

VECTOR

EDGE & LOAD MANAGEMENT SYSTEM

MADE IN USA



BY H A R K E N



USER INSTRUCTION

VECTOR

EDGE & LOAD MANAGEMENT SYSTEM TABLE OF CONTENTS

<i>1. INTRODUCTION</i>	2
<i>2. ASSEMBLY INSTRUCTIONS</i>	4
<i>3. WARNINGS</i>	6
<i>4. WORKING LOADS</i>	8
<i>5. SET-UP INFORMATION</i>	8
<i>6. WARRANTY</i>	16
<i>7. REPLACEMENT PARTS</i>	17

INTRODUCTION

PRODUCT OVERVIEW

The Vector Edge and Load Management System has been designed and engineered as a light-weight and portable tool for use in industrial, mountain and urban rescue environments. When combined with high strength - low stretch cord, quality life-safety rope, lightweight pulleys and carabiners, the Vector provides rescuers with a versatile resource which can reduce risk and go virtually anywhere.

THE VECTOR IS INTENDED FOR EXPERT USERS ONLY.

This innovative monopod system is the result of a collaboration between SMC and our expert training partners. This combination of SMC's 50 years of experience in design, testing and manufacturing of technical rescue equipment and our partners' experience in training advanced rescue techniques throughout the world has created a 3lb. solution to edge transition scenarios.

BEFORE USE

The techniques employed in the proper and safe use of this equipment may only be learned through hands-on instruction received from an instructor who is well-qualified in all phases of vertical rope work. Such instruction will include an evaluation of your comprehension of, and ability to perform, the tasks required to safely and efficiently use this equipment. Never attempt its use until you have received such instruction and are believed competent by your instructor.

This User Instruction is designed to aid in the assembly and safe use of the Vector Edge and Load Management System. It is not designed to provide the user with the theory or practice of using portable anchor systems, monopod or other high directionals, as this comes only from extensive training from qualified trainers on such systems. Do not attempt to use the Vector without specialized training as mis-use could lead to serious injury or death.

INSPECTION FOR USE

Inspect the VECTOR visually for cracks, deformation, corrosion, scratches or gouges, sharp edges or rough areas that could abrade a rope or affect the integrity of the VECTOR. Compare this Vector with a new model if necessary to determine its condition. Remove from service if there is any doubt about its safety or serviceability. The following inspection points indicate conditions that may affect safety or serviceability of the Vector:

TUBE

1. Inspect for lack of straightness
2. Inspect for dings, dents and gouges to the wall or ends of the tube
3. Inspect inside tube for any debris and remove accordingly
4. Inspect for fouled threads which might impair assembly

ROPE HORN

1. Inspect for excessive rope wear
2. Inspect for fouled threads which might impair assembly
3. Inspect for gouges which might create surfaces that could damage rope or webbing
4. Inspect for deformation of top or bottom flanges which might impair assembly

RIGGING PLATE

1. Inspect for deep gouges and sharp edges caused by rope wear or hardware
2. Inspect center ring for deformation which might prevent attachment to the rope horn
3. Inspect for being bent or out of flat

BALL FOOT AND SPIKE FOOT

1. Inspect spike to ensure steel tip is present and inspect for any cracking or bending
2. Inspect for fouled threads which might impair assembly

REMOVAL FROM SERVICE

This VECTOR should be removed from service if it has been dropped, or exposed to heat sufficient to alter the surface appearance, or if deformation of any part is apparent, or if any cracks are apparent, or if it has scratches or gouges of more than a superficial nature.

MAINTENANCE AFTER USE

Carefully clean and dry this VECTOR to remove all dirt or foreign material and moisture. Minor sharp edges may be smoothed with a fine abrasive cloth before cleaning. Store in a clean, dry place.

WARNING:

DAMAGE TO THE WALL OF THE TUBE CAN SEVERELY AFFECT STRENGTH. INSPECT FOR DAMAGE BEFORE EVERY USE. TUBES WHICH APPEAR TO BE BENT OR DEFORMED, HAVE DENTS, DINGS AND DEEP GOUGES SHOULD BE REMOVED FROM SERVICE IMMEDIATELY AS THEY COULD BE STRUCTURALLY COMPROMISED.

The cost to inspect and repair a VECTOR that appears damaged, or that may have been damaged by impact loading or other abuse, will exceed the cost of its replacement with a new part.

RECORDS

It is suggested that the user of this VECTOR keep a permanent record listing the date and results of each usage inspection. Such record should show, as a minimum, inspection for all of the following conditions:

- Cleanliness
- Dryness
- Freedom of bends or deformation
- Freedom from scratches, gouges and sharp edges
- Freedom from corrosion
- User Information sheet present

USE OF THIS USER INFORMATION SHEET

It is suggested that this User Information sheet be retained in a permanent record after it is separated from the VECTOR, and that a copy of it be kept with the VECTOR. It is suggested that the user refer to this User Information sheet before and after each use of the VECTOR.

LIFESPAN

The service life the VECTOR is largely dependent on the type of use and the environment in which it is used. Under moderate use, with limited exposure to moisture, salt water, corrosive agents, excessive loads, shock loading and excessive wear, the VECTOR may last many years. However, many events such as dynamic loading, dropping, or other events which cause physical damage, can reduce the lifespan of this VECTOR dramatically.

You must inspect your VECTOR frequently and take personal responsibility for evaluating its condition and retiring unsafe gear. Inspection is extremely important, but visual inspection only will not assure that damage has not occurred. If history of the VECTOR is unknown or if based on the history of the use of this VECTOR there is any doubt regarding its safety, it should be removed from service. You should destroy retired gear to prevent future use.

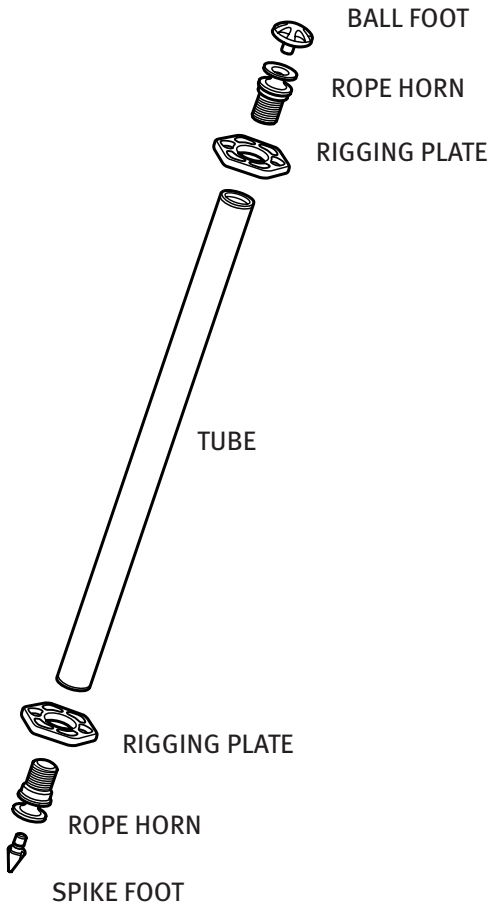
ASSEMBLY INSTRUCTIONS

The Vector Edge and Load Management System is designed for use in a single tube, one meter configuration and requires no tools for assembly. The standard kit ships complete with a Vector Tube, two Vector Rigging Plates, two Rope Horns, one Spike Foot one Ball Foot and this User Instruction.

NOTE: Guy lines for rigging are not included but are required for a stable monopod. The Vector was designed to work best with high tenacity, low stretch, small diameter cord.

STANDARD SINGLE TUBE 1 METER ASSEMBLY

1. Place first Vector Rigging Plate on Vector Rope Horn and thread into one end of the Vector Tube. Tighten until “hand-tight.” Ensure that Vector Rigging Plate can spin freely.
2. Thread Vector Ball Foot in to the Vector Rope Horn until “hand-tight.”
3. Place other Vector Rigging Plate on Vector Rope Horn and thread into the other end of the Vector Tube. Tighten until “hand-tight.” Ensure the Vector Rigging Plate can spin freely.
4. Thread Spike Foot in to the Rope Horn until “hand-tight” (as required by terrain).



VECTOR ROPE HORN & VECTOR RIGGING PLATE

The Vector Rope Horn and the Vector Rigging Plate have been designed to work in conjunction to minimize hardware by looping a bight of webbing, cord or rope through the rigging plate and over the horn (see images below as reference). The Vector Rigging Plate and the Vector Rope Horn are the only components that should be connected to rigging. The Vector Rigging Plate has been designed to rotate and center itself between the guy lines and rigging to prevent any torque from being imparted to the Vector. The Vector Rigging Plate may be used independently as a rigging plate.

WARNING

- The Rope Horn is intended to connect only to the Spike Foot and Ball Foot. Any other use is prohibited and will void the warranty
- Inspect threads for dings which might create resistance when threading on main tube
- Inspect for gouges which could damage cord or webbing used in rigging or guy lines
- If using the Vector Rigging Plate independently, DO NOT clip any carabiners through the center hole because it could cause damage to the interface with the Rope Horn

PRO TIP

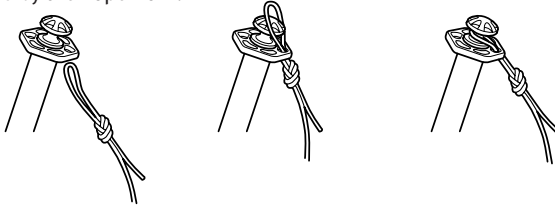
ROPE/CORD/WEBBING

Step 1: Tie a figure 8 on a bight.

Step 2: Slip the bight up through a perimeter hole in the Vector Rigging Plate from the bottom.

Step 3: Slip the bight over the Vector Rope Horn.

Step 4: Pull on rope, cord or webbing to assure the webbing, cord or rope is secured and captured by the Rope Horn.



WEBBING SLING/ PRUSIK LOOP

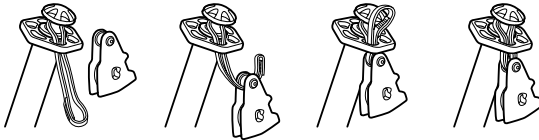
Step 1: Slip a loop of webbing or prusik through one of the perimeter holes in the Vector Rigging Plate from the bottom.

Step 2: Slip the loop over the Vector Rope Horn.

Step 3: Slide the free end of loop through the pulley or other hardware.

Step 4: Slip the loop through the perimeter hole in the Vector Rigging Plate from the bottom.

Step 5: Pull on loop to assure the hardware and loop are secured and captured by the Rope Horn.



WARNING

If attaching a pulley with a soft shackle, only use pulleys designed for that application

VECTOR SPIKE FOOT

The Vector Spike Foot is equipped with a hardened steel tip ideal for placement in soft or compact soil, hard rock, concrete and pavement.

PRO TIP

The Vector Spike Foot can be threaded into the inside the Rope Horn for secure storage when not in use.



BALL FOOT

The Vector Ball Foot provides a wide footprint for environments which require maximum surface area on the ground. This provides better flotation over soft materials and is less likely to damage flooring, roofing and other surfaces.

WARNING: Damaging the threads may make the system UNSAFE and difficult to assemble

WARNINGS

The Vector Edge and Load Management System is fabricated from thin-walled aerospace-grade aluminum tubing that is very strong along the main axis but significantly less resistant to lateral loads. Users must ensure that lateral loads not be introduced to the tubing while the system is under load. Likewise, any damage to the Vector Tube can act as a weak point that can initiate compression failure in the tube during a dynamic event. Users must inspect the Vector before and after every use to ensure that the Vector Tube is free from any damage.

THE VECTOR IS INTENDED FOR EXPERT USERS ONLY.

KEY



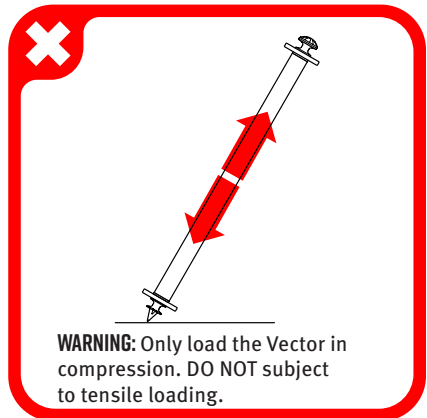
Recommended



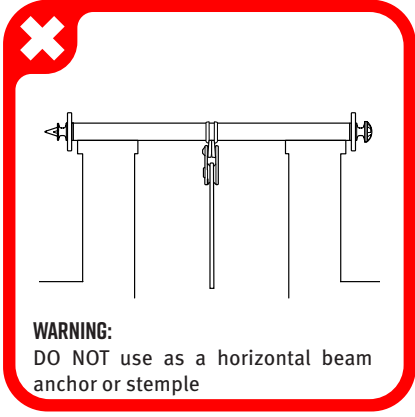
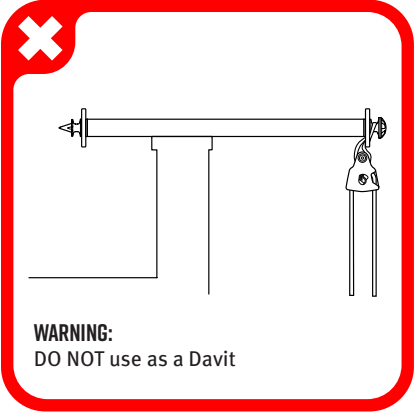
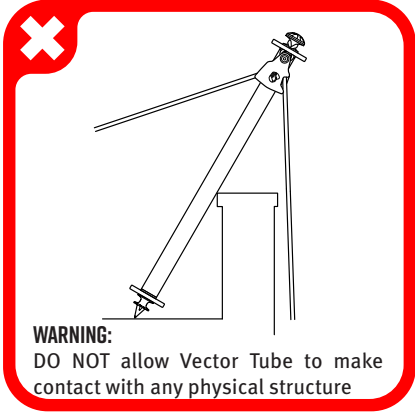
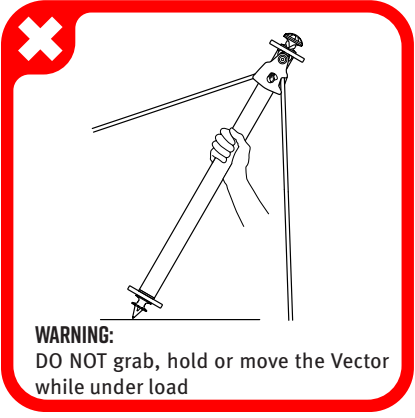
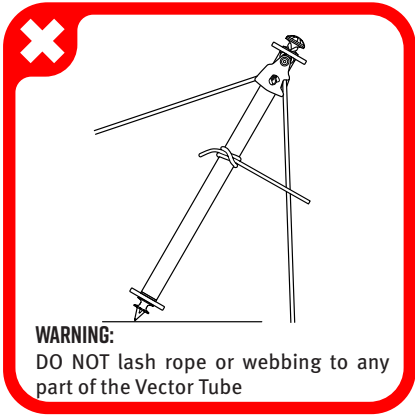
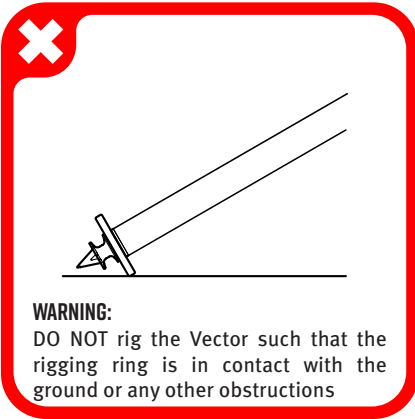
Use Caution



Prohibited



These warnings do not represent every possible misuse scenario. The User is responsible for rigging the Vector safely.



WORKING LOADS

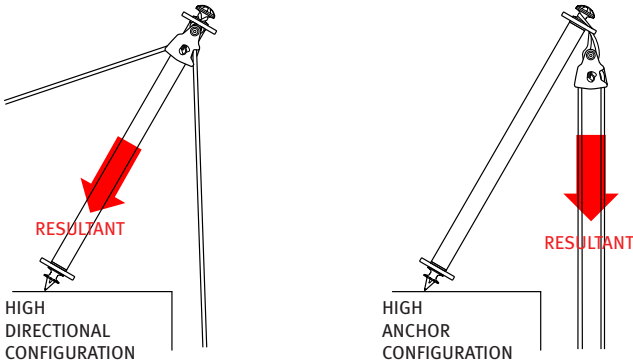
The Vector Edge and Load Management System has been through extensive lab and field testing. Listed below are Working Load Limits (WLL) for the two configurations approved for use. SMC does not approve of any configurations not identified in this manual.

CONFIGURATION	RATING
Single Tube 1-Meter High Directional	2 kN WLL (448 lbf)
Single Tube 1-Meter High Anchor	1 kN WLL (224 lbf)
Vector Rigging Plate (used independently)	36 kN MBS (8000 lbf)

SET-UP INFORMATION

This section is provided for information only and is not a substitute for proper training.

The Vector Edge and Load Management System can be set up in two different modes: High Directional Configuration and High Anchor Configuration.



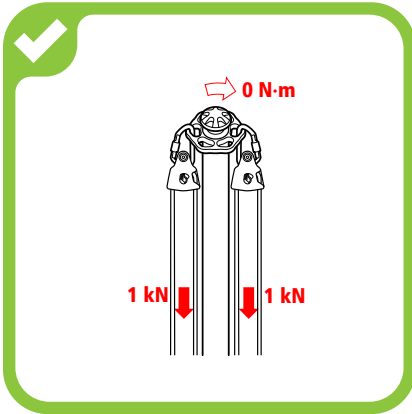
An ideally-rigged High Directional Configuration will have the resultant of the main line in line with the pole so that the guy lines take little or no load and the pole resolves all of the forces. An ideally-rigged High Anchor Configuration will have a resultant that is straight down and will rely on a combination of the rear guy line and the pole to resolve the forces.

The strength of any particular High Directional or High Anchor Configuration is highly dependent upon the rigging. Pole angle, guy angles and resultant angles interact in a complex way that can potentially create significant forces on anchors, especially with High Anchor Configurations. On the following pages, we have provided a series of Load Scenarios that illustrate how the geometry of the rigging affects loads on the system components.

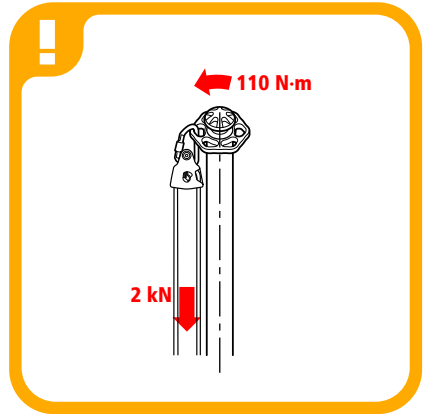
BENDING MOMENT FORCES

Eccentric loading (forces not in the plane defined by the Vector Tube) will impart bending moment forces to the Vector Tube that could cause the tube to buckle in a dynamic event. It is recommended that the user minimize eccentric loading whenever possible. A two tensioned rope system with one rope on each side of the Vector is one example that can reduce the possibility of eccentric loading.

**TWO TENSIONED ROPE SYSTEM
HIGH DIRECTIONAL CONFIGURATION
45° POLE, 90° INCLUDED ANGLE
(front view)**

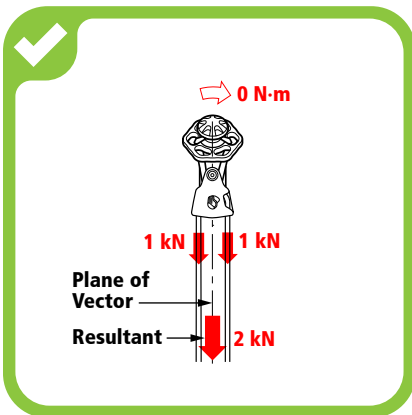


**SINGLE ROPE SYSTEM
HIGH ANCHOR CONFIGURATION
45° POLE, 90° INCLUDED ANGLE
(front view)**

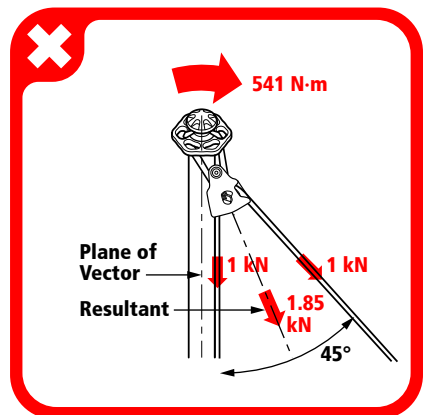


WARNING: When using the Vector in High Anchor Configuration, always keep the resultant of the load in the plane defined by the Vector. Out-of-plane loads may cause the Vector to fail.

**HIGH ANCHOR CONFIGURATION
45° POLE, 45° REAR GUY
(front view)**



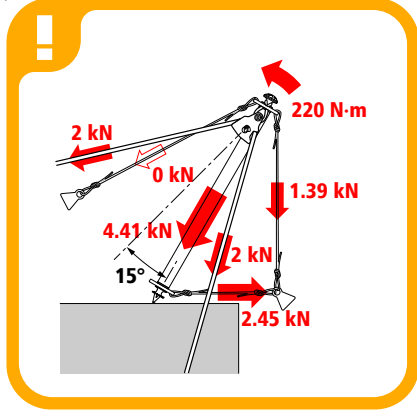
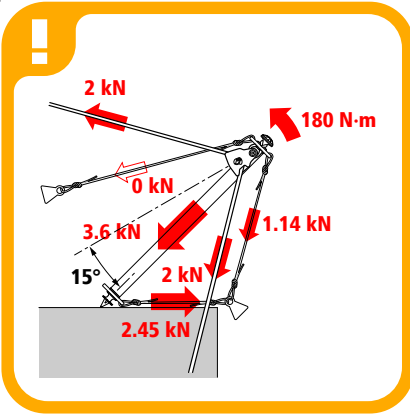
**HIGH ANCHOR CONFIGURATION
45° POLE, 45° REAR GUY
(front view)**



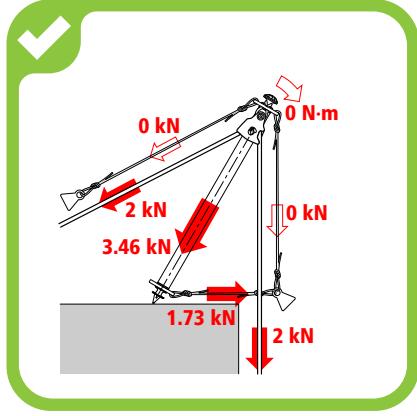
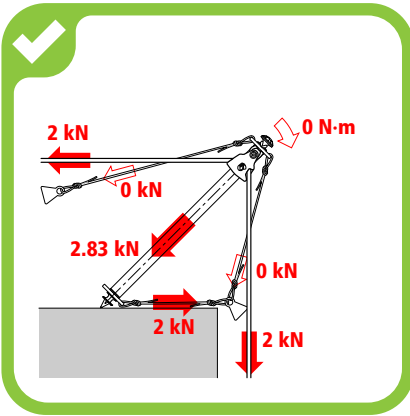
45° POLE, 90° INCLUDED ANGLE

60° POLE, 60° INCLUDED ANGLE

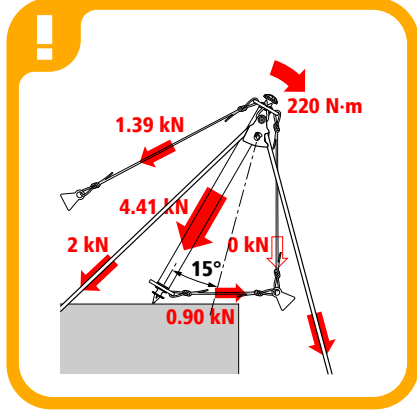
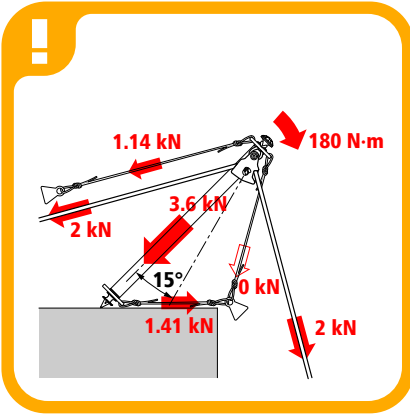
-15° RESULTANT



ALIGNED RESULTANT



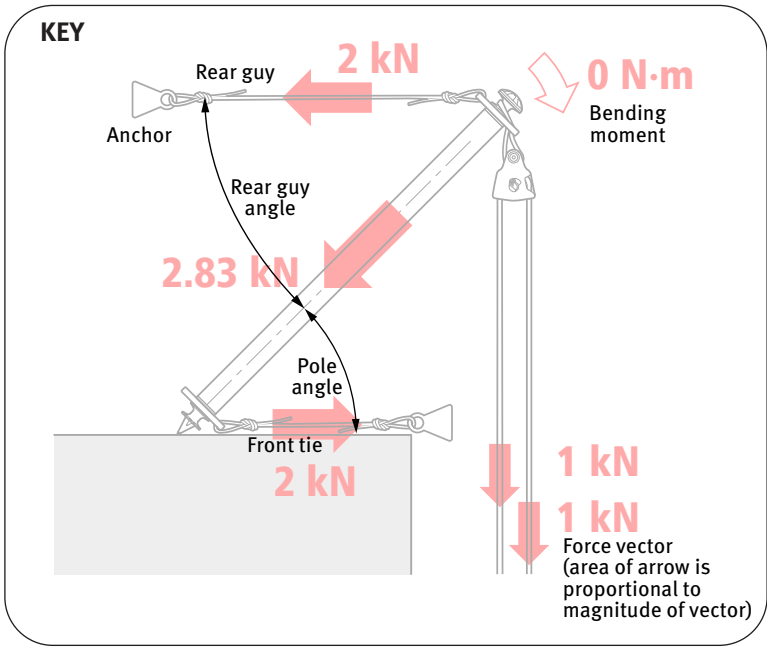
+15° RESULTANT



HIGH ANCHOR CONFIGURATION STATIC LOAD SCENARIOS

Loads are 1 kN for all High Anchor scenarios.

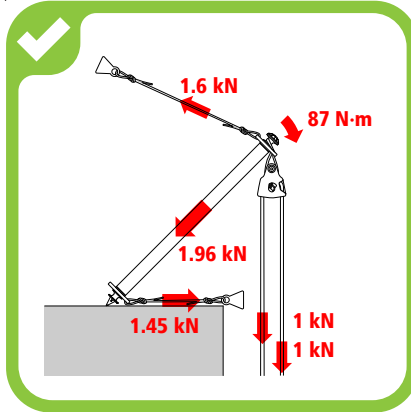
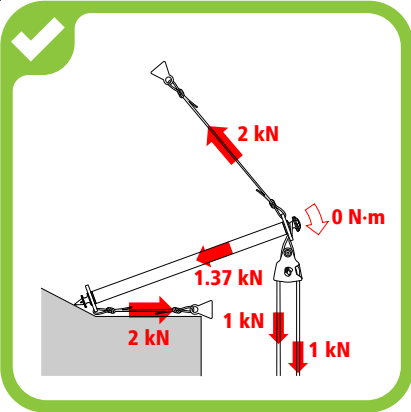
These load scenarios are provided for information only and are not a substitute for proper training.



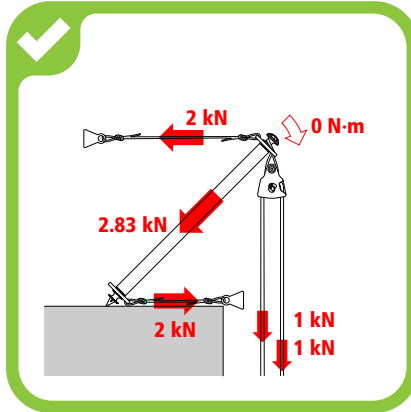
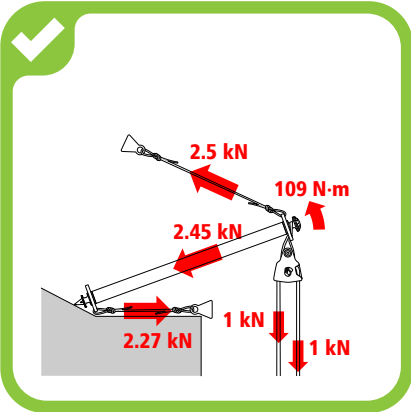
20° POLE

45° POLE

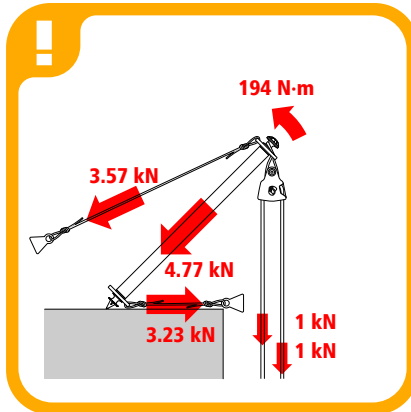
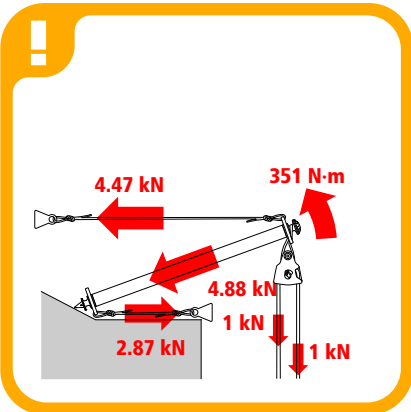
70° REAR GUY



45° REAR GUY



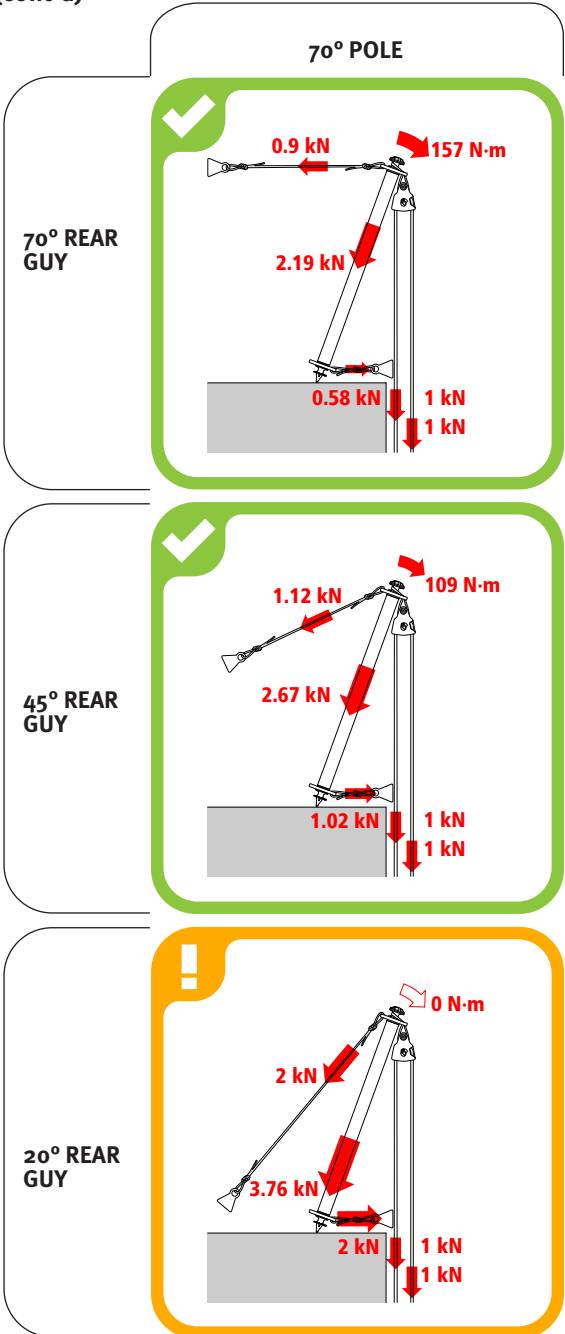
20° REAR GUY



HIGH ANCHOR CONFIGURATION STATIC LOAD SCENARIOS (cont'd)

Loads are 1 kN for all High Anchor scenarios.

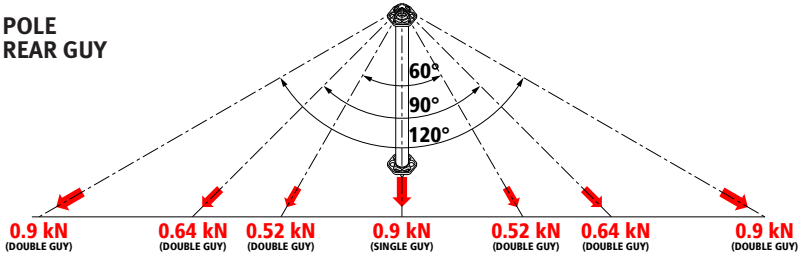
These load scenarios are provided for information only and are not a substitute for proper training.



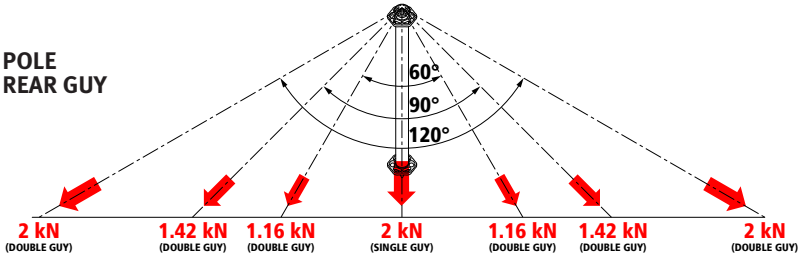
**HIGH ANCHOR CONFIGURATION
REAR GUY STATIC LOAD SCENARIOS
(Top view)**

NOTE: Using two rear guys will improve stability

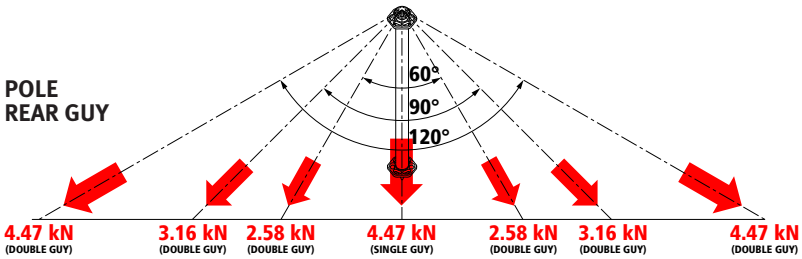
**70° POLE
70° REAR GUY**



**45° POLE
45° REAR GUY**



**20° POLE
20° REAR GUY**



WARRANTY

Harken, Inc. guarantees this product for three years against any defects in materials or manufacture. The guarantee does not cover this product from normal wear and tear, oxidation, modification or alteration, incorrect use or storage, poor maintenance, accidental damage, negligence, or any usage for which the product was not designed.

If you need assistance, please call Harken, Inc. or visit www.harken.com/safetyandrescue.

Due to the complexity of the Vector, if one of the main components of the system appears to be damaged, the entire system is suspect and must be inspected by the manufacturer. As a result, replacement parts for these components are not available without first sending them to SMC for inspection.

If during inspection the parts are determined to be damaged as a result of a manufacturer defect, the necessary part(s) will be replaced at no cost to the end user. If the manufacturer determines that the damage is due to misuse, overloading, unsafe configurations or neglect, the replacement part(s) may be made available to the user at user's cost. Any parts deemed unsafe will not be returned to the user.

Warranty Registration Information

Name:
Address:
Phone:
Email:
Purchase Date:
Purchased From:
Manufacturer Lot Number (MLN):

See below for an Inspection and Maintenance Log Example.

Item	Qty	Date	Inspected By	Findings	Safe for Use
Vector Main Tube					
Vector Rigging Plate					
Vector Rope Horn					
Vector Ball Foot					
Vector Spike Foot					

REPLACEMENT PARTS

REPLACEMENT PARTS

PN 290023 Vector Tube

PN 290043 Vector Rope Horn

PN 290053 Vector Rigging Plate

PN 290063 Vector Spike Foot

PN 290083 Vector Ball Foot

PN 290010 Vector Edge and Load Management Sytem Kit

FOR MORE INFORMATION ABOUT REPLACEMENT PARTS AND WARRANTIES, PLEASE CALL HARKEN, INC. AT 262.691.3320.



BY HARKEN

Harken, Inc.
6930 Salashan Parkway
Ferndale, WA 98248
www.smcgear.com
262.691.3320
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