ARMY NONLETHAL
SCALABLE EFFECTS CENTER

EMPLOY VEHICLE ARRESTING DEVICES

TERMINAL LEARNING OBJECTIVE

ACTION: Employ vehicle arresting devices

CONDITIONS: Given a situation which requires you to stop a vehicle from entering a secured area, a Portable Vehicle Arresting Barrier (PVAB) and a Vehicle Lightweight Arresting Device (VLAD)

STANDARDS: Perform steps to assemble, activate, trouble shoot, and recover the PVAB and VLAD with minimal damage to the vehicle and occupants

BERUIT INTERATIONAL AIRPORT OCTOBER 1983

- **Enemy** – Suicide Bomber in a rental truck loaded with 12,000lbs of TNT
- **Defense** – Two (2) Marine Sentries armed with M16 Rifles
- **Results** – 241 U.S. Servicemen Dead, 6 injured

ENABLING LEARNING OBJECTIVE A

ACTION: Employ the Portable Vehicle Arresting Barrier (PVAB)

CONDITIONS: Given the PVAB and a situation which requires you to stop a vehicle from entering a secured area

STANDARDS: Perform steps to assemble, activate, trouble-shoot, and recover the PVAB with minimal damage to the vehicle and occupants

SITE IDENTIFICATION

WARNINGS

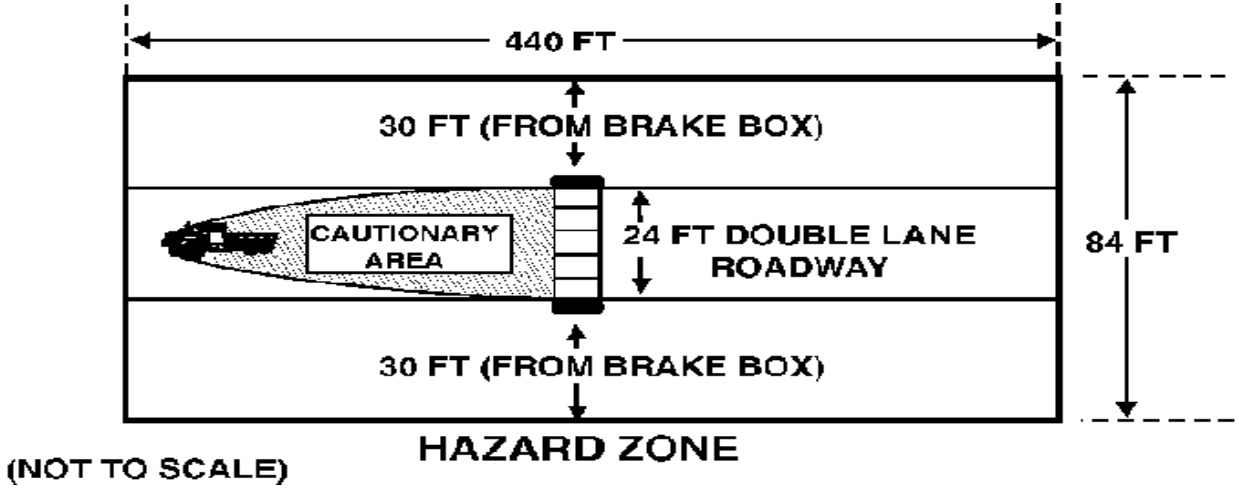
- Ensure area is large enough to accommodate an exclusion zone since captured vehicles may veer or components may fly
- To prevent inadvertent activation, do not place control box where water may build up and flood components

Caution

- Avoid areas where water, due to rain, snow, etc., may build up and flood components causing damage to equipment

SITE IDENTIFICATION (CONT.)

- Check roadway site prior to installation
- Roadway should be fairly straight
- Hazard zone accommodation
- Hazard zone dimensions

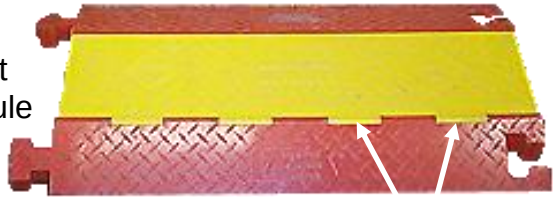


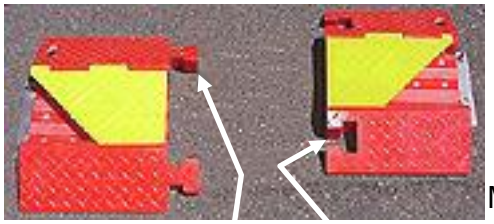
BUMP MODULE ASSEMBLY

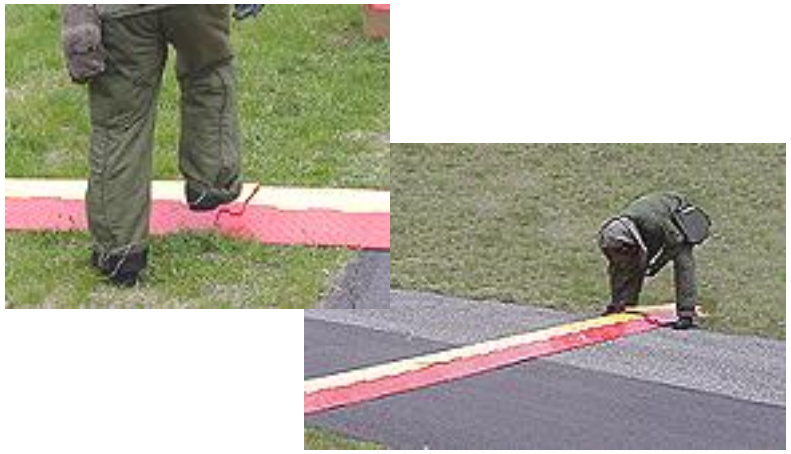
- Start with bump end module (dogbone end). Place seven (7) bump modules (double lane) or four (4) to six (6) modules (single lane) and other bump end module (slotted end) across roadway, with top door hinges towards the expected primary direction of capture

- Face oncoming traffic. Starting with the left bump end module (dogbone end) and working to the right, assemble modules by laying the slotted end over the dogbone end of one bump module and firmly stepping on the two modules to join them together. Ensure modules are flush when assembled. Continue this step to assemble all bump modules needed for road width, ending with the right bump end module (slotted end)

BUMP MODULE ASSEMBLY (CONT.)







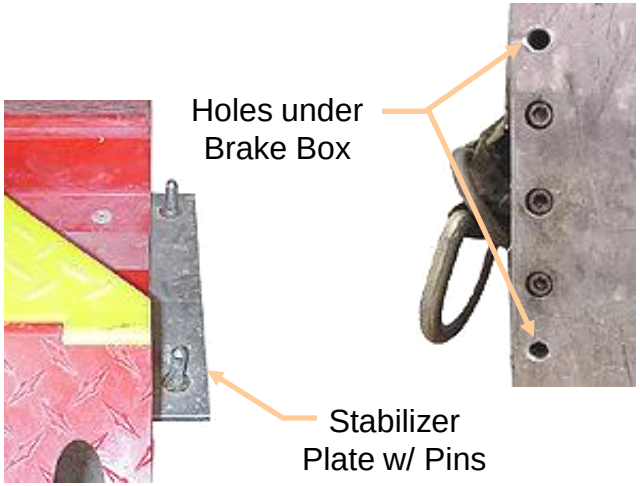
Single or double lane:

- If roadway is a single lane (15 ft), use 4-6 modules or double lane (24 ft), use seven (7) modules
- Remove the required bump modules needed to cross roadway (built in handle on three (3) ft. modules only)
- Start placing modules across roadway (lid hinges facing expected primary direction of capture)
- Start with the “dogbone” side end module, laying a three (3) ft. module’s “slotted” side over the “end” module’s “dogbone” side. Firmly step on the joint connecting the two (2) together
- Continue assembly across roadway using the three (3) ft. modules. Finish assembly using the “slotted” side end module

BRAKE BOX INSTALLATION

WARNING

Brake boxes are heavy and require a two person lift to prevent personnel injury.



- Place a brake box on each side of roadway
- Position brake box so brake webbing (attached to “D” ring) faces end bump Modules
- Attach brake boxes to end modules by aligning holes under brake box onto the pins on stabilizer plate of end module

SOIL CONDITIONS

- Normal Soil: May be described as soil with enough moisture and clay content to allow the soil to be compacted or tamped
- Frozen Soil: Frozen soil is described as soil that will remain frozen for an extended period of time and that extends into the ground at least 12 inches
- Undisturbed Desert Soil: Is identified as not having been driven over or broken up by digging
- Desert or Sandy Soil: Pure sand and excessively dry desert soil can not be readily re-compacted

ANCHOR INSTALLATION (NORMAL SOIL)

WARNING

Any anchoring method and all exposed wires or control cables used may present a tripping hazard. Use extreme care to keep any exposed anchor cables covered with soil. Coil all wires and cables and keep them out of the foot traffic areas. If this is not possible, mark or flag the cables with a prominent material (police barrier plastic tape). If a long section of the 300 ft. pendant control cable must be used, conceal cable as much as possiblee

ANCHOR INSTALLATION (CONT.) (NORMAL SOIL)

Normal Soil

ANCHOR INSTALLATION (CONT.) (NORMAL SOIL)

Caution

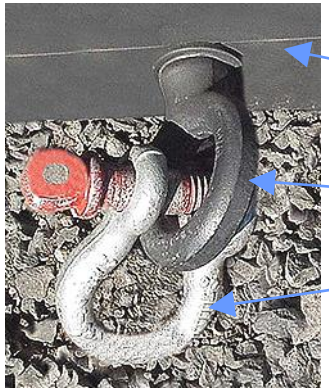
When digging the holes, avoid getting dirt on the brake boxes, since excessive amounts of dirt or other materials may affect the performance of the unit. Keep dirt pile close to hole to refill after anchor is buried

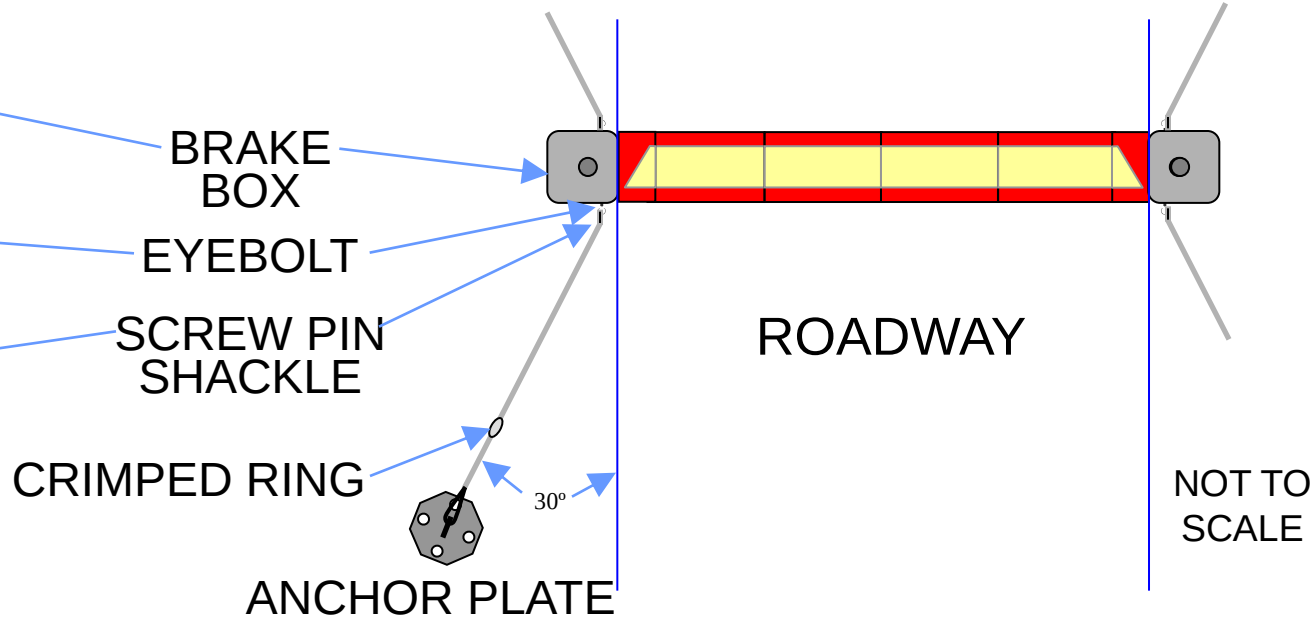
- Move anchor out of way to dig hole.
- Holes need to be at least 2 ft deep and 2 ft round (approx). If soil is soft/easy to dig make hole deeper

Note: The anchor cable has a crimped ring located at 24 inches for proper depth. The hole is deep enough when the crimped ring of the anchor cable is even with or slightly below the surface level of the ground when the anchor cable is held vertically

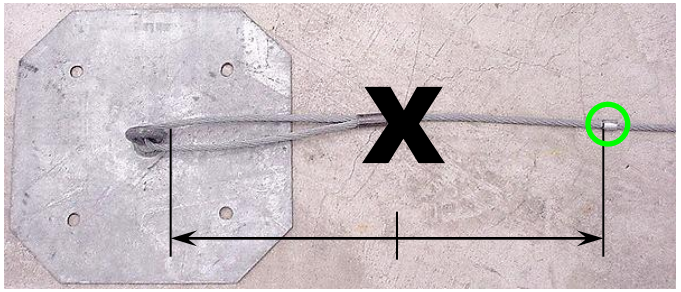
ANCHOR INSTALLATION (CONT.) (NORMAL SOIL)

Stretch anchor away from box at a 30° (approx) angle from roadway



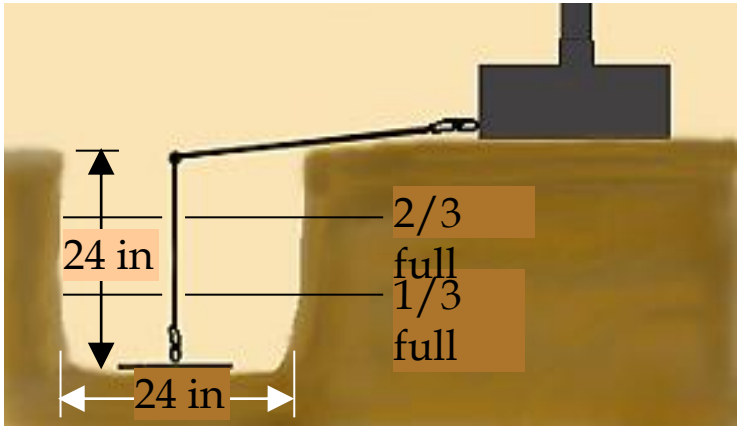


- Find, then mark on soil, the midway point between crimped ring (circled) on anchor cable and anchor plate eye, (X) this is the location to start hole



ANCHOR INSTALLATION (CONT.) (NORMAL SOIL)

- Disconnect anchor cable from brake box, then place anchor plate flat in bottom of hole and use crimped ring on cable (2 ft.) as depth marker
- Once correct depth is established tamp down anchor plate in bottom of hole
- Cover anchor plate with 1/3 of the dirt (approx), tamp down while holding anchor cable vertically
- Fill hole to 2/3 using dirt, tamp down then reconnect cable to brake box



ANCHOR INSTALLATION (CONT.) (NORMAL SOIL)

Note: It is important to reconnect cable now. If not, there is a risk that the cable will not reach the brake box

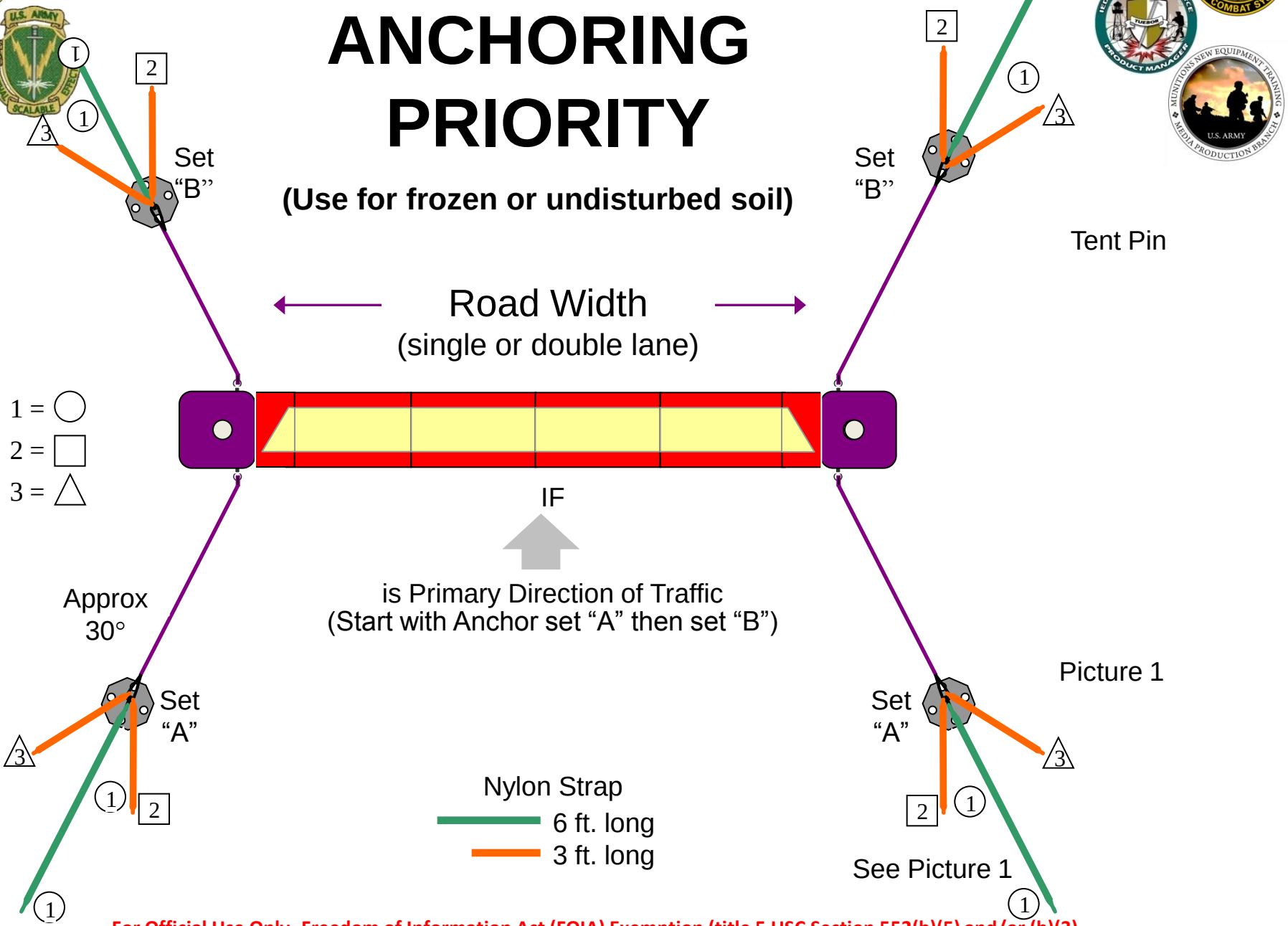
- Fill hole with remaining dirt and tap down. The Cable should be partly covered
- Wet down backfill with water (If available)
- Repeat steps for remaining anchors

ANCHOR INSTALLATION (CONT.) (NORMAL SOIL)

Remember, installation under normal conditions is within two (2) hours using a two-person person team

RECOMMENDED ANCHORING PRIORITY

(Use for frozen or undisturbed soil)



ANCHOR INSTALLATION (FROZEN SOIL)

Frozen Soil

UNDISTURBED DESERT OR SANDY SOIL

Undisturbed Desert
or Sandy Soil

DESERT OR EXTREMELY SANDY SOIL

Desert or Extremely Sandy

ERECTOR ASSEMBLY INSTALLATION

- Insert base of erector assembly into mounting cup on top of brake box, while aligning air hose fitting into slot
- Open all bump module lids
- Decide where control box will be located

ERECTOR ASSEMBLY INSTALLATION (CONT.)

- Align end of 30 foot inter-connect control cable with erector assembly connection
- Lay the 30 foot inter-connect control cable into channel 1
- Push the other connector end of the 30 foot inter-connect control cable through two (2) holes in the other bump end module and over the top of the anchor cable
- Connect one (1) end of the 6 ft. inter-connect control cable to erector assembly connection that is on the same side as the control box

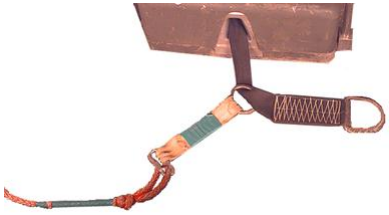
ERECTOR ASSEMBLY INSTALLATION (CONT.)

- Unscrew the cap from the fill valve on the air bottle assembly
- Set the cap aside
- Screw the air pump valve onto the fill valve
- Use the air pump to pressurize each air bottle so that the valve assembly gauge reads a minimum of 120 psi, but not more than 130 psi
- Unscrew the air pump valve from the valve assembly and remove the air pump

NET ASSEMBLY

RATCHET CAM

NET ASSEMBLY



PACK NET

PACK NET (CONT.)

ACTIVATION

SAFETY

WARNING: Brake webbing, capture lines and brake boxes are under extreme tension and may snap or pull free. Use extreme caution when approaching captured area. Never stand directly behind the captured vehicle or between brake webbing as shown in the photo (red shaded area). Serious injury could occur to users.

ENABLING LEARNING OBJECTIVE B

ACTION: Employ the VLAD

CONDITIONS: Given the VLAD, and a situation requiring you to stop a vehicle from entering a secured area

STANDARDS: Perform steps to assemble, activate, trouble shoot, and recover the VLAD with minimal damage to the vehicle and occupants

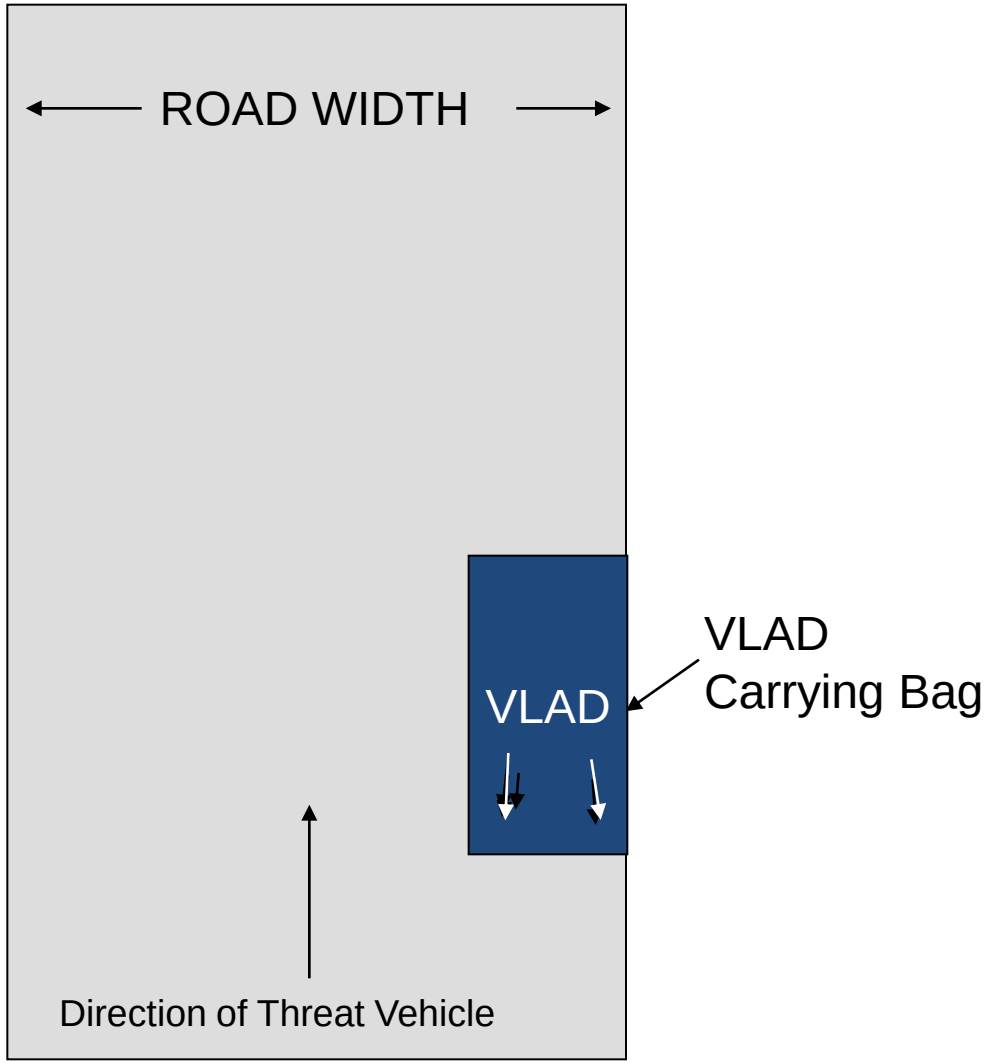
SPEED AND STOPPING DISTANCES

Vehicle Speed	Typical Stopping Distance
30 mph (48km/h)	82 ft. (25m)
40 mph (64km/h)	118 ft. (36m)
50 mph (80km/h)	180 ft. (55m)

SITE PREPARATION WARNING

- Ensure area is l arge enough to accommodatean exclusion zone since captured vehicles may veer or components may fly
- Ensure that you have a minimum of 330 ft. (Approximately 100m in dry conditions)
- Ensure that you have a minimum of 660 ft. (Approximately 200m in wet conditions)

SITE PREPARATION



RAPID DEPLOYMENT

Step 1 - Determine Direction of the threat vehicle.

Step 2 - Pull open the handle wrap to separate the carrying straps. Using two (2) people, each user grabs a carrying Strap and places the VLAD carrying bag just off the roadway with the arrows marked “Towards Target Vehicle” pointing towards threat vehicle approach

Step 3 - Using thumb and index finger on each side of the buckle, squeeze both buckle releases together to unclip Outside Strap on carrying bag. Repeat for second outside strap

RAPID DEPLOYMENT (CONT.)

Step 4 - Pull open outside Flap #1 and outside Flap #2. Pull open inside Flap #1 and inside Flap #2

Buckle Releases

Buckle on Outside Flap

Carrying Bag

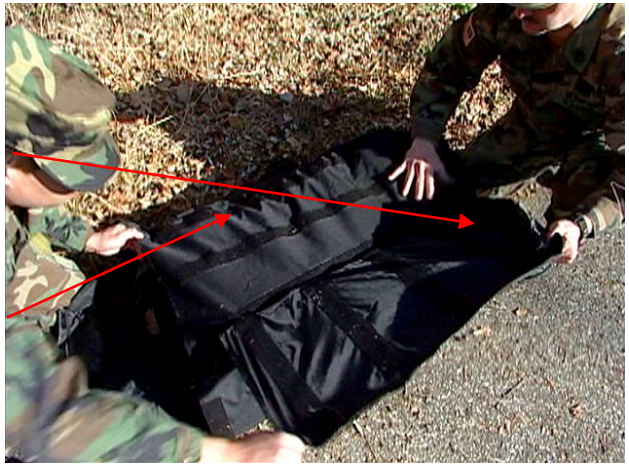
Step 5 - One (1) end of carrying bag is closed with hook and pile closures. To open that end of the carrying bag, pull the hook and pile closures apart and lay it flat

Outside Flap #1

Outside Flap #2

Inside Flap #1

Inside Flap #2



RAPID DEPLOYMENT (CONT.)

Step 6 - Using two (2) people, one (1) person carefully places both Hands under the entire spiked section of the folded net and lifts it up while the other person pulls the carrying bag out of the way. Set the carrying bag aside for possible repacking.

RAPID DEPLOYMENT (CONT.)

Step 7 - One (1) user lifts net device up while user 2 pulls carrying bag out of the way (save bag for possible repacking).

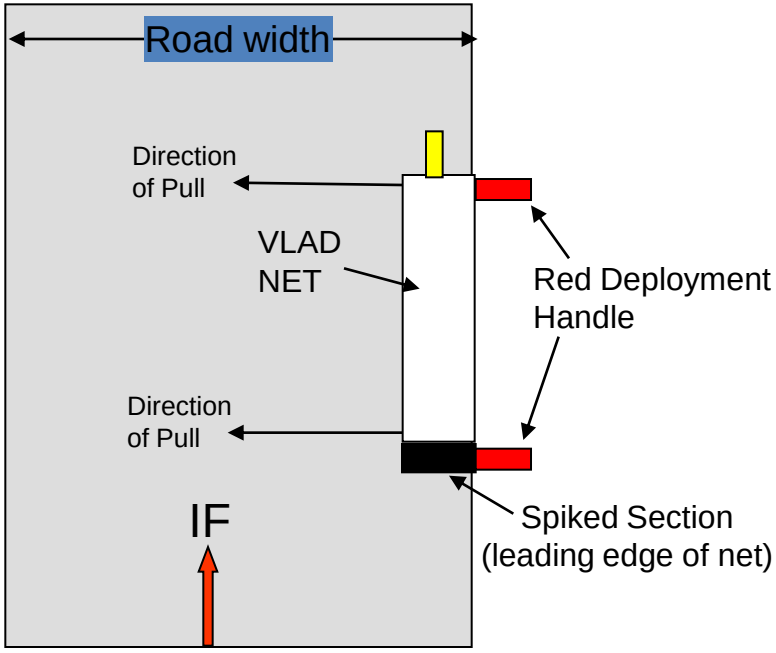
RAPID DEPLOYMENT (CONT.)

Step 8 - One (1) user grabs the two (2) yellow tabs on the spiked End of the net device and pulls it so that the net unfolds (Net should be parallel with the roadside)

Non-Spiked
End of Net

RAPID DEPLOYMENT (CONT.)

Step 9 - Using two (2) people, each user grabs a red deployment handle and pulls the net device across the road so that the barbed spikes on the leading edge of the net are upright and net is pulled tight. Do not remove plastic covers over the barbed spikes. They are designed to crush down and expose the spikes when a tire runs over them



is Direction of Threat Vehicle

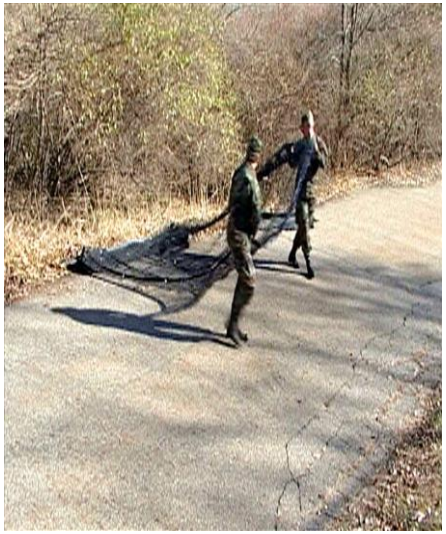
RAPID DEPLOYMENT (CONT.)

Step 10 - Ensure the net is as flat as possible in order to Avoid detection by threat vehicle

WARNING: To prevent injury, DO NOT step on the barbed spikes

RAPID DEPLOYMENT (CONT.)

Step 11 - Once the VLAD is deployed, stand clear of the area



Step 12 - If VLAD was deployed but not used to stop a vehicle, see “Repacking the Net Device”

LANYARD DEPLOYMENT

Step 1 - Determine Direction of the threat vehicle

Step 2 - Place the carrying bag just off the roadway with arrows marked “Towards Target Vehicle” pointing towards the threat vehicle approach, and the pouch marked “Deployment Lanyards” at the roadside

Step 3 - Using thumb and index finger on each side of the buckle, squeeze both buckle releases together to unclip outside Strap on carrying bag. Repeat for second outside strap

LANYARD DEPLOYMENT (CONT.)

Step 4 - Pull open outside Flap #1 and outside Flap #2. Pull open inside Flap #1 and inside Flap #2

Buckle Releases

Buckle on Outside Flap

Carrying Bag

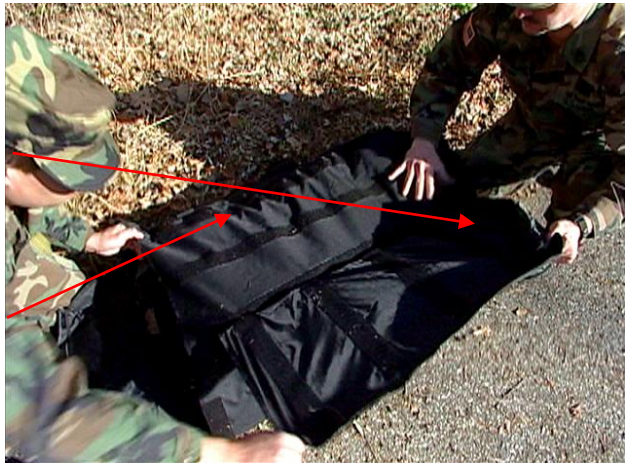
Step 5 - One end of carrying bag is closed with hook and pile closures. To open that end of the carrying bag, pull the hook and pile closures apart and lay it flat

Outside Flap #1

Outside Flap #2

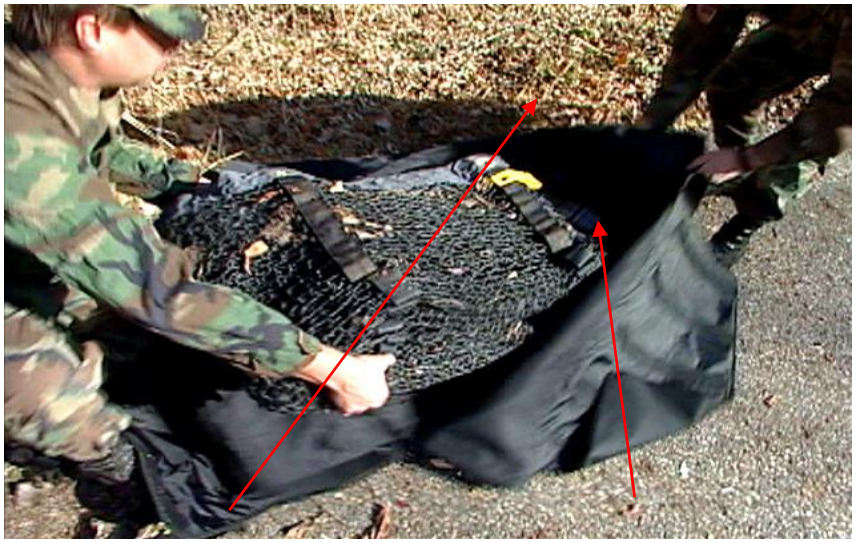
Inside Flap #1

Inside Flap #2



LANYARD DEPLOYMENT (CONT.)

Step 6 - One (1) user lifts net device up while the other user pulls the carrying bag out of the way (save bag for possible repacking)



Yellow Tab

Yellow Tab (Hidden)

Step 7 - One (1) person holds the net in place as the other person Grabs the yellow tabs pulling the net until it is unfolded. The net should be parallel to the roadside

LANYARD DEPLOYMENT

Step 8 - Remove two (2) plastic bags from the pouch on outside of carrying bag marked “Deployment Lanyards.” Remove two (2) plastic anchor pegs, two (2) anchor lanyards, and two (2) deployment lanyards from plastic bags. Place empty plastic bags back in pouch for re-use. Set carrying bag aside for possible re-use

Carrying Bag

“Deployment Lanyards Pouch”

Anchor Lanyards

Anchor Pegs

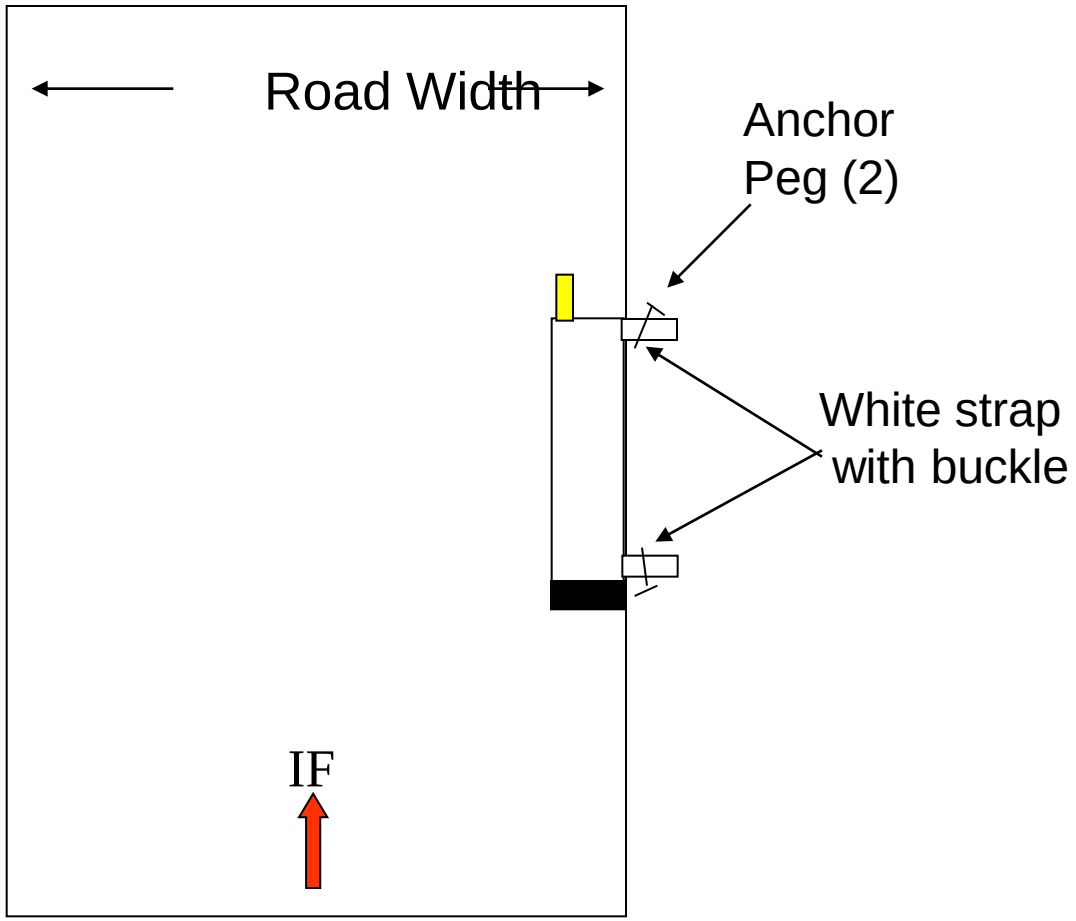
Deployment Lanyards

LANYARD DEPLOYMENT (CONT.)

Step 9 - To anchor the net device, determine if there are soft edges at the side of the road, and take the following actions:

If there are soft edges, use two (2) plastic anchor pegs to secure the net device. Insert a plastic anchor peg through the grommet on the two (2) white straps on the side of the net. Push plastic anchor pegs into the ground. Do not hammer in or force in too deeply (Stopping the vehicle may be effected)

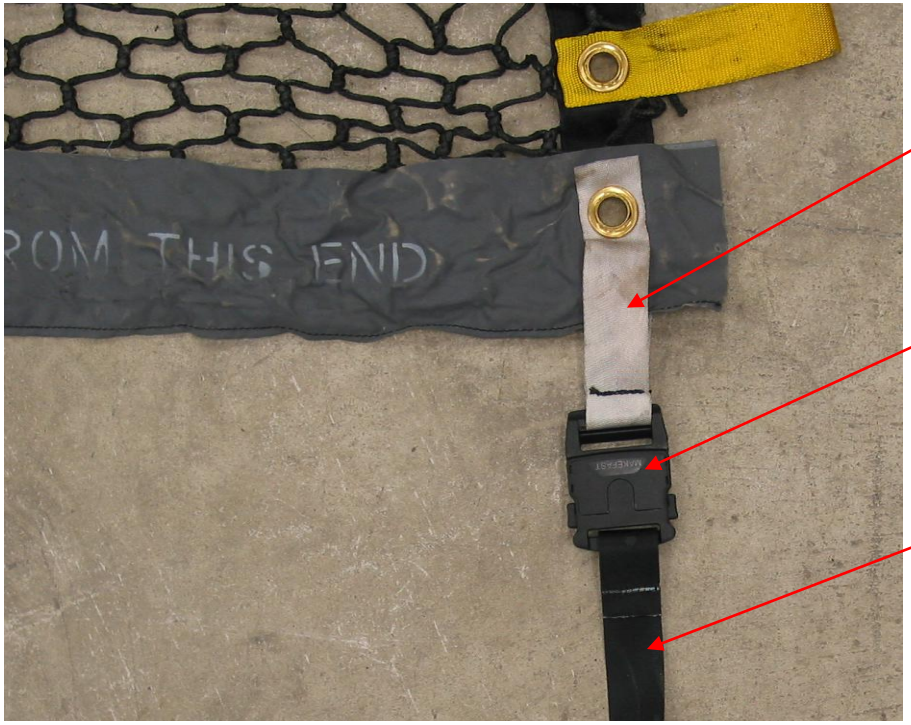
LANYARD DEPLOYMENT (CONT.)



Is Direction of Threat Vehicle

LANYARD DEPLOYMENT (CONT.)

Step 9 (cont.) - If there are no soft edges on the side of the road. Clip an anchor lanyard to the buckle at the end of the white strap on each side of the net device. Run anchor lanyards out to a soft area at a 45^{o} angle and insert an anchor peg into one (1) of the three (3) pre-sewn loops



LANYARD DEPLOYMENT (CONT)

Step 9 (cont) - At both sides of the net, insert an anchor peg into one (1) of the three (3) pre-sewn anchor peg loops on the anchor lanyards. Ensure loop is securely under the hooks at the top of the anchor peg. Using hands, push anchor into ground. Do not hammer in or force in too deeply

LANYARD DEPLOYMENT (CONT.)

Step 10 - Clip a deployment lanyard to each buckle on the end of the two red deployment handles on the net device

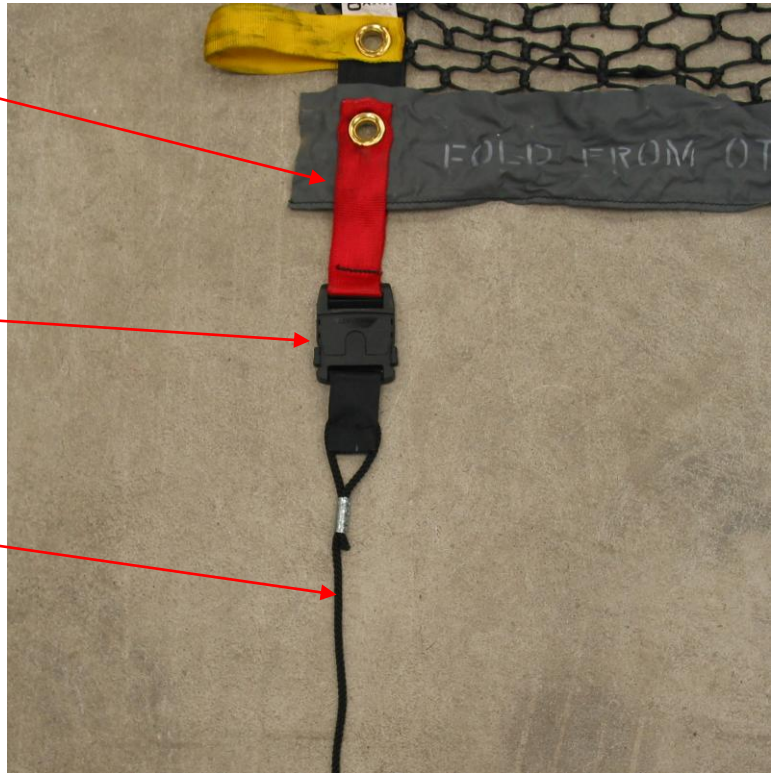
Note:

Anchor lanyards at a 45º angle.

Red Deployment Handle

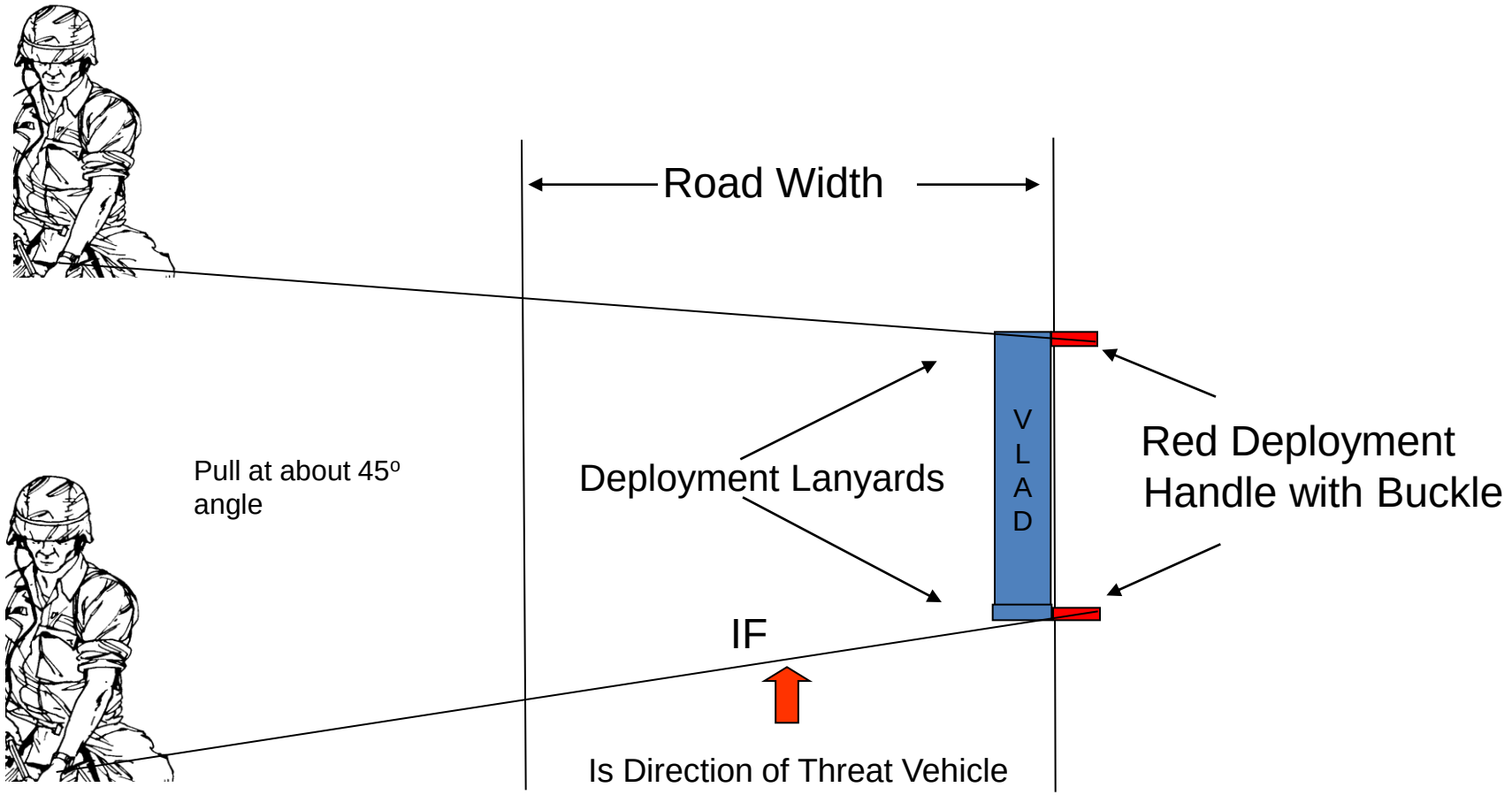
Buckle

Deployment Lanyard



LANYARD DEPLOYMENT (CONT.)

Step 11 - Using two (2) people, each user grabs an end of a deployment lanyard and walks it to the opposite side of the road while keeping the two (2) lanyards at approximately a 45º angle. Do not unfold the net at this time



LANYARD DEPLOYMENT (CONT.)

Step 12 - From hidden vantage point, each user loosely holds the end of a deployment lanyard and awaits a target vehicle. Do not wrap the end of the deployment lanyard around hands or fingers

End of Deployment Lanyards

LANYARD DEPLOYMENT (CONT.)

Step 13 - Just before the target vehicle approaches, both users quickly pull deployment lanyards straight across the road to ensure the leading edge of the net is pulled tight and spikes are upright. Let go of deployment lanyards immediately after deployment of the net device. Stand clear of area

REMOVE NET DEVICE FROM VEHICLE

- Once the occupant (s) of the stopped vehicle have been detained, put on leather gloves and avoid unnecessary handling of the net. Use a sharp knife to remove the bulk of the net from the vehicle tires. Be careful not to step on barbed spikes
- Dispose of the remaining netting to prevent unauthorized re-use
- Recover the vehicle in accordance with local standard operating procedures

REPACKING THE NET DEVICE

Note: Two (2) personnel required to repack the VLAD net device

Step 1 - If the net device was anchored, remove the plastic bags from the pouch outside of carrying bag marked “Deployment Lanyards”. Remove anchor pegs from ground if used. Remove and fold anchor lanyards and deployment lanyards from net device if used. Place the two (2) plastic bags in pouch marked “Deployment Lanyards”

Carrying Bag

Deployment Lanyard Pouch

Anchor Lanyards

Anchor Pegs

Deployment Lanyards

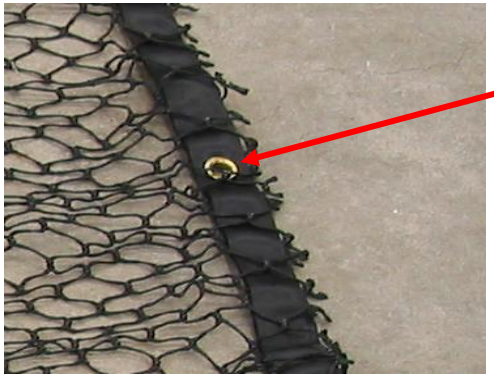
REPACKING THE NET DEVICE (CONT.)

Step 2 - Remove heavy debris from the net. Put on leather gloves

Step 3 - Starting from the end of the net labeled “Fold From This End”, (picture 1 slide 91) one user kneeling down on the non-spiked end of the net using the grommets (picture 2 next slide) as the folding points and another person kneeling down on the spiked end of the net using the half–circle indentations (picture 3 slide 92) as folding points. Both people place one (1) hand on a white strap to keep the net in place and begin folding the net in an “accordion” pattern by pulling and dragging the net (pictures 4 and 5 slide 93)

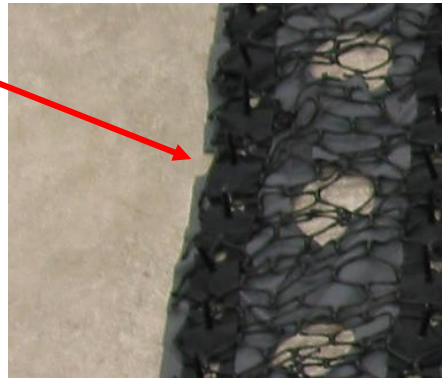
REPACKING THE NET DEVICE (CONT.)

Fold from this end



Picture 2

Picture 1



Picture 3

REPACKING THE NET DEVICE (CONT.)

Picture 4

Picture 5

REPACKING THE NET DEVICE (CONT.)

Step 4 - Continue folding the net into equal sections the same width as the bag while ensuring the folded spiked sections of the net are neatly placed on top of each other (picture 6). Using folding points, continue to drag and fold the net ensuring spiked sections are folded neatly on top of each other until there is only one (1) net section to be folded

Picture 6

REPACKING THE NET DEVICE (CONT.)

Step 5 - Using a red deployment handle, lift up the last net section and place it over the spiked section so that spikes are pointed down into the bulk of the folded net (picture 7). Net should look like (picture 8)

Picture 7

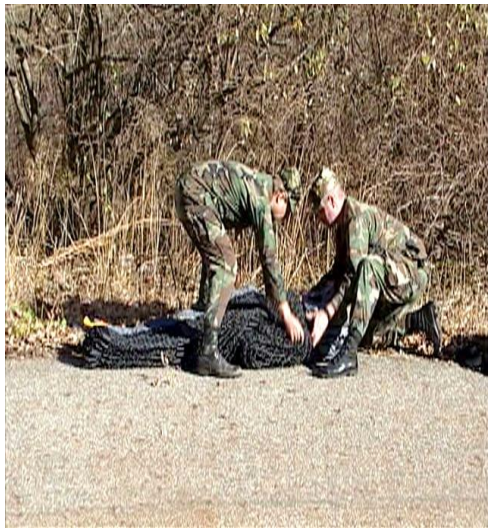
Picture 8

REPACKING THE NET DEVICE (CONT.)

Step 6 - User at the spiked section will make an indentation in the net just behind line “B” (picture 9). The other user will place both hands under line “A” area of the net and lift up bringing the folding line “A” up to meet line “B” (pictures 10 and 11)

Picture 9

Picture 10



Picture 11

REPACKING THE NET DEVICE (CONT.)

Step 7- User lifts up one (1) non-spiked end (last section) of the net and folds it over the spiked section (picture 12) completing the fold

Picture 12

Picture 13

REPACKING THE NET DEVICE (CONT.)

Step 8 - Obtain carrying bag, place behind folded net and fully open bag. Both users will place both hands under entire folded section. Lift net and place the spiked end section into the end of the carrying bag marked “Spikes This End” (picture 14). Ensure all net is neatly packed in the carrying bag

Picture 14

REPACKING THE NET DEVICE (CONT.)

Step 9 - Close the side of the carrying bag using hook and pile tapes

Step 10 - Place inside Flap #2 over the net. Place inside Flap #1 over inside Flap #2. Secure with hook and pile tapes

Inside Flap #1

Inside Flap #2

REPACKING THE NET DEVICE (CONT.)

Step 11 - Place outside Flap #2 over the inside flap. Fold outside Flap #1 over all. Using hook and pile tapes to secure

Outside Flap #1

Outside Flap #2

REPACKING THE NET DEVICE (CONT.)

Step 12 - Clip the buckles together on the two (2) outside straps to secure carrying bag

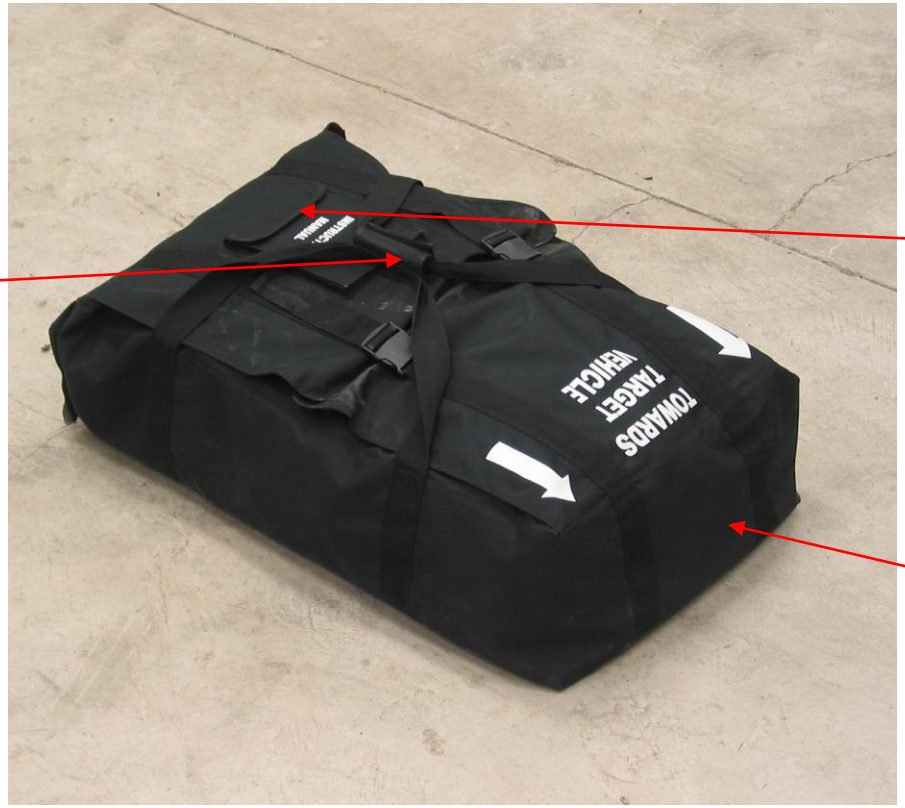
Buckle on Outside Strap

Carrying Bag

REPACKING THE NET DEVICE (CONT.)

Step 13 - Place the Instruction Manual in the pouch on top of the carrying bag

Step 14 - Bring the two (2) carrying straps up over the carrying bag and secure with the handle wrap



SUMMARY/REVIEW

- Employ the PVAB
- Employ the VLAD