DIREZIONE
Via Veneto, 8 – I-24041 Brembate (BG)
Tel. +39 035 4826195 – Fax +39 035 2283818

www.liski.it - info@liski.it

Installation, maintenance and uninstall guide of NET – A with OB POLES protection system

Operations – In most cases, the Resort Competitions and Events department will be the lead department on the building, maintaining, and removal and storage of the A-Net systems. If this department does not exist, the local race organization will have a large role in the installation, maintenance, and removal of the net systems. This may change from location to location but no matter what, make sure that there is a representative educated in A-Net systems that can come and check to make sure that the systems are installed properly and up to standard, and that all fall lines are properly protected properly.

Ski Patrol – The building, maintaining, and removal process of A-Net Systems can be a time consuming task.

****If you are looking to work on or in the area of the nets, it is advised that Ski Patrol either closes the run that the net system is located on, or close a lane along the net where you will be working, preferably twenty meters off the desired**
anchor location. This will keep unwanted public from coming in contact with unprotected towers, equipment, supplies, and staff that are in the area.**

Snowmaking –There will need to be a representative from the build crew that is in constant contact with someone from snowmaking to make sure they know how much more snow will be needed to be ready to build the A-Net system.

Grooming – The grooming department, or trail crew, is an important part of preparing the hill for an A-Net installation, and also the maintenance and removal of the system.

Volunteer Support – Setting up an A-Net system is not a small task. If possible, try to have as much support as possible to not only install the A-Net, but also maintain, and remove the A-net system as well. This will ensure that the job will get done in a timely manner. The more people you have the better, just make sure that all hands are moving at all times.

It is good to have a positive relationship with your local resort's departments. In some cases, departments like lift ops, ski school, any many more can be added to the net building team on a temporary basis to ensure that there is a large force setting up, maintaining, and removing the A-Net systems.

DIREZIONE
Via Veneto, 8 – I-24041 Brembate (BG)
Tel. +39 035 4826195 – Fax +39 035 2283818

www.liski.it - info@liski.it

IT WOULD BE IDEAL ALL THE WORKING TEAM HAS ALREADY ANY EXPERIENCE IN MATTER
It's very important that Volunteer Support will be always managed by a responsible on site.
Who doesen't have experieces in this case, it is advised to be in World Cup Races or International events to create his own experience

Parts Needed

Pole Pads – It is adviced positioning a reference (flags, tufts, poles exc.) in this way to have a correct vision of distance and position between a pole and the others.

HighLine Pads – It will need necessarly at the start and finish of each HighLine.

DIREZIONE
Via Veneto, 8 – I-24041 Brembate (BG)
Tel. +39 035 4826195 – Fax +39 035 2283818

www.liski.it - info@liski.it

Z - LINE – This will connect the net with the highline.

A – NET – The number of nets depends on the length, the meshes and thickness.
This variables can change in order to the used.
Make sure that all the nets are without tears or rips.

Skirt Net – It is a important part for speed races (DH SSG obligatory) for all the NET – A.

DIREZIONE
Via Veneto, 8 – I-24041 Brembate (BG)
Tel. +39 035 4826195 – Fax +39 035 2283818

www.liski.it - info@liski.it

The neccessary number for all support mentioned above, can be calculated in order to the length system, while is recommended to have stock for each part of the system. The same reason it is adviced to have a stock to install the system in a quickly way.

U – BOLTS Needful to connect the highline to the berth. They are also to be used to secure the rods and the redance. They are adviced 3 u-bolts each locking

HIGHLINE – Highline will be length like the net with an extra part, up – hill and down – hill to secure them to the berths.

Carabiners – This will be one of the devices that connect the Z- LINE to the net and the z-line to the highline. It is important have extras carabiners to be used at start and finish track.

DIREZIONE
Via Veneto, 8 – I-24041 Brembate (BG)
Tel. +39 035 4826195 – Fax +39 035 2283818

www.liski.it - info@liski.it

The distance beetwenn the two carabines can chiange in order to the pole height, or if the net system is in a bow of the slope.

Pulley – This device needs to create the z – line, and slide out the dynamic rope for tensioning the net. Moreover in a falling way, the dynamic rope that passes through the pulley, can slide out and so adsorb the impact.

The distance between could change in order to the pole height, or if the net si system is in turn or straight line.

Cookie – The cookie is a simple plate which is connected a 2m rope. Before the assembly the cookie must be secured into the snow. It is necessary create a hole in the snow with an auger and put the cookie in a desired position. After the securing, get out the rope from the snow and connecting it to the net.

DIREZIONE
Via Veneto, 8 – I-24041 Brembate (BG)
Tel. +39 035 4826195 – Fax +39 035 2283818

www.liski.it - info@liski.it

The cookie should be aligned with the lower carabiner of the z - line.

Connector – This will need to joint the net together, and also to fix any tears or rips on the net. Make sure that the connector has the same material of the net, this will not allowed to any section to be stronger than the next.

Elastics – This connect the skirt line to the NET – A. Make sure that all the elastics are in a perfect condition, without cracks in the rubber.

Tools Needed

Small disposable Rope – This will be used not only for running out and setting a line for the cookies to be placed, but also when it comes time to remove the nets. It is good to have rope that can be cut up, and used to tie off the nets and skirts.

Tuft / pole – The tuft/poles will need to set the line rope for the cookie secure reference. They must be bamboo tuft/poles redirecting to the rope if there will be bow in your system net.

DIREZIONE
Via Veneto, 8 – I-24041 Brembate (BG)
Tel. +39 035 4826195 – Fax +39 035 2283818

www.liski.it - info@liski.it

It is always adviced to have little tools, that can be bringing to the slope

List of necessary tools for Safety System Set-up

Articolo preparazione	Foto	Qt.	Dettagli
Off-road (pick-up) for staff transportation to the track		1 o 2	4 wheels
Radio		3 o 4	
Excavators with driver		1 o 2	
Helicopter for transportation of material on track		1	If possible just to be faster
Trimming stands for cables		3	Widht 1m x height 1m

DIREZIONE
Via Veneto, 8 – I-24041 Brembate (BG)
Tel. +39 035 4826195 – Fax +39 035 2283818

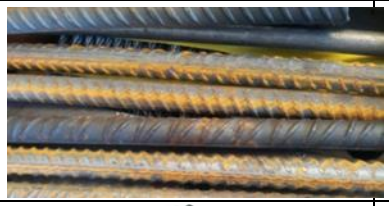
www.liski.it - info@liski.it

Belts (n. 5 6m long + n. 5 8m long)		5 o 6	
schackle		10	for lifting poles (Helicopter)
Motor drill with bits (n° 2 Ø 24mm + n° 2 Ø 28mm)		1 o 2	
Ratchet hoist		2	
Ratchet Tirvit		4	

Hoist for cable pulling		2 o 3	
Shears for cutting		2	
Battery Drill 18 V / 24 V (screwdriver type)		2	DeWALT DCD790N 18V

DIREZIONE
Via Veneto, 8 – I-24041 Brembate (BG)
Tel. +39 035 4826195 – Fax +39 035 2283818

www.liski.it - info@liski.it

Battery Drill 18 V / 24 V for cable cutting		1 o 2	DeWALT DCS355N 18V
Pickaxe		3 o 4	
Shovels for mountain		3 o 4	
Piede di porco		2 o 3	
Iron tip bars Ø 22mm x Length 100cm approx.		10	
Case work with wrenches various types and sizes		1 o 2 set	10", 11", 12", 13", 14"

Chainsaws to cut branches		1	
Chainsaws to cut branches		1	10L

DIREZIONE
Via Veneto, 8 – I-24041 Brembate (BG)
Tel. +39 035 4826195 – Fax +39 035 2283818

www.liski.it - info@liski.it

Saws for cutting wood		2	
Hammer drill		1	
Hacksaw for cutting iron		2	
Cutters		1 o 2	
Insulating tape		10	blach
Pincers		2	Per tagli cavi giuntati
shearing		2	
Hummer		2	

DIREZIONE
Via Veneto, 8 – I-24041 Brembate (BG)
Tel. +39 035 4826195 – Fax +39 035 2283818

www.liski.it - info@liski.it

Harness Work		3 o 4	
Tools Working belts		6 or 7	Per tutti i lavoratori e supervisori
Helmet		6 or 7	Per tutti i lavoratori e supervisori
Equipment cover		1	opzionale
Marker Pens		5	
Work gloves		7	for all workers, and supervisors

Material Check

When unpacking all supplies, try to separate the supplies, into different piles according to the net system. This will make staging the supplies easier, and continue to bringing more than needed to each system's location.

Net & Slip Skirt – Make sure that all sections are in full working, if it will be tears or rips, these must be repaired. Do this before the supplies go on hill. Repairing every net or skirt, will be easier, if done at the base area opposed to the assembly zone, where there may be steep pitches involved. Make sure to bring a few extra sections, in case of changes or addition.

DIREZIONE
Via Veneto, 8 – I-24041 Brembate (BG)
Tel. +39 035 4826195 – Fax +39 035 2283818

www.liski.it - info@liski.it

Pads – Make sure there aren't tears or any damage to any of the pads, and stage one for every pole in the net system.

Z-Line – Make sure that all z-lines are not cut or damaged, and that the proper amount of lines are staged for each net system.

Carabiners – Make sure that the latch can be opened and closed properly and there is no damage to the hinge that is on the latch.

Pulleys – Make sure that the wheel inside the pulley moves freely and both side of the pulley are maneuverable.

Cookies – Make sure all cookie plates are intact and have a rope long enough to anchor the net properly.

Try to stage supplies for each net system in a manner that allows support from trucks or snow cats. This will need to be done early in the season, ideally prior to snow on the hill, so that the supplies can be there and ready when the net systems installation begins, keep in mind that stage locations need to be in a spot that will not interfere with snow making. All stage locations and supplies will need to be covered from the elements, so that they are accessible, when the installation begins. It is advised to stage all supplies up-hill from the net system locations, this will allow easy down-hill transportation once there is enough snow at the net system.

INSTALLATION

WARNING

For a proper NET – A installation it is important the patrol of the slope to value the protect zone.

Important value to consider:

1) Value the bend slope (inclination).
2) Consider the track line, if it in in straightaway or in bend way.
3) Value the consistency of the ground.
4) In structure phase of a slope it could be steep, tunnels ore armed ground
5) Consideraring the bend changes of compressure of the skilifts
6) Value the height of the poles, in order to the distance from the net to the pole. **1***
7) Value the distance between one pole and the other, in order to the slope morphology. **2***

DIREZIONE
Via Veneto, 8 – I-24041 Brembate (BG)
Tel. +39 035 4826195 – Fax +39 035 2283818

www.liski.it - info@liski.it

1*n.b. : The distance between net and the pole:

- 3,50m for Slalom e Giant Slalom
- 5,50m for DH e SSG

2*n.b. : The height of the poles can change from 9 to 12/15 mt

POLE ASSEMBLY

1) Mount the pullet in the “ears” of the pole. (Fig.1)

2) Insert the redance in the pulley and in the rings on the pole. Block the cable with a u - bolt (Fig.1)

3) Mount at the top of the pole on the lateral holes, the rods blocking the cables with a minimum of three u-bolts. (Fig.1)

DIREZIONE
Via Veneto, 8 – I-24041 Brembate (BG)
Tel. +39 035 4826195 – Fax +39 035 2283818

www.liski.it - info@liski.it

4) The rods are usually 25mm long.

5) Mount the base directly on the pole, inserting the stud in the hole and then block it with a cotter pin. (Fig.2)

TRANSPORT ON SLOPE

1) Transport the armed pole on the slope using a heavy veichle. (Elicopter, TIR , Escavator ecc.ecc.)
2) Posizioning at the desired point with the pole base addressed to the slope line.

POLE RAIS UP

1) After have prepared n° 2 berths and the zone where the pole will be positioned, Keep in mind the distance between pole and the net.

2) Using the escavator with a 6m bend. Slinging the pole and paying attention to insert a little rope about 7/8m at the bend, for the rescue of the bend after mount it on the pole.

3) Pass uphill rod on the escavator arm, and bring the two rods to the berth plates.

4) The escavator raise the pole till Value point of the Chief

5) Consider the distance beetween net and pole, calculating about 1m of compressed snow in the ground.

6) Consider the pole perpendicularity in order to the inclination of the slope.

DIREZIONE
Via Veneto, 8 – I-24041 Brembate (BG)
Tel. +39 035 4826195 – Fax +39 035 2283818

www.liski.it - info@liski.it

7) After this valutations, block the rods to the berth plates and prepared preveously during the raising pole up with at least tre u – bolts.

8) Value the pole rotation. After that, insert 4 pickets at the base with the hammer, then secure them in the ground.

9) We have already the redance secured at the top of the pole in his pulley. So we will have the exact height from the top of the pole to the ground.

DIREZIONE
Via Veneto, 8 – I-24041 Brembate (BG)
Tel. +39 035 4826195 – Fax +39 035 2283818

www.liski.it - info@liski.it

Double Redance

1) All LISKI poles are composed by double pulley, and double redance, to use them with double highline and double net.
2) With this redance system we can manage the highline falling and raising in order to the using without going up to the pole.

WARNINGS

1) All Berths are very important to guarantee a safe hold.
2) Berth plates are secured with pickets.
3) The positioning of the berths is very important: Positioning the berths in order to the tensioning of cables.
4) Positioning the plates at least 6/10m behind to the pole. In extreme cases even more.

UPWIND

1) Positioning the plates 4/5m in front of the pole
2) Using the cable Ø8 /10 about 6/8m long. Turn the cable on the pole, where there is the lower ring, and then join the cable to the plate with at least 2 u – bolts.

DIREZIONE
Via Veneto, 8 – I-24041 Brembate (BG)
Tel. +39 035 4826195 – Fax +39 035 2283818

www.liski.it - info@liski.it

Start and finish track berths

1) Value the berths of start and finish track in order to the solidity of the ground.
2) More distance we have with the berths, less load will have on the first and last pole. It's Important that in fanked soil way, it's adviced to dig 1m in the ground and put the berth, getting out the berth cable and connecting it to the highline.

MATERIAL

1) All material that will need to install the NET – A, it will bring uphill to the start track.
2) Positioning the highline cable on the trestles.
3) Spooling downhill to insert the highline into the specific buttonhole of the redance that it will be about the human height .
4) Arrived at the bottom, leave an extra cable about 6/8m long. Leave the same length uphill before cutting the cable.

DIREZIONE
Via Veneto, 8 – I-24041 Brembate (BG)
Tel. +39 035 4826195 – Fax +39 035 2283818

www.liski.it - info@liski.it

5) Spooling the lowline in order to the ideal line. For the lowline it doesn't need the extra cable.
6) Use the berths that they will put in the ground with a distance between one and the other of 5m.
7) Tensioning the lowline, after anchored it uphill.
8) If the cables are 2 to secure the double net, the distance is 80cm .
9) Using the cookie we don't need the lowline.

Net Installation

1) Unroll the net and positioning it at 5m uphill of the first pole.

2) Applying the high and lowline uphill from the first pole at about a distance of 10m of the first carabiner. This one must be blocked with the u-bolts.

3) Before laying the net, secure or anchore the net with the dynamic rope to the carabiner.

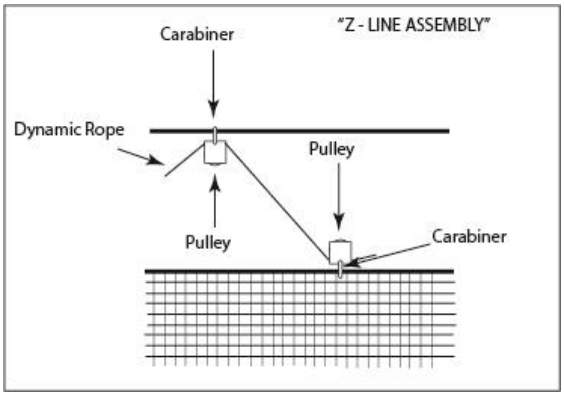
4) Block the net with the dynamic rope, and proceed to the complete unroll, considering a distance from the highline of 3/4m.

5) Kepping the net in tension downhill, connect the moduls net with the dynamic rope.

DIREZIONE
Via Veneto, 8 – I-24041 Brembate (BG)
Tel. +39 035 4826195 – Fax +39 035 2283818

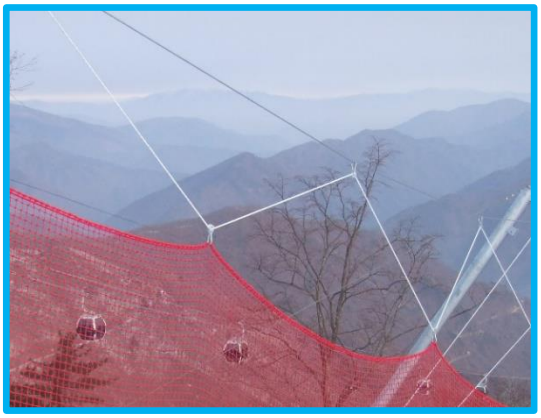
www.liski.it - info@liski.it

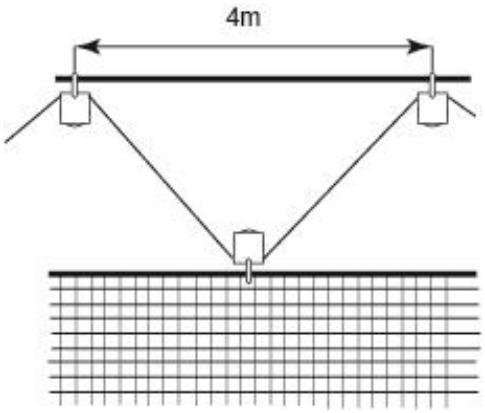
6) After that restart uphhil creating the z – line with the dynamic rope (pulleys/carabiner).



7) Start the z – line up hill from the first pole, kepping an extra dynamic cable of 6/8m

8) The distance between the 2 carabiners on the net will be about 4m





9) The distance of the two carabiners on the net can change on the linear structure or in bend conditions.

10) The carabiner that will be join, to the net must be join also to the dynamic rope.

11) The narrow part of the carabiner will joint with pulley, and the large part will joint with the net and the highline.

12) During the joining to the highline and the net, be carefull to the direction of the pulley. The opening part must be always addressed to the external slope.

13) The z - line must be managed from the ground maintaining an equal distance

DIREZIONE
Via Veneto, 8 – I-24041 Brembate (BG)
Tel. +39 035 4826195 – Fax +39 035 2283818

www.liski.it - info@liski.it

between net and highline.

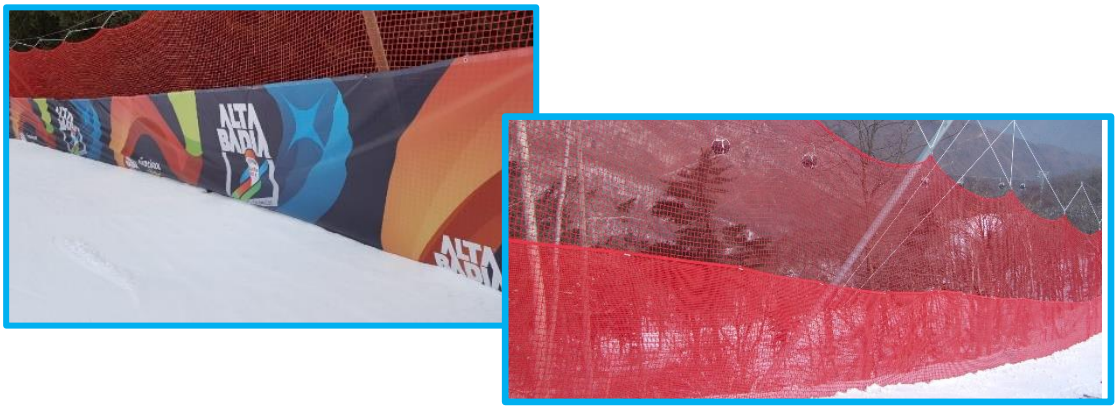
14) Important is the spooling of the dynamic rope. Insert a pipe in the dynamic rope, spool and make it turn.

15) The dynamic rope inserting in the pulley is easied to the cheeks opener.

16) Very Important to interrupt the z - line every 3 poles manteining the extra of the dynamic rope for the managing of the z - line.

RAISING UP THE NET

1) Riase/ Tensioning the redance until the top of the pole, starting from the first uphill pole continue to downhill. Bring the redance until the top of the pole blocking it with at least 2/3 u bolts.
2) After raising up all, check the highline if sufficiently tensioned, if not tensioned it more. (not exaggerate)
3) During the raising, check the z - line that is regular and ready for the using.
4) Proceed joining the net with the lowline or using the cookies.
5) Manage the net tension with the dynamic rope or redance .



SKIRT LINE

The skirt line usually measures 25m or 50m by 2.25m height with a mesh with 0.8 plastified.

1) The installation happens by apllying the skirt line to the net base, considering to overlay it at least 1m in order to the direction of the athlete
2) Join the skirt line to the net with the elastics, with a distance to each other at least 1m/1.5m.
3) Put down the net on the snow with at least 15/20cm of abdomen to cover it with the snow. In this way if the athlete fall, he doesn't pass under the skirt line.
4) It is adviced to apply to the skirt line only the NET – A in the period of the event.
5) For a bigger capacity in case of wind, put the laces to the centre of the net.

DIREZIONE
Via Veneto, 8 – I-24041 Brembate (BG)
Tel. +39 035 4826195 – Fax +39 035 2283818

www.liski.it - info@liski.it

Maintenance

ORDINARY MAINTENANCE ON AND OFF SEASON

Once the “protection system type A” is assembled, it must be periodically controlled to avoid problems.

During winter season, with slopes open to skiers, the problems can be :

- Very heavy snowfalls, that can easily partially or totally cover the net putting extremely high loads on steel structures. At this point these structures can bend or even break (even big and massive structures !), leaving the slope without appropriate protection until the end of the season, being not possible to substitute a structure pole during winter ! (please check picture below)

- Storms or even medium/strong wind can accumulate snow on the net, having the same effect of an heavy snowfall. Or it can “full” the meshes of the nets, changing a meshed net into a sail. The addition of the weight of the accumulated snow and the wind can badly affect the protection system.

Solutions :

1. Try to remove the excess of snow on the net in case of heavy snowfalls or storms/strong wind.
2. In case the removal it’s not possible due to long time storms and relative large amount of snow fall in short period, detach the dynamic rope Ø 10mm used for the “zigzag” at a joint or free the redance cable.
3. If no detach is possible, please consider the possibility to cut the dynamic rope Ø 10mm to free the net from the structure. The system will not works as a protection then, but You will avoid the damage of it.
4. As soon as possible put 2 or 3 rows of “Protection System Type B”, as provisional safety systems.

During spring / summer season please make a deep check on :

- Position and situation of bases (for OB poles) and all plates related to tension cables and upper/lower cables.
- In any case, after ANY important rain, it’s important to visit the slope, checking possible moving of the protection system components.

DIREZIONE
Via Veneto, 8 – I-24041 Brembate (BG)
Tel. +39 035 4826195 – Fax +39 035 2283818

www.liski.it - info@liski.it

Protect the net and the dynamic ropes by UV shading net; to do this, all the LISKI A-NET systems have the possibility to raise or lower the A-NET through the redance of the protection structure.

PROCCESS

1) Loseen the net to the base.
2) Fall down with the redance all the net system, z - line, highline until to arrive with the highline at the human height.
3) Starting from the top, rolling up the net from the bottom to the top including also the z - line and block them with a lace.
4) After loosen the anti UV net, starting from the top place the anti uv net on the NET – A, z - line, and dynamic rope, kepping attention to cover them all. Lace up all with a little rope or a bend.
5) If the net will annoy it is adviced raising up all the net