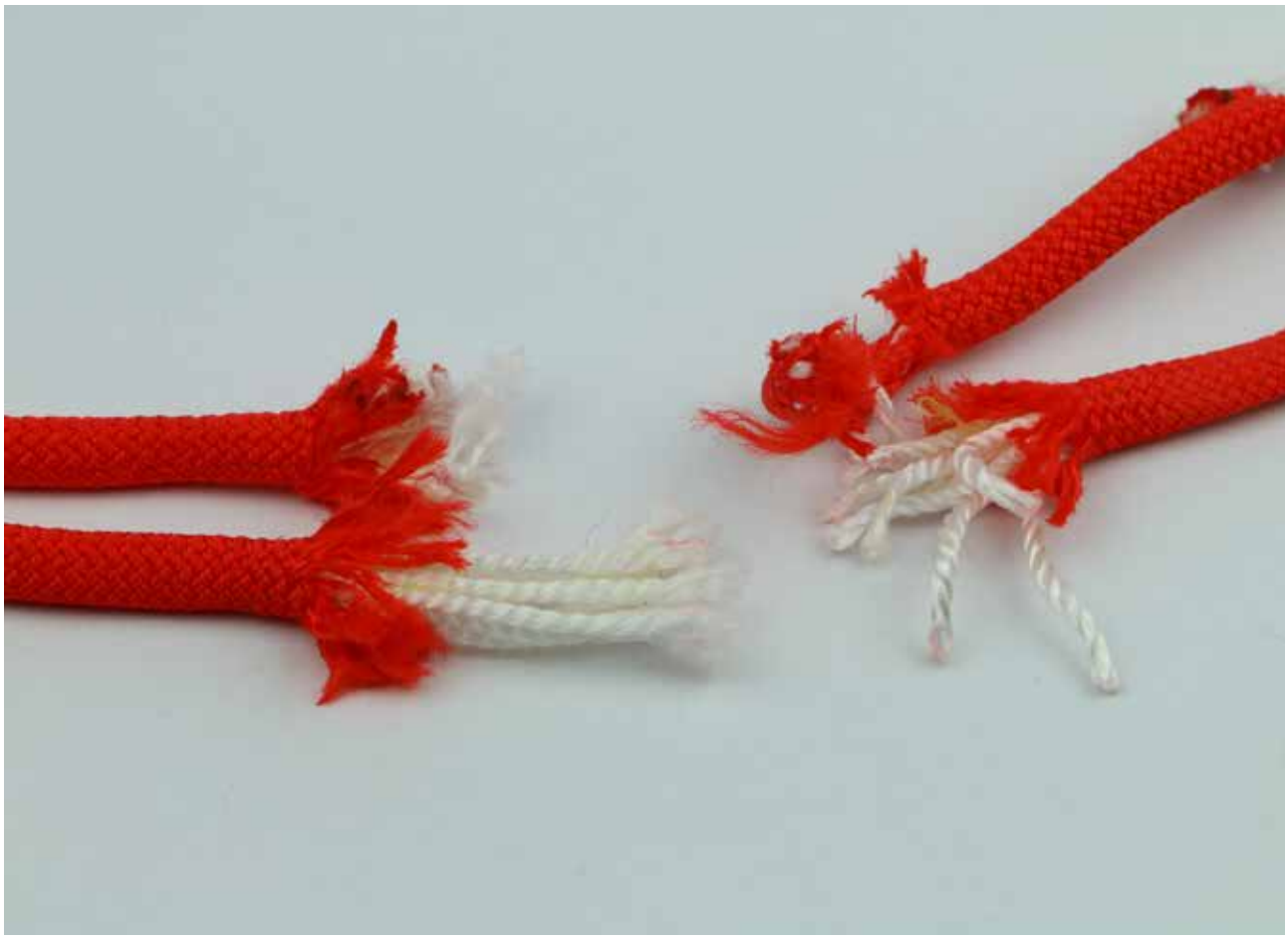
ECAAS ISO 9001 CERTIFIED QUALITY MANAGEMENT

Tested by: Grant Prattley

Signed: Grant Prattley

Machine has a current calibration certificate. www.aspiring.co.nz


15.
17.10.19
32.41 kN
2pt Floating
Clip 2 strands 2 biners
8.2mm Dynamic half



Fixed focal, 1 carabiner, 2 strands clipped, 90cm sling

~~Slow Pull Test~~	~~Friction Test~~	**Drop Test**

Materials

- CT 8.2mm dynamic rope

Test setup

- Loop sewn.
- Tied overhand knot at focal point.
- 200kg mass (approx 1.96kN).
- 0cm drop.

Test parameters

- Tested between 12mm steel carabiners.
- Dropped on the side of the bend and side without the bend.
- Ext. = Extension of the RHS from start length with the load in place pre-drop to finish length post-drop with the load still hanging, including the leg and loop.

Results – side with bend

Date	#	Start RHS (cm)	End RHS (cm)	Ext. RHS (cm)	Predrop LHS (kN)	Predrop RHS (kN)	Post drop RHS (kN)	Diff. RHS (kN)
11/12/20	16*	37.00	40.00	3.00	1.00	1.00	2.46	1.46
11/12/20	17	39.00	42.00	3.00	0.98	1.00	2.48	1.48
11/12/20	18	40.00	44.00	4.00	0.98	1.00	2.42	1.42
Average				**3.33**			**2.45**	**1.45**

* Sample 11/12/20 #16 of the testing shown on the following pages.

Results – side without bend

Date	#	Start RHS (cm)	End RHS (cm)	Ext. RHS (cm)	Predrop LHS (kN)	Predrop RHS (kN)	Post drop RHS (kN)	Diff. RHS (kN)
16/10/20	10*	24.00	27.00	3.00	0.84	1.06	2.34	1.28
16/10/20	11	26.00	29.50	3.50	0.96	0.94	2.38	1.44
16/10/20	12	18.00	22.00	4.00	0.90	1.02	2.46	1.44
Average				**3.50**			**2.39**	**1.39**

* Sample 16/10/20 #10 of the testing shown on the following pages.

OVER·THE·EDGE RESCUE

Test Date: Friday, 11 December, 2020

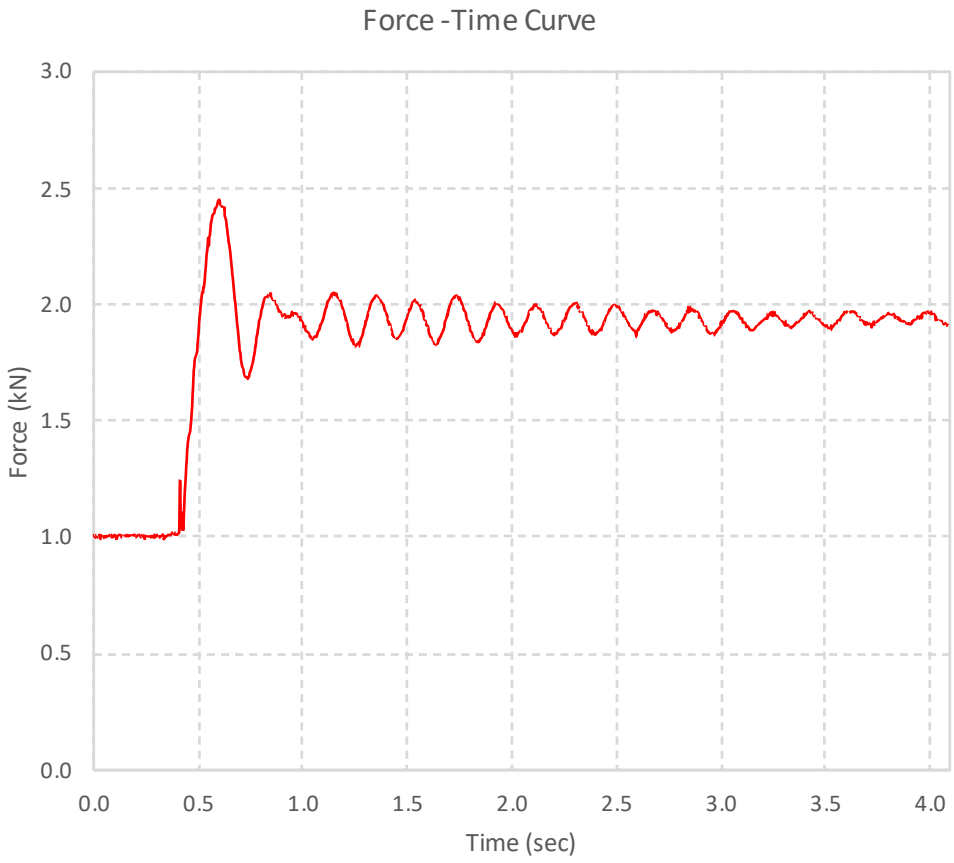
Test #: 16

Product Name: 2-point fixed, overhand knot, stitched, 90cm sling

Material: 8.2mm CT Dynamic Rope

Test type: Drop 0cm, side without stitching, 200kg

Max arrest force (kN): 2.46kN



Tested by: Grant Prattley

Signed: Grant Prattley


#: 16 Date: 11/12/20
Test: 0cm drop, 200kg, fall 1 side
Type: 2-point fixed anchor, overhand limiting, w/o stitching
Rope: 8.2mm CT Dynamic
Force: 2.46kN

OVER·THE·EDGE RESCUE

Test Date: Friday, 16 October, 2020

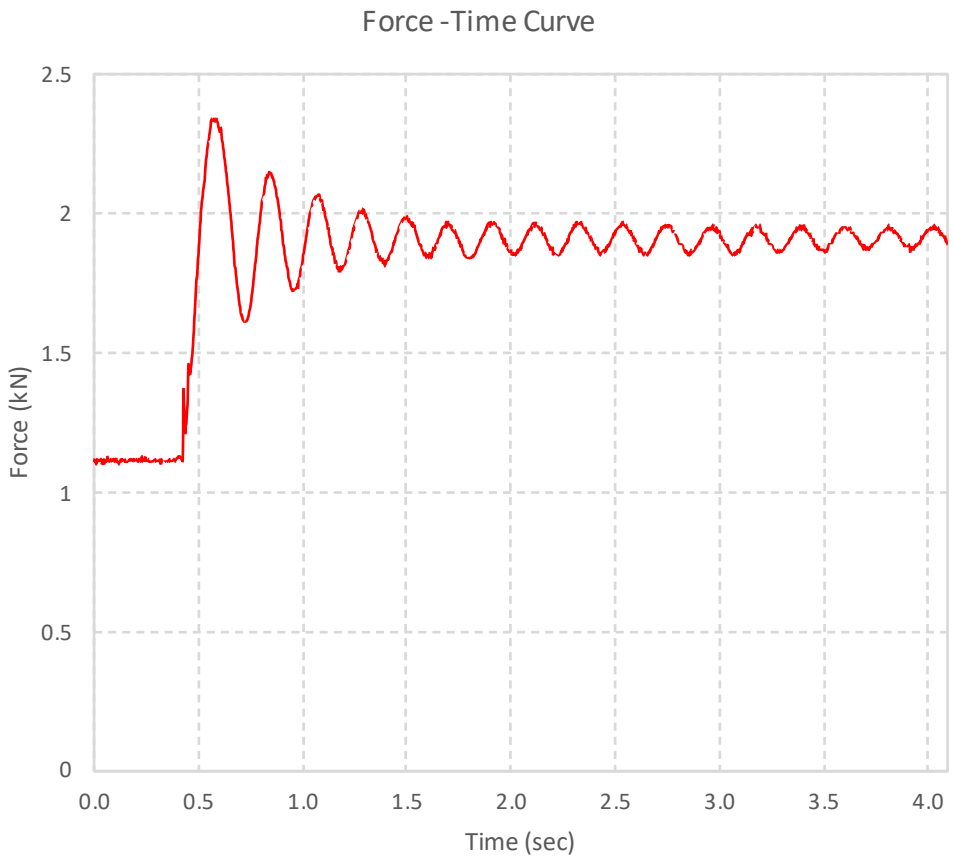
Test #: 10

Product Name: 2-point fixed anchor, overhand knot, sewn, 90cm sling

Material: 8mm CT dynamic rope

Test type: Drop 0cm, side with stitching, 200kg

Max arrest force (kN): 2.34kN



Tested by: Grant Prattley

Signed:


#: 10 Date: 16/10/20
Test: 0cm drop, 200kg, fail 1 side
Type: 2-point fixed anchor, overhand focal, bend side
Rope: 8.2mm CT Dynamic Rope
Force: 2.34kN

Floating focal, 1 carabiner, 1 strand clipped, 90cm sling

~~Slow Pull Test~~	~~Friction Test~~	**Drop Test**

Materials

- CT 8.2mm dynamic rope.

Test setup

- Loops sewn together.
- Tied two overhand limiting knots at 20cm apart.
- 200kg mass (approx 1.96kN).
- 10cm drop.

Test parameters

- Tested between 12mm steel carabiners.
- Dropped on the side of the stitching and side without stitching.
- Ext. = Extension of the RHS from start length with the load in place pre-drop to finish length post-drop with the load still hanging, including the leg and loop.

Results – side without stitching

Date	#	Start RHS (cm)	End RHS (cm)	Ext. RHS (cm)	Predrop LHS (kN)	Predrop RHS (kN)	Post drop RHS (kN)	Diff. RHS (kN)
3/11/20	13*	48.00	72.00	24.00	1.00	1.00	3.80	2.80
3/11/20	14	48.00	72.50	24.50	1.00	0.96	3.90	2.94
3/11/20	15	46.00	73.00	27.00	1.00	0.98	4.00	3.02
Average				**25.17**			**3.90**	**2.92**

* Sample 3/11/20 #13 of the testing shown on the following pages.

Results – side with stitching

Date	#	Start RHS (cm)	End RHS (cm)	Ext. RHS (cm)	Predrop LHS (kN)	Predrop RHS (kN)	Post drop RHS (kN)	Diff. RHS (kN)
28/10/19	10*	46.00	75.00	29.00	1.08	0.94	4.20	3.26
28/10/19	11	45.00	72.50	27.50	1.08	0.94	4.20	3.26
28/10/19	12	48.00	72.00	24.00	1.08	0.92	4.18	3.26
Average				**26.83**			**4.19**	**3.26**

* Sample 28/10/1 #10 of the testing shown on the following pages.

OVER·THE·EDGE RESCUE

Test Date: Tuesday, 3 November, 2020

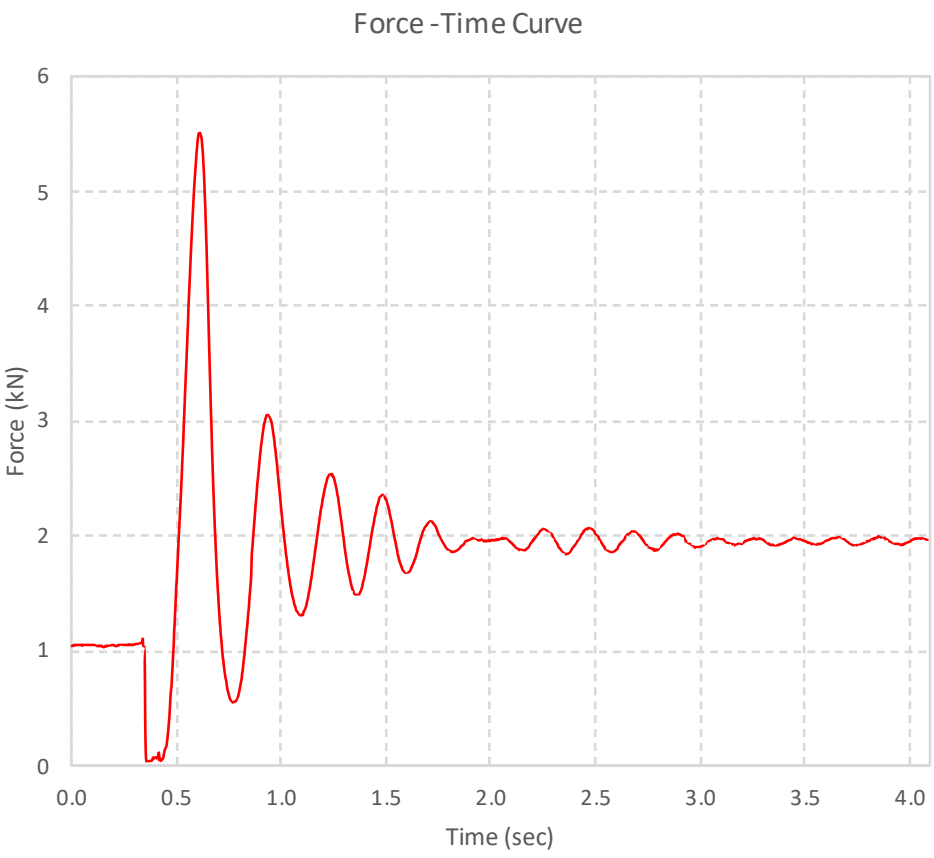
Test #: 13

Product Name: 2-point floating, 1 strand, 1 biner, o/h limiting knots, sewn, 90cm sling

Material: 8.2mm CT dynamic rope

Test type: Drop 10cm, side without stitching, 200kg

Max arrest force (kN): 3.80kN



Tested by: Grant Prattley

Signed: Grant Prattley


#: 13 Date: 3/10/20
Test: 10cm drop, 200kg, fail 1 side
Type: 2-point floating anchor, overhand limiting, w/o bend side
Rope: 8.2mm CT Dynamic
Force: 3.80kN


Test #10: Floating anchor 20cm
Date: 28 October 2019
Brand: CT Dynamic 8.2mm sewn
Type: Drop 200kg overhands
Start: L – 1.08kN / R – 0.94kN
Finish: 4.2kN
Extension: 46cm to 75cm