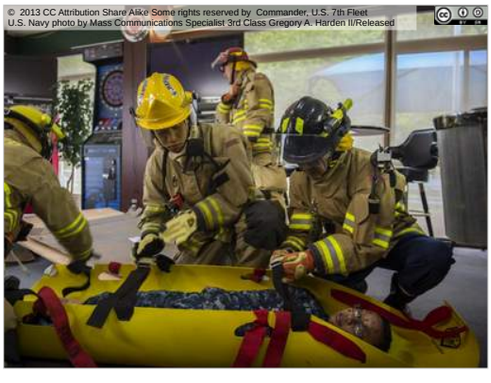
Unit 28: Packaging and Level Ground Litter Carry Out
Date Last Updated: February 19, 2020

Locate, Access, Stabilize, Transport.

After finding a subject, it may necessary to carry them out of the woods.

Takes lots of people. Litters are good tools for that.

Here's a patient being packaged in a rigid stokes Litter for flat ground carry out (in training).



And here is a flexible litter (a sked).

Use under the direction of medically qualified personnel.

Not all backboards work with all litters.

6 people, just holding the litter (rail or straps) good for short distance flat carry (as is being done here in a transfer to a helicopter).

Carrying like this takes a lot of effort.

There are a variety of designs of wheels that attach to rigid litters.

Here's a two wheel design for sand or soft ground.

Here's a one wheel design for irregular ground. Takes much of the load, but still needs a multi-person team to handle (including keeping it stable).

It still takes a lot of people to carry a litter more than a short distance. Here are two teams rotating.

Think in terms of 18 people (three rotating teams of 6) as a reasonable number for carry outs on level ground. Add more for rigging haul assist systems in low angle terrain.

Safest way to rotate – stop, lower the litter to the ground, rotate out the litter bearers, raise the litter and continue.

It is possible to improvise a litter, but it will take a lot of people to do a carry out.

Carry out team Positions/Functions

- Leader
  - Brief team on the evacuation plan
- Carry
- Medical care: Designated EMS care provider
- Relief
- Navigation
  - Locate, mark, guide team on carry out route
- Rigging
  - Rope assist for steeper parts of non-technical terrain

Need lots of people, need to be organized.

Have a plan, brief the team on it.

Fill functional needs.

Ensure the litter bearers gets breaks and gets hydrated.

Rotate the litter bearers (side to side and switching out between carrying and accompanying personnel

Litter Packaging

- Protection from the elements
  - Heat, Cold, Rain, Snow, Sun, etc.
- Protection from the environment
  - Branches, falling rocks, etc.
- Protection from gravity
- Medical Concerns

Multiple ways to package someone in a litter.

Multiple concerns in litter packaging – protecting the patient from the elements, protecting them from branches, rocks etc. (how? (eye protection, head protection, care to avoid disturbing rocks on the fall line, etc.)).

Non-technical terrain carry out, or on a rope system where gravity is a hazard?

Medical concerns for access and monitoring (iv access, vitals, etc).

Litter Tie-in

- Tie in for a burrito wrap.
  - Protection from the cold.
  - Limited access, limited adjustability.
- Yosemite tie in.
  - Good access and adjustment.
  - Protection from gravity.

We'll look at two methods for tie in – a burrito wrap for protection from the cold, and the yosemite tie in for protection from gravity.

Plenty of other variants.

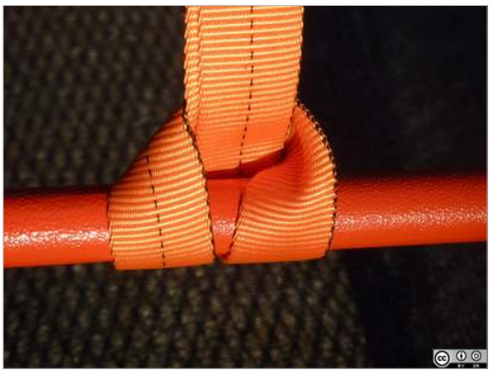
Long laces or multiple short laces

Perform a thorough and appropriate tie in for the situation.

All use similar ties in webbing.

Clove Hitch

End of webbing to rail.



Girth Hitch

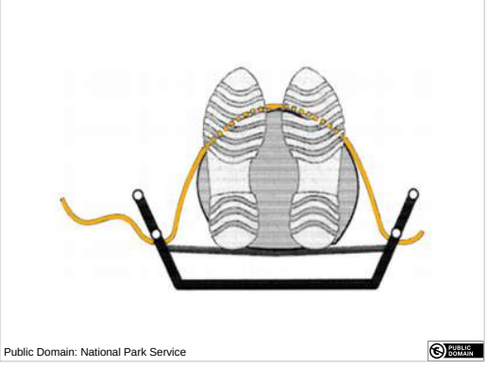
Center of webbing or webbing loop to rail

Packaging described here is not adequate for anything other than litter carries on flat terrain.

More training is needed for high angle packaging.

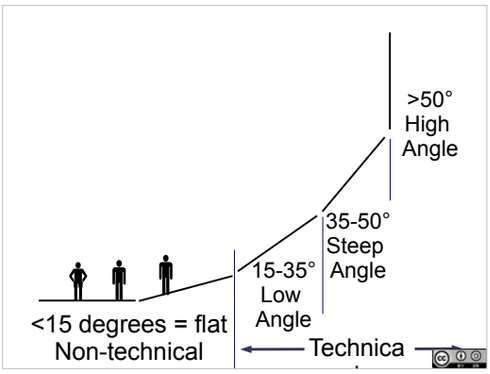
What is missing here?

Provide eye protection for the subject.



Tie to the bottom rail – capturing more of the patient's circumference for more control over side-to-side motion of the patient.

Circumferential tie-in – more circumference, more stability.



Definitions for high/low angle conditions vary:
NFPA: High Angle = Weight supported by rope system.
Low Angle = Weight supported by ground.
Common (somewhat variable definition) we'll use here:
Flat ground: 0-15 degrees
Low angle: 15-35 degrees
Steep angle: 35-50 degrees (most dangerous)
High angle: 50-90 degrees

Quality of footing also factors in – poor footing, loose scree, etc, makes for more dangerous conditions.

Anything more that 15 degrees calls for support from technical rescue resources.

We are talking here about carry out on <15 degree (<27% grade, less than 2.7 rise in 10 run), non-technical terrain.

Litter Packaging

- Protect the subject
  - Environmental protection
  - Protect their eyes
- Comfort
  - Pad between litter and shoulders, pelvis, legs
  - Pad behind the knees
  - Reduce uncertainty: explain the evacuation plan to the subject.
- Medical Concerns
  - Airway
  - IV Access sites
  - Splints/Spine
  - Access (injuries, IV sites, distal neurovascular, vitals)

Concerns for packaging:

Protect the subject from the environment: (heat, cold, rain, snow, sticks in the face...).

Put eye protection on the subject.

Make sure the packaging doesn't interfere with the subject's ability to breath.

Adjust the packaging to support medical needs (splints, airway access, IV access, spinal immobilization, etc).

Fill the patient in on the evacuation plan.

One packaging method for warmth – lay a waterproof barrier over the litter, then put blankets (one for legs, one for upper body), or a sleeping bag over it.

You can lay a reflective thermal layer (space blanket) over the blankets.

Then put the subject in the litter and wrap them in the thermal layer, the blankets, and the outer moisture barrier.

Then lash them in to the litter.

One lashing method – take a 40 foot length of 1" tubular webbing, girth hitch the center to the rail at the feet.

Start wrapping the litter with 1 inch tubular webbing (here with one 40 foot length).

Girth hitch the center of the webbing to the top rail at the foot of the litter.

Criss-cross the litter on the verticals – wrap the verticals to lock the webbing.

Avoid wrapping the webbing around the upper rail, easier to abrade it rubbing on things.

Make sure the webbing isn't straight across the subject's neck (or so they'll slip down onto it). Make a steep V over the shoulders.

Work the slack out of the webbing.

Make sure the subject's breathing isn't compromised.

Put safety glasses on the subject (protect their face and eyes).

Tie off the webbing with clove hitches that capture a vertical bar.

Then tie an overhand safety or paired half hitches in the webbing.

Protect from the environment as appropriate.

Hot and sunny, shade may be more appropriate than a mummy wrap.

Is this going to take more people?

If the subject isn't mummy wrapped, tie their hands in a handcuff knot and lash it to the foot of the litter so that the subject isn't able to reach out and grab on to things while being carried (with the potential of throwing the litter bearers off balance).

Here is protection from the rain, in a vertical system. Tarp over patient and head shield over face.

For rope assist on steeper bits in non-technical carry out.

Attachment point for rope to litter.

Or use a 12 foot length of webbing, pass center through top of litter, make three wraps down each side, wrap around vertical post, tie ends with water knot, gather to attachment point.

Can use to put a pulley for 2:1 mechanical advantage on the litter.

You can reduce the effort in a litter carry by holding the litter rail in one hand, and holding a strap looked over the shoulders in the other hand – transfer more of the load off of your arm.

10-12' length of tubular webbing, bend the ends together with a water knot, then girth hitch the loop to the litter rail, and wrap it over your shoulders.

The person in gray in the center is using the litter strap properly, over both shoulder.

Litter carry, assisted with straps over the shoulders – more distributed load.

Lifting off the ground (two of the 6 bearers demonstrating position)

Litter strap over both shoulders, hold in outside hand.
Hold rail with inside hand.
Kneel, back straight.

On command (from person at the head)

Lift with the legs, not the back.

Same for lowering to the ground, lower with the legs, not the back.

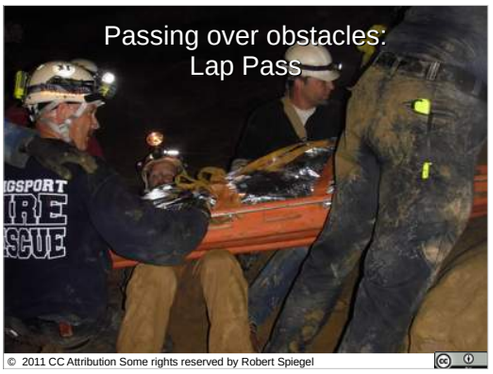
Likely to encounter obstacles when doing a litter carry out.

Need to pass the litter over the obstacles.

Here's a Hand Pass.

Set of litter bearers on each side of the obstacle. Hand the litter over the obstacle.

Passing over obstacles: Lap Pass



Lap Pass. For longer distance over obstacle, need people on the obstacle to pass the litter along.

Here's a form of lap pass in a cave rescue in Worley Cave

There's also a turtle pass (primarily cave rescue technique, one person crawls with the litter on their back through a tight space, with others at each end helping guide the litter).

Rotate

- Without putting down
  - Like a hand pass, stop, 6 bearers pass forward to 6 new bearers ahead.
- Stop and put down.
  - Switch out litter bearers.
  - Litter bearers switch sides.
- Make sure the litter bearers get to rest and hydrate.

Rotate the litter bearers.

Can do without putting down, pass forward as in a hand pass to a new team of 6.

Or can put the litter down.

Can switch sides, can switch out litter bearers.

Make sure the litter bearers hydrate and get to rest.