

High Line Analysis

A visual and tactile presentation of two separate high line systems. The data to be presented reflects rigging preferences of high lines from twenty different MRA (Mountain Rescue Association) Teams.

Participants will have the opportunity to review, evaluate and operate both systems. As time allows, facilitators will coordinate discussion and attempt to summarize participants input.

This presentation will take place at the Alpine Rescue Team Headquarters.

About the Presenters:

Paul "Woody" Woodward is a Qualified Rescue Rank Member and Mission Leader of the Alpine Rescue Team. He has been a member of the team for 13 years. He has also been an Emergency Medical technician since 1982. In addition to being the past Field Director and Training Director for the team, he served as the Vice-Chair of the Rocky Mountain Region of the MRA and was responsible for the accreditation and reaccreditations within the region. Woody has been the Director and a climbing guide for the past 16 years with Colorado based, Horizon Adventures, Inc. In addition to his guiding in Colorado he has been involved in over 10 international climbing expeditions to Mexico, Ecuador, Argentina and Africa. He holds a Bachelor of Science in Outdoor Recreation.

Mike Everist is a Qualified Rescue Rank Member and Mission Leader of the Alpine Rescue Team. He also presently serves as Alpine's Field Director. Mike has participated in and led Search and Rescue Missions in all types of weather and terrain throughout Colorado for the past ten years. Alpine specializes in technical rock and winter rescue, and all types of backcountry search operations. He is past Training Director and Prospective Member Director of the team. Mike has climbing experience on routes around the U.S. as well as Mexico and South America. He is employed with United Airlines as a pilot, currently flying the 747-400 on international routes. He holds a Bachelor of Science in Aeronautical Science and an Associate of Science in Aviation Management.

Scott Grotheer is a Rescue Rank Member Alpine Rescue Team and past member of Larimer County Search and Rescue. He presently serves as Alpine's Training Director. Scott has participated in and led Search and Rescue Missions in all types of weather and terrain throughout Colorado during the past 11 years. Alpine specializes in technical rock and winter rescue, and all types of backcountry search operations. He is employed with the U.S. Geological Survey at the National Water Quality Laboratory as a Biologist. He holds a Bachelor of Science in Zoology and Master of Science in Zoology.

ITRS 2001
November 3rd @ "The Shack"
(The Alpine Rescue Team)
Evergreen, Colorado

TITLE

High Line Analysis

ABSTRACT

A visual and tactile presentation of two separate high line systems. The data to be presented reflects rigging preferences of high lines from seventeen different MRA (Mountain Rescue Association) Teams.

Participants will have the opportunity to review, evaluate and operate both systems. As time allows, facilitators will coordinate discussion and attempt to summarize participants input.

BACKGROUND

As an independent system, high lines can be rigged in a variety of different ways. Earlier this year, the Technical Standards Committee of the Alpine Rescue Team put to the MRA list server the following:

The members of the technical standards committee for the Alpine Rescue Team, Evergreen Colorado, have been reviewing our current technical systems and wanted to get some additional input about highline systems from the other MRA teams across the nation. So that we are all working with the same information, the scenario is as follows:

"Your team has to set up a highline system to transport one patient and one rescuer across a 175ft span over a river. You have plenty of trees that will serve as anchors on both sides. (So that we are all using the same rope - we currently use 7/16 PMI EZ Bend that the rated minimum breaking strength from (UL) is 6050Lbs.)

So here are our questions!

- 1. - Would your team use one or two tensioned lines to support the load?**
- 2. - Would your team use two lines (one from each side) that would serve the dual purpose of allowing the load to be moved back and forth AND also back-up the main tensioned line(s) or would these lines simply be used to move the load, not backing up the main tensioned line(s).**

If these lines serve as a back-up, what type of belay device(s) would your team use for this purpose?

- 3. - In attaching the litter to the mainline(s) does your team use a single point or a two point attachment.**
- 4. -To also help us in working with this information, could you please indicate how often your team uses highline systems in the field within a year? And, has your team been through a formal highline system training from an outside resource?**

The results from seventeen teams are referenced under “supporting documentation” on the last page of this document. In reviewing the data, it was apparent that out of 17 teams responding:

- 11 teams use two track lines as a standard system setup.
- 3 teams use one track line as a standard system setup.
- 3 teams use one or two track lines depending on load / sag considerations.
- 10 teams use a tag line as a belay line. (Back up for the track line). Out of these 10, 9 teams use tandem prusiks as their belay device.
- 10 teams use a single point attachment for the litter. 5 use a dual point attachment. 1 will use either.
- 8 teams have had formal training (outside agency) for their high line systems. 8 have not.
- None of the teams responding use high lines to any extent in actual missions.
 - 2 seldom use high lines (less than 3 per year)
 - 11 rarely use high lines (less than 1 per year)
 - 2 have never done so in an actual mission.

(Note: 20 teams responded. 17 of those teams actually answered the questions posed. Out of the 17 teams, not all answered every question)

OBJECTIVES

It is not our intent to recommend or encourage the use of one system over another. It simply is a display of extremes of systems in use today in the mountain rescue community. We encourage participants to view, touch, examine and operate both systems. We especially encourage discussion amongst the two groups. Use the outline on the following pages as a framework for discussion. As time is quite limited, a facilitator will be present to take simple notes from the comments generated at each system. We will also try to “guide” the discussion to keep from stagnating too long on any one point.

PARAMETERS

Please limit discussion to key safety and design areas, as well as practical operation of each system. During the operation of any system, take into account that those operating it may be unfamiliar with its use. Verbalize your opinions! Generate discussion! Ask questions! This is your time to be involved with the presentation, rather than just listening to it!

HIGH LINE #1 – “MINIMUM RIGGING”

FOCUS POINTS

ITEM

1. Track Lines:
 - One or two?
 - Independent?

2. Use of Tag Lines:
 - Solely for litter movement?
 - As a back up for track line failure?
 - Attachment to the litter. Accepted / preferred method?

3. Litter Attachment:
 - Pro's to this setup?
 - Con's to this setup?
 - When to use this?

4. Tensioning of System:
 - Prior to loading?
 - After loading?
 - Force factors for haul system?
 - Ability to maintain safety factor and also efficiency?
 - Other methods?

5. Operation of System:
 - Ease of setup?
 - Ease of operation?
 - Required equipment?
 - Required personnel?

HIGH LINE #2 – “MODIFIED BASIC KOOTNEY SYSTEM”

FOCUS POINTS

ITEM

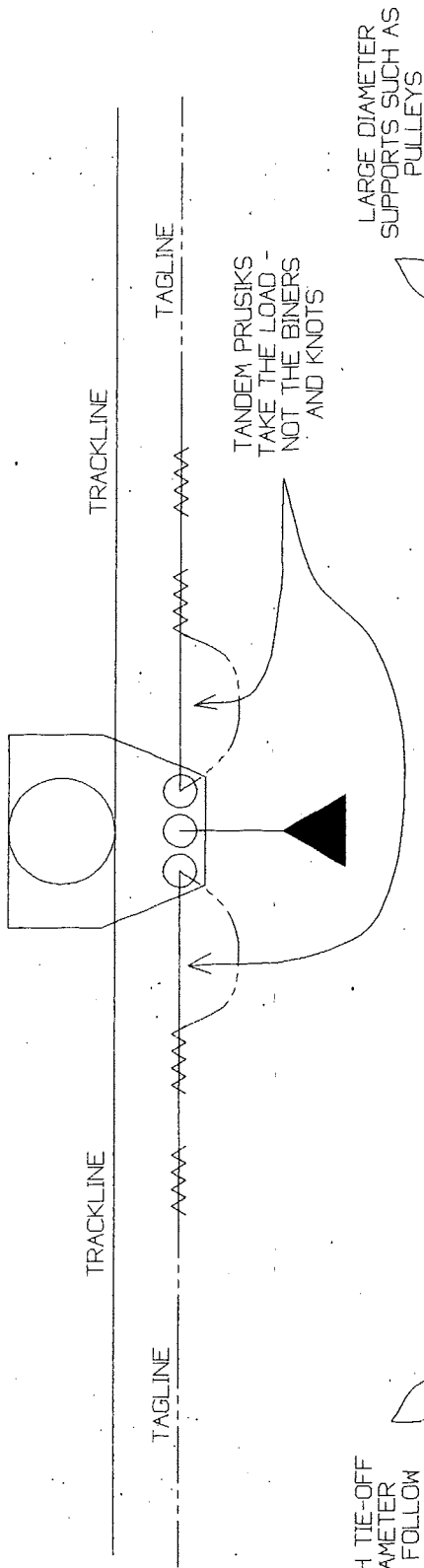
6. Track Lines:
 - One or two?
 - Independent?

7. Use of Tag Lines:
 - Solely for litter movement?
 - As a back up for track line failure?
 - Attachment to the litter. Accepted / preferred method?

8. Litter Attachment:
 - Pro's to this setup?
 - Con's to this setup?
 - When to use this?

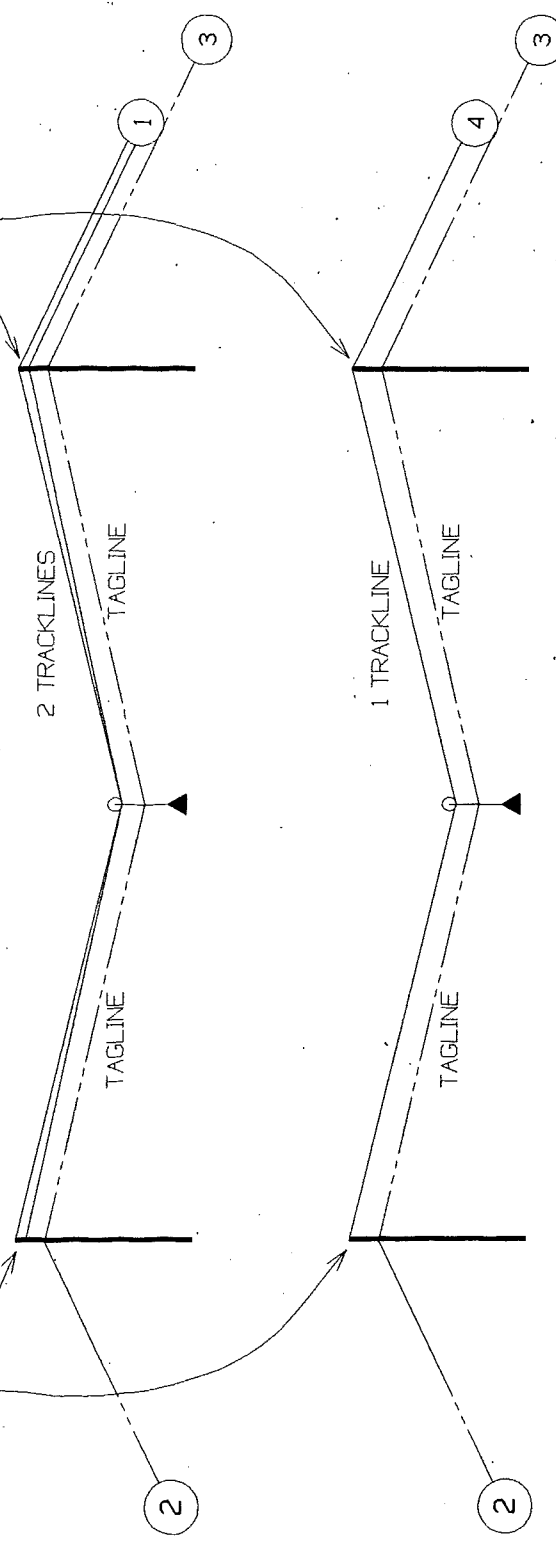
9. Tensioning of System:
 - Prior to loading?
 - After loading?
 - Force factors for haul system?
 - Ability to maintain safety factor and also efficiency?
 - Other methods?

10. Operation of System:
 - Ease of setup?
 - Ease of operation?
 - Required equipment?
 - Required personnel?



FULL STRENGTH TIE-OFF OR LARGE DIAMETER SUPPORT WITH FOLLOW THROUGH TO A FULL-STRENGTH TIE-OFF

Modified Basic Kootenay (Larson, 1990)



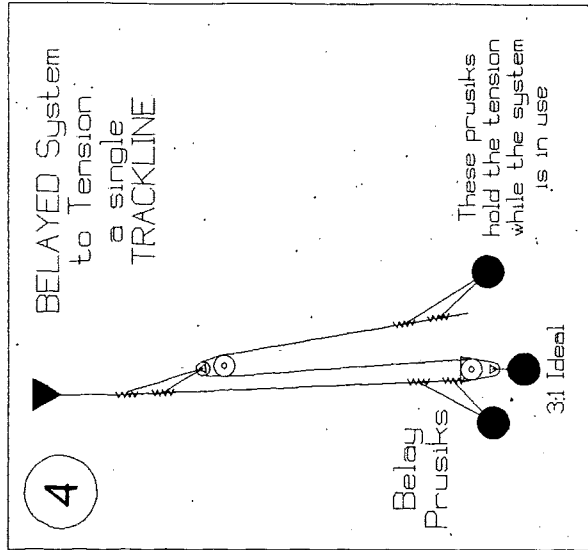
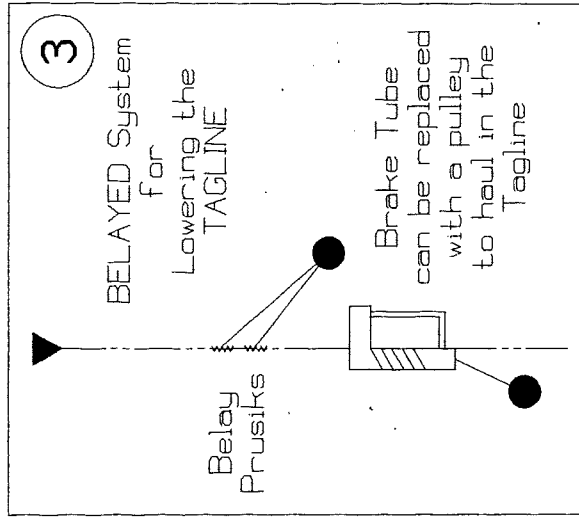
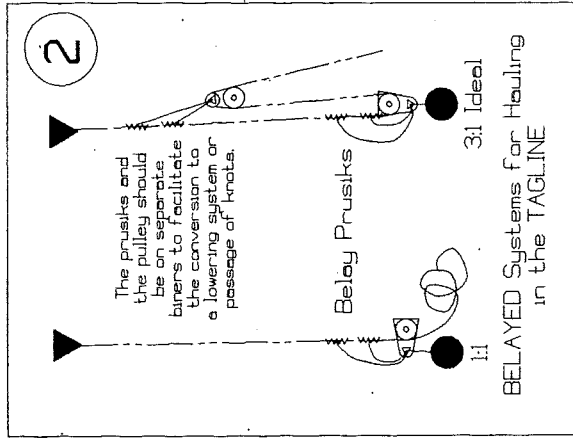
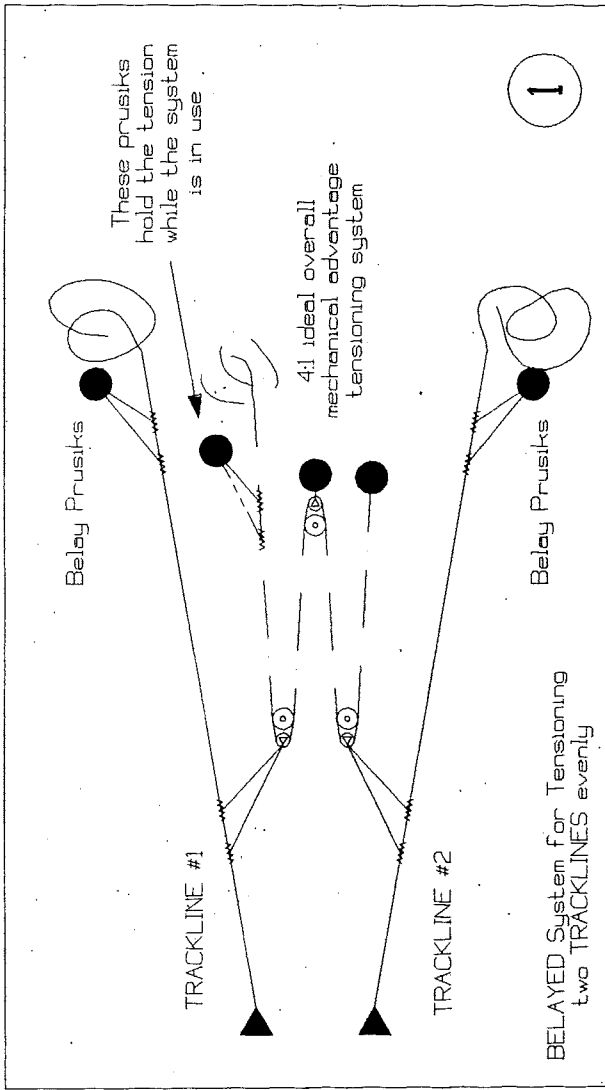
Minimum Rigging
 Below Prusiks NOT installed
 Tandem Prusiks not used to attach taglines to the Load

(Circled numbers refer to the system diagrams on the attached sheet)

SYSTEMS INVOLVED IN THE SET-UP OF HIGHLINES

Although anchor points are figured separately, rigging can be attached to the same point, if it is adequate to hold the entire load. Standards will vary with a group's desire to achieve redundancy.

A full-strength tie-off such as a tensionless tree wrap is preferred for use on the non-adjustable end of the trackline.



- = Separate Haul System
- = Tagline
- = Trackline
- = Anchor
- ▲ = Load
- = Prusik Minding Pulley
- = Pulley
- = Prusik

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Supporting Documentation

List of responding teams:

Bellingham Mountain Rescue

Alaska Mountain Rescue Group

Montrose Search and Rescue

Dan Land

Grand County Search and Rescue

Altadena Mountain Rescue

San Diego Mountain Rescue

Placer County Sheriff Mountain Rescue Team

San Bernadino Sheriff's Department

Deschutes Sheriff's Search and Rescue

Albuquerque Mountain Rescue

Tacoma Mountain Rescue

Stowe

Santa Barbara Search and Rescue

Seattle Mountain Rescue

Mountain Rescue Aspen

Salt Lake County Search and Rescue

China Lake Mountain Rescue Group

La Plata County Search and Rescue

	# of Tracklines	Taglines as Belay	Belay Device	# of Litter Attachments	Uses in one Year	Formal Training
1	2	Yes	nr	1	rarely	no
2	n/a	n/a	n/a	n/a	rarely	no
3	1 or 2	yes	prusik	1	seldom	NR
4	2	no	n/a	2	2-3 times	no
5	1	yes	prusik	1	rarely	no
6	2	yes	prusik	NR	NR	yes
7	2	no	n/a	1	rarely	no
8	1	yes	prusik	1	rarely	yes
9	1 or 2	yes	prusik	1 or 2	rarely	yes
10	2	no	n/a	2	rarely	yes
11	2	yes	prusik	1	rarely	no
12	1 or 2	yes	prusik	2	rarely	yes
13	2	no	n/a	1	rarely	NR
14	2	no	n/a	2	none	no
15	n/a	n/a	n/a	n/a	n/a	n/a
16	2	no	n/a	1	rarely	yes
17	1	yes	prusik	2	NR	yes
18	2	no	n/a	1	none	no
19	2	yes	prusik	1	NR	yes

NR = no response n/a = not applicable