4th Brigade
Junior Reserve Junior Reserve Officers’ Training Corps (JROTC)
RAPPELLING PROCEDURES

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Purpose: To provide guidance for the conduct of Rappelling operations by Cadre and Cadets of 4th Brigade Reserve Officers' Training Corps (JROTC).

Section I

PERSONNEL

1. The following personnel will be required to conduct rappel training:

a. Rappel Master / Rappel Safety Officer (RSO) – Rappel Master/RSO refers to Army/Cadet Command Rappel Master or Rappel Safety Officer certified personnel specifically. The rappel master/RSO is responsible for the safety of rappellers. He ensures that all equipment (installation, unit, and personal property) is serviceable. He personally supervises the rappelling operation. The primary rappel master/RSO will not perform the duties of OIC.

b. Officer in Charge – the OIC must be a SFC or above. The OIC is responsible overall for the safety of all rappellers and ensures that all safety precautions are followed. The OIC briefs VIPs, visitors, and inspecting authorities on training, safety requirements, and layout of training areas. In addition, the OIC will be responsible for completing a risk assessment and ensuring risk management guidelines are followed. It is also the responsibility of the OIC to ensure that prior to training, a rappel operations safety brief is read to all personnel participating in training. OIC should not perform the duties of rappel master/instructor.

c. Rappel Lane Officer/RSO - Safety is the rappel lane Officer's/RSO’s number one priority. For the conduct of all rappelling operations, the rappel lane Officer/NCO must be Rappel Master/RSO certified. The rappel lane Officer/NCO may be the on-site rappel master/RSO if no other trained personnel are available. The rappel lane Officer/NCO:

- Ensures proper safety procedures are followed.
- Ensures proper hookup once directed to a rope station.
- Issues commands and maintains eye contact with the rappeller at all times.
- Is responsible for safety requirements in his lane.
- Inspects all equipment used on his lane.
- Ensures anchor points are satisfactory.
- Is able to Identify safe and unsafe hookups.
- Establishes the rappel point.
- Inspects rappel seats.
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- Understands emergency procedures.
- Understands belay control procedures.

d. **Belay Control/Safety Officer/NCO** – Ensures belay personnel are performing their duties properly. Rappel training requires one belay safety for each two rappel stations.

e. **Belay personnel** – There will be an individual performing belay duties on each rope at all times while rappel training is being conducted. All belay personnel will receive training in belay procedures prior to performing belay duties.

f. **Rappeller** - Rappel qualification requirements apply to the individual rappeller. Participants in tower rappel training must complete the following requirements prior to being allowed on the tower. The Senior Army Instructor ensures that personnel successfully complete these requirements.

- Identify all rappelling equipment.
- Demonstrates correct wear of the rappel harness.
- Identify unsafe attachments, equipment, rope connections, and harness wear.
- Define terms used in rappelling operations.
- Identify knots used in rappel operations.
- Understand and demonstrate rappel commands.
- Demonstrate rappelling positions.
- Demonstrate belaying procedures.
- Demonstrate the ability to lock in.

g. **Medic** – There must be at least one Army Medic, Combat Lifesaver, or civilian EMT with current certification on site at all times. Medic will have a minimum of a backboard, neck collar, dedicated evacuation vehicle and a strip map to the nearest medical facility.

**Section II. SAFETY PROCEDURES**

The rappel master/RSO ensures participants have a basic understanding of requirements and safety procedures before conducting training.

1. The following personnel and equipment must be present during tower training.

- Two Static rappel ropes for each rappel station long enough to be secured to at least two anchor points and with a minimum of 10 feet extra upon reaching the base of the tower.
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- One OIC
- One rappel master/RSO.
- One rappel lane Officer/RSO per rappel station.
- One medic with medical kit and backboard.
- One safety or medical evacuation vehicle with driver.
- One belayer for each rope station.
- One belay safety for each two rappel stations.

2. All Cadre, cadets and other participants will observe the following safety procedures when training on the rappel tower or rappel site:

a. Loose clothing and equipment will be secured.

b. Rappel Harness will be donned by the individual and checked by a rappel master/RSO prior to conducting a rappel.

c. Rappellers will climb the tower or move to the edge of the rappel site only when told to do so by a rappel master/RSO/SAI/AI.

d. On the tower Rappellers will stay behind the yellow line until told to move to a rappel point by a rappel master/RSO/SAI/AI.

e. No one will be allowed within three feet of the edge of the tower or rappel site without being secured to the tower unless moving to a hook up point.

f. Rappel masters/RSOs will wear a safety line secured to their rappelling harness and secured to an anchor point while on the rappel tower. There will be a minimum of one recovery line per two rappel ropes already secured to anchor points prior to the start of rappelling operations for rappeller recovery.

g. No one will be allowed to sit or lean on the railings or banisters located on the top of the tower.

h. When hooking up to the rappel rope, the hand between the rappeller and anchor point pulls pulls the slack towards the anchor point, rotates the slack under and then over the snaplink and through the gate.

i. Any rappeller weighing over 190 lbs. may use a double wrap around the snaplink.

j. Heavy-duty gloves designed for rappelling are required for all tower rappel training. All rappellers will wear gloves.
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k. While on the tower, the rappeller will maintain eye to eye contact with the rappel master/RSO at all times and take all commands from the rappel master/RSO.

l. Both rappeller and rappel master/RSO will insure that belay personnel are present and ready at the base of the tower or rappel site.

m. The belay personnel will not wear gloves and will keep both hands in a loose spot weld on the ropes at all times. Belay personnel will also keep his/her head and eyes on the rappeller at all time.

n. Running is prohibited on the tower. Running is prohibited in the area around the tower.

o. Eating is prohibited on or near the tower.

p. Anyone observed intentionally committing an unsafe act that might endanger his/her own life or the life of those around him/her will be removed from the tower or rappel site.

3. Rappellers at the top of the tower must be able to communicate with the belayers at the bottom. The following commands will be used during all rappel training.

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<th>COMMAND</th>
<th>GIVEN BY</th>
<th>MEANING</th>
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<tr>
<td>LANE NUMBER ____, ON RAPPEL</td>
<td>Rappeller</td>
<td>I am ready to begin rappelling.</td>
</tr>
<tr>
<td>LANE NUMBER ____, ON BELAY</td>
<td>Belayer</td>
<td>I am on belay and you may begin your rappel.</td>
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<tr>
<td>LANE NUMBER ____, OFF RAPPEL</td>
<td>Rappeller</td>
<td>I have completed the rappel, cleared the rappel lane, and am off the rope.</td>
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<tr>
<td>LANE NUMBER ____, OFF BELAY</td>
<td>Belayer</td>
<td>I am off belay.</td>
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4. See Appendix 1 - Safety Briefing for mandatory safety briefing which must be read to all participants at the rappelling site, whether or not they will be descending the tower.

5. See Appendix 2 - Rappeller Recovery Procedures for emergency procedures in the case of a rappeller becoming possum (slides backwards down
the rope before bounding and ends upside down) or hung due to an obstruction in their snaplink or decender.

6. See *Appendix 3 - Rope Management* for rope care and maintenance and use of the DA Form 5752-R (Rope History and Usage) form. All ropes used for rappelling will have their DA Form 5752-R logged into this SOP.

### Section III

**TOWER SAFETY AND PREPARATION**

1. The rappel master/RSO is in charge of the tower. He conducts a visual and physical inspection of every item of equipment to include the structural lumber and timber, the ladder, the platform floor, and all anchor points. See *Appendix 4 - Cadet Command Rappel Site Inspection Checklist*. This checklist must be completed prior to each use of the Tower.

   a. The static tower will not be used during thunderstorms or excessively high winds. If ice is present, or if the platform is slick from rain, rappelling will be delayed until conditions are safe.

   b. All rope stations are rigged with two anchor points (Figure 1-2A, B, C). The first anchor point is a middle-of-the-rope knot, and the second is an end-of-the-rope anchor knot. Two carabiners are placed in each anchor point so the gates are opposite (form an —X when opened). Ropes are rigged for one primary and one secondary anchor. The anchor knots are tied using one of the approved anchor knots (See Appendix 5 – Rappelling Knots). The loop of the anchor knots will be placed into the carabiners at the anchor, ensuring the gates are closed. One carabineer is rotated, ensuring the gates are on opposite sides.

   c. The rappel master/RSO removes all the slack between the knots to create equal tension on the anchor points. He ensures that no less than 10 feet of rope is on the ground during static rappelling.
Section IV
RAPPELLING PROCEDURES

1. All rappelling from the tower will be conducted using the SEAT-HIP RAPPEL. No other type of rappel (Hasty, Australian or Body rappels) are allowed.

2. All rappellers **MUST** use a certified seat harness for rappelling. **Swiss Seats are not authorized.** All rappellers will be checked for correct wear of the seat harness by a 4th Brigade certified Rappel Master/RSO prior to reporting to the tower stairs for accent.
3. Step by Step instructions for how to wear and care for a seat harnesses may be found in *Appendix 6 - Rappel Harness Wear and Care.*

4. **Mounting the Tower.**

   a. Before climbing the stairs, the safety OIC or other SAI/Al rechecks each rappeller’s equipment.

   b. The rappeller kicks all dirt and debris off his boots before climbing.

   c. The rappeller grasps the railings as appropriate.

   d. Just before climbing, the rappeller sounds off, "(name) climbing," and then begins climbing. Once at the top and clear of the stairs, the rappeller sounds off, "(name) clear."

   e. Once off the stairs, the rappeller waits until the rappel master/RSO or lane Officer/NCO directs him to proceed to a rope station.

5. **Tower Procedures**

   After the rappellers climb the tower, the following procedures are adhered to:

   a. Once directed to a rope station, the Rappel Master/RSO or lane Officer/NCO ensures proper hookup for rappelling using the following steps:

      (1) Rappel master/RSO has the Rappeller approach and announces his/her brake hand, holding hands at eye level. RM/RSO reaches out and grasps the brake hand with his hand and ensures the break hand is on the side of the rappeller closest to the tower edge.

      (2) Inspects the gloves for serviceability (no holes, cuts, tears, etc)

      (3) Inspects the helmet for serviceability and fit

      (4) Inspects the Rappeller from the head to the waist to ensure there are no hazards that would damage the equipment or harm the Rappeller.

      (5) Inspects the rappel harness:

          1. Ensures the seat harness is properly fitted, leg and waist loops are tight, waist web loop is fed back through the harness buckle, and the remaining waist web loop is tied in an overhand knot.

          2. Pulls the snaplink left and right to ensure the link is securely in the harness ring. Ensures the carabiner gate is up and opens easily down and away from the Rappeller.
3. Tells the Rappeller to squat, checks to ensure the leg harness webbing is not crossed.
4. Tells the Rappeller -“Stand, turn, bend and place your brake hand on your head”
5. Traces down the brake hand side to ensure there is nothing that will obstruct the brake hand or presents a potentially hazardous situation.
6. Tugs the leg and waist webbing to ensure the seat is tight
7. Advises the Rappeller the seat is good and proceeds with the hookup.

b. Rappel Hookup

To hook up using the seat-hip method, the rappel master/RSO or rappel lane officer/NCO performs the following:

**SNAP LINK HOOKUP**

(1) The rappeller identifies his break hand and stands facing the Rappel Master/RSO with the brake hand away from the tower and towards the decent wall.

(2) The rappel master/RSO verifies the snaplink has a positive locking mechanism and is properly attached to the rappel harness.

(3) RM/RSO grasps the two ropes with both hands and drops them through the gate of the snaplink. (At this point, two ropes should be running through the snaplink.)

(3) Using the hand closest to the anchor point, pull the slack towards the anchor point. Rotate the slack under and then over the top of the snaplink.

(4) Drop the two ropes a second time through the gate of the snaplink. (At this point, four ropes should be running through the snaplink.)
(5) RM/RSO locks the carabineer.

(6) Have the rappeller place the guide hand on the rope between the anchor point and the snaplink (palm facing up).

(7) Have the rappeller place the brake hand around the running end of the rope (palm facing down). Place the brake hand with the rope in the small of the back.

**FIGURE ‘8’ DECENDER HOOKUP**

(1) The rappeller identifies his break hand and stands facing the Rappel Master/RSO with the brake hand away from the tower and towards the decent wall.

(2) Hold the Figure —8decender in one hand with the larger eye opening toward the Rappel Master/RSO. Grasp the two ropes with one hand and feed a bight up through the large eye and then slip the bight over the smaller eye.
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(3) Place the smaller loop of the Figure —8decender into the locking carabineer on the rappeler’s harness

(4) Lock the carabineer.

(5) Have the rappeller place the guide hand on the rope between the anchor point and the figure 8 decender (palm facing up).

(7) Have the rappeller place the brake hand around the running end of the rope (palm facing down). Place the brake hand with the rope in the small of the back.

Note on Figure 8 Decenders: If you have very light cadets or wish to reduce the amount of friction on the rope (note that less friction will require more braking force by the cadet), you may want to rig the figure 8 in the following manner.
Both methods of rigging are correct and will provide a safe rappel.

(1) Connect the small eye of the Figure 8 decender to the locking carabiner.
(2) Grasp the two ropes with one hand and feed a bight up through the large eye and then into the locking carabiner.
(3) Lock the Carabiner.

**c. Rappeller Actions**

(1) At this time, the rappeller sounds off with "Lane Number ___, On Rappel" and the belayer sounds off with "Lane Number ___, On Belay."

(2) While maintaining his brake, the rappeller (on command from the rappel master or lane OIC/NCO) moves to the edge of the tower and turns and faces the anchor point.

(3) At this point, the Rappel Master/RSO or lane Officer/NCO sounds off with the following verbal commands and arm-and-hand signals.

(a) "Get Ready"—Rappel Master/RSO or lane Officer/NCO extends both arms to the front with fists clenched and thumbs pointing upward (Figure 2-1). This alerts the rappeller. The rappeller then looks over his brake hand shoulder to check for the belay man. The rappeller then looks at the rappel master. The Rappel Master/RSO makes his second check of the hookup, rappel seat, snaplink, and equipment. Rappel Master/RSO looks over the edge of the tower and ensures the belay is looking up.

(b) "Position"—With the brake hand in the small of the back, the rappeller rotates 180 degrees out onto the wall and assumes an L-shaped position. The feet should be shoulder width apart, balls of feet on the wall or skid, knees locked, and body bent at the waist (Figure 2-2).
Figure 2-2. L-shape position.

(3) “Go”—This initiates the rappel. The rappeller flexes his knees and walks down the tower. The rappeller looks over his brake hand shoulder at all times during descent.

(4) The rappeller descends in a smooth, controlled manner.

(5) The rappeller maintains eye contact with the ground at all times.

(6) The rappeller maintains a modified L-shape position during descent with the feet shoulder-width apart, knees flexed, and buttocks parallel to the ground (Figure 2-3).

Figure 2-3. L-shape position while rappelling.

(7) The rappeller’s back is straight. He looks over the brake hand shoulder.

(8) The guide hand is extended on the rope with the elbow extended and locked.

(9) The rope slides freely through the guide hand, which is used to adjust equipment and to assist in balance during descent.
10. To brake, the rappeller places the brake hand (with rope in hand) in the small of the back and then grasps the rope firmly with the brake hand.

**Note:** Do not grip the rope firmly with the brake hand while the brake hand and brake arm are extended at the 45-degree angle. If this is done while rappelling, the brake hand and glove may become entangled in the snaplink causing injury to the hand and causing the rappeller to become hung up on the ropes.

11. Releasing tension on the rope and moving the brake hand out to the rear at a 45-degree angle regulates the rate of descent.

12. The rappeller never lets go of the rope with his brake hand until the rappel is completed.

13. Upon reaching the ground, the rappeller releases his brake and guide hands and places them over the rope on top of his snap link. The rappeller then walks backwards until the rope is cleared through the snaplink.

14. Once clear of the rope, the rappeller sounds off with "Lane Number ___, Off Rappel" and the belayer then sounds off with "Lane Number ___, Off Belay."

d. **Belayer Actions**

Prior to the rappeller sounding off, the belayer –

1. Wears a helmet to prevent injuries from falling debris.

2. Does not wear gloves to ensure a firm grip on the rappelling rope.

3. Assumes a position at the base of the lane about one pace away from the tower area.

4. Ensures that the rappel ropes are even with the ground during tower rappels.

5. Loosely holds the rappel rope with both hands so as not to interfere with the rappeller but still be able to stop the rappeller should he fall.

Upon hearing the rappeller sound off with "Lane Number ___, On Rappel" and the belayer responding by sounding off with "Lane Number ___, On Belay," the belayer—

1. Watches the rappeller at all times, and maintains constant voice or visual contact.
2) Immediately stops the rappeller by pulling downward on the rappel ropes if the rappeller shouts "falling" or loses control of his brake hand during descent.

3) After fallen rappeller regains control of the rappel, slowly feeds slack to the rappeller to allow completion of the rappel.

4) Once the rappeller has reached the ground, drops the rope and steps out of the way so the rappeller can clear the rope if using a snaplink rappel or unhooks the figure 8 decender if used.

5) Once rappeller has cleared rope and sounded off —Lane Number ____, Off Rappel," responds by sounding off —Lane Number _____, Off Belay."

Section V
MEDEVAC PROCEDURES

MEDEVAC Procedures:

a. Medical assistance will be available on site for all rappel operations.

b. The senior medic on site will determine the need for evacuation and notify the OIC before leaving the site. When medical personnel leave the site, training will cease until coverage is restored.
APPENDIX 1 - SAFETY BRIEFING

RAPPEL SAFETY BRIEFING

The following safety briefing will be given to all personnel when rappelling:

1. Obey all commands from the Tower Rappel Master/RSO, Officer in Charge, NCO in Charge and other JROTC Cadre.

2. Protective headgear and gloves will be worn during rappelling.

3. Beware of falling objects from the tower or rappeller.

4. Horseplay and unprofessional conduct will not be tolerated.

5. No running is allowed on the tower.

6. No eating is allowed near the tower.

7. Double-lines will be used for all rappelling.

8. No unauthorized rappelling methods, i.e. Australian, Inverted, Body, etc. are allowed.

9. Safety personnel and the Tower OIC/NCOIC will inspect all harnesses, swiss seats and hookups prior to rappelling.

10. Do Not climb the tower until told to do so.

11. While on the tower, the rappeller maintains eye contact with the Rappel Master/RSO or rappel lane OIC/NCO and receives all commands from them.

12. No more than three personnel are authorized on the tower roof at a time. Wait for the command from the Rappel Master/RSO or tower OIC/NCOIC before climbing onto the roof.

13. Stay in the center of the tower until instructed to move to the rappel point.

14. The rappeller ensures that he has a belayer on his rope.

(Continued on Next Page)
15. The belayer does not wear gloves and keeps both hands on the rope at all times. He also faces the rappeller at all times.

16. Prior to rappelling, give the command, "Lane Number ____, On Rappel" to the Belayer on the ground. Wait for his response of "Lane Number ____, On Belay" prior to starting your rappel. Upon reaching the ground and clearing the rope, sound off with "Lane Number ____, Off Rappel". The Belayer will sound off with "Lane Number ____, Off Belay".

17. No single-bounds are permitted to the ground.

18. No equipment rappels are authorized.

19. Remove all keys, change, etc. from your pockets prior to rappelling.

20. Ensure loose clothing is well tucked in.

21. All participants who are unable to rappel, lack confidence, or refuse to rappel will not be forced. NO ONE is forced to complete a rappel.
APPENDIX 2 – Rappeller Recovery Procedures

POSSUM

1. When a rappeller becomes possum (slides backwards down the rope before bounding and ends upside down), the Rappel Master/RSO /instructor will immediately instruct the possum rappeller to “freeze” and establish and maintain eye contact with the rappel master/instructor.

2. The Rappel Master/RSO will tell the rappeller to show him the snap link by removing the guide hand from the rope. This should allow the rappel master to inspect the snap link. The Rappel Master/RSO inspects the snap link to ensure that it has not inverted and that it is not open.

    a. If the snap link has not inverted and it is not open, the Rappel Master/RSO directs the possum rappeller to place the guide hand back on the rope and instructs the rappeller to continue the rappel to the ground.

    b. If the snap link has inverted or has opened, the Rappel Master/RSO will lower the possum rappeller a recovery line which the possum rappeller will hook to the metal D ring of their rappel harness, using the snap link attached to that recovery line. If the possum rappeller is not able to snap in due to fear or another concern, the Rappel Master/RSO will rappel down to the site of the possum rappeller and connect them to the safety line. If there are additional rappel masters (RSO)/SAIs/AIs on the tower, they all assist in pulling the possum rappeller back up to the top of the tower. If there are no other rappel masters (RSO)/SAIs/AIs, other rappellers may be used to assist. It is mandatory that any personnel assisting in the recovery of a possum rappeller have a safety line attached from them to the tower.

HUNG RAPPELLER

There are many reasons that a rappeller may become hung up during a rappel and not be able to continue their decent. These include fear – rappeller freezing on the rope, as well as objects of clothing or hair becoming wedged in the carabeener or figure 8 decender. Below is one method of freeing a hung rappeller who has had his/her carabeener or figure 8 decender jammed with a foreign object.

Option 1 – Free the obstruction from the carabiner or figure 8.

    a) Belayer puts pressure on the rope to keep the rappeller steady.

    b) Using the back-up safety line, the Rappel Master/RSO rappels down so he/she is even or just slightly above the hung rappeller, but within easy reach of the obstruction on the rappellers equipment.
c) The Rappel Master/RSO then locks him/herself into their rappel rope using either an acender (see directions that come with the decender for correct usage), or by locking off using a leg wrap using the following steps:

1. Stop. Place your guide hand next to your brake hand to take the belay and slide your break hand up the rope until it is directly under the snaplink or figure 8 decender and hold it with a secure break hand grip.

2. Reach between legs with non-brake hand and pull rope forward between legs. Pass the rope outward to the brake side of the rope and wrap it around the upper thigh five times. Keep the wraps as high on the thigh as possible and dress the wraps.

3. Drape the rope that is hanging down from the leg wrap across your chest and over the shoulder that is opposite of the leg with the rope wrapped around it and then down your back.

4. After visually checking to see that you have done this correctly, you may release your break hand.

d) Using a snaplink, the Rappel Master/RSO clips his rappel rope to that of the hung rappeller to keep them together and attempts to free the obstruction. If it cannot be freed easily, it may be necessary to tie a safety line that has a loop on the end to the rappeller rope using a left or right hand accender if available. If the RM/RSO does not have an accender a prussik knot can be used. The rappeller than can step into the loop and, raising themselves up, take pressure off the carabiner or figure 8 decender. Ensure to have the belayer ease up on the pressure on the belay.

e) Once the rappel master/RSO has freed the rappeller, it is time to remove the leg wrap. It is critical that one of your hands securely grips the rope directly under your rappel device with a secure brake hand grip prior to beginning to remove the leg wraps. Once you have a secure break hand grip, remove the leg wrap by by following the sequence you used to put it on backwards.
APPENDIX 3 - ROPE MANAGEMENT

The rope is a vital piece of equipment to the rappeller. When rappelling, the Rappel Master/RSO must know how to properly utilize and maintain this piece of equipment. If the rope is not managed or maintained properly, serious injury may occur.

The service life of a rope depends on the frequency of use, applications (rappelling, climbing, rope installations), speed of descent, surface abrasion, terrain, climate, and quality of maintenance. Any rope may fail under extreme conditions (shock load, sharp edges, misuse).

1. PREPARATION

The proper rope must be selected for the task to be accomplished according to type, diameter, length, and tensile strength. It is important to prepare all ropes before departing for training.

   a. Packaging. New rope comes from the manufacturer in different configurations—boxed on a spool in various lengths, or coiled and bound in some manner. Precut ropes are usually packaged in a protective cover such as plastic or burlap. Do not remove the protective cover until the rope is ready for use.

   b. Securing the Ends of the Rope: If still on a spool, the rope must be cut to the desired length. All ropes will fray at the ends unless they are bound or seared. Both static and dynamic rope ends are secured in the same manner. The ends must be heated to the melting point so as to attach the inner core strands to the outer sheath. By fusing the two together, the sheath cannot slide backward or forward. Ensure that this is only done to the ends of the rope. If the rope is exposed to extreme temperatures, the sheath could be weakened, along with the inner core, reducing overall tensile strength. The ends may also be dipped in enamel or lacquer for further protection.

2. CARE AND MAINTENANCE

The rope is a rappeller's lifeline. It must be cared for and used properly. These general guidelines should be used when handling ropes.

   a. Do not step on or drag ropes on the ground unnecessarily. Small particles of dirt will be ground between the inner strands and will slowly cut them.
b. While in use, do not allow the rope to come into contact with sharp edges. Nylon rope is easily cut, particularly when under tension. If the rope must be used over a sharp edge, pad the edge for protection.

c. Always keep the rope as dry as possible. Should the rope become wet, hang it in large loops off the ground and allow it to dry. Never dry a rope with high heat or in direct sunlight.

d. Never leave a rope knotted or tightly stretched for longer than necessary. Over time it will reduce the strength and life of the rope.

e. Never allow one rope to continuously rub over or against another. Allowing rope-on-rope contact with nylon rope is extremely dangerous because the heat produced by the friction will cause the nylon to melt.

f. Inspect the rope before each use for frayed or cut spots, mildew or rot, or defects in construction (new rope).

g. The ends of the rope should be whipped or melted to prevent unraveling.

h. Do not splice ropes for use in rappelling.

i. Do not mark ropes with paints or allow them to come in contact with oils or petroleum products. Some of these will weaken or deteriorate nylon.

j. Never use a rappelling rope for any purpose except rappelling.

k. Each rope should have a corresponding rope log (DA Form 5752-R, Rope History and Usage), which is also a safety record. It should annotate use, terrain, weather, application, number of falls, dates, and so on, and should be annotated each time the rope is used (Figure 1-1). DA Form 5752-R is authorized for local reproduction on 8 1/2- by 11-inch paper.
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1. Never subject the rope to high heat or flame. This will significantly weaken it.

m. All ropes should be washed periodically to remove dirt and grit, and rinsed thoroughly. Commercial rope washers are made from short pieces of modified pipe that connect to any faucet. Pinholes within the pipe force water to circulate around and scrub the rope as you slowly feed it through the washer. Another method is to machine wash, on a gentle cycle, in cold water with a nylon safe soap, never bleach or harsh cleansers. Ensure that only front loading washing machine are used to wash ropes.

n. Ultraviolet radiation (sunlight) tends to deteriorate nylon over long periods of time. This becomes important if rope installations are left in place over a number of months.

o. When not in use, ropes should be loosely coiled and hung on wooden pegs rather than nails or other metal objects. Storage areas should be relatively cool with low humidity levels to prevent mildew or rotting. Rope may also be loosely stacked and placed in a rope bag and stored on a shelf. Avoid storage in direct sunlight, as the ultraviolet radiation will deteriorate the nylon over long periods.

3. INSPECTION

Ropes should be inspected before and after each use, especially when working around loose rock or sharp edges.
a. Although the core of the kernmantle rope cannot be seen, it is possible to damage the core without damaging the sheath. Check a kernmantle rope by carefully inspecting the sheath before and after use while the rope is being coiled. When coiling, be aware of how the rope feels as it runs through the hands. Immediately note and tie off any lumps or depressions felt.

b. Damage to the core of a kernmantle rope usually consists of filaments or yarn breakage that results in a slight retraction. If enough strands rupture, a localized reduction in the diameter of the rope results in a depression that can be felt or even seen.

c. Check any other suspected areas further by putting them under tension (the weight of one person standing on a Prusik tensioning system is about maximum). This procedure will emphasize the lump or depression by separating the broken strands and enlarging the dip. If a noticeable difference in diameter is obvious, retire the rope immediately.

d. Many dynamic kernmantle ropes are quite soft. They may retain an indentation occasionally after an impact or under normal use without any trauma to the core. When damage is suspected, patiently inspect the sheath for abnormalities. Damage to the sheath does not always mean damage to the core. Inspect carefully.
**RAPPELLING PROCEDURES**

<table>
<thead>
<tr>
<th>UNIT ID MARKING</th>
<th>ROPE LOG (USAGE AND HISTORY)</th>
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<tbody>
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- **Instructions for inspection and handling of ropes**:
  - Immediately retire all suspect ropes.
  - Inspect rope for damage or excessive wear even if deployed and again after each use.

<table>
<thead>
<tr>
<th>DAMETER</th>
<th>CONSTRUCTION</th>
<th>COLOR</th>
<th>ISSUE DATE</th>
<th>DATE OF INF</th>
<th>SERIAL NUMBER</th>
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For use of this form, see FM 3-7.6, the Proponent agency is TRADOC.
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**Rappelling Procedures**

<table>
<thead>
<tr>
<th>MANUFACTURER</th>
<th>DATE USED</th>
<th>LOCATION</th>
<th>TYPE OF USE</th>
<th>DATE INSPECTED</th>
<th>ROP CONDITION</th>
<th>ROP COMMENTS AND COMMENTS</th>
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APPENDIX 4 - CADET COMMAND RAPPEL SITE INSPECTION CHECKLIST

CADET COMMAND RAPPEL SITE INSPECTION CHECKLIST

GENERAL INFORMATION

Name and Location of Tower: _________________________________

Date of Tower Construction: ________________________________

Built by: ________________________________________________

Owned by: ______________________________________________

Last Date of Any MAJOR Modifications:
(If applicable, list modification, and by whom performed, in addition to date; otherwise list Not Applicable.)

Date of Previous Inspection:

Name, Title, and Organization of Previous Inspector:

Is a copy of previous inspection available?

TOWER INSPECTION CRITERIA

Is the tower structurally sound? Do structural support members appear serviceable, free from deterioration, breaks, or damage? Yes / No

Are there any signs of insect infestation? [29CFR1910.141(a)(5)] Yes / No

Are bolts that connect structural members or support cables serviceable and properly connected/tightened? Yes / No

Are stairs or ladders firmly attached to the tower? Yes / No

Do stairs/fixed ladders comply with OSHA standards? [29CFR1910.24 and 1910.27] Yes / No

Are all areas marked in yellow that pose a potential trip hazard or head hazard? [29CFR1910.144(a)(3)] Yes / No

Are the tower platform and all rappel rope stations accessible without having to climb over any obstacles (guard rails, support cables, etc.)? Yes / No
Is the tower deck free of slip/trip hazards such as water, protruding nails/bolts/splinters, loose equipment, etc? [29CFR1910.141(a)(3)(ii) and (iii)] Yes / No

Are the tower deck and any open areas (above 4’) guarded with guardrails? [29CFR1910.23(c)(1)] Yes / No

Are all guardrails a minimum of 42” high and capable of withstanding a side force of 200 lbs? [29CFR1910.23(e)(1) and (e)(3)(iv)] Yes / No

Are toe boards or similar barriers installed in all areas where personnel could pass underneath? [29CFR1910.23(c)(1)] Yes / No

Do all tower rope stations have primary and secondary anchor points? Yes / No

Are all anchor points in serviceable condition and free of corrosion, sharp edges, burrs, or grooves that could cut or damage ropes? Yes / No

Have all anchor points been load tested to insure that they will accommodate a dead load weight of at least 5000 pounds each? [29CFR1910.66, Appendix C (I)(c)(10)] Yes / No

Is the rappel wall face area free of protruding nails, bolts, or splinters? Yes / No

Is the rappel wall face area free of broken, loose, decayed, or missing boards? Yes / No

Is padding material in place on all edges that ropes and/or personnel cross? Yes / No

Is the edge padding in good condition and securely fastened? Yes / No

Is the edge padding free from protruding nails, bolts, or other fasteners that could fray or cut ropes or injure rappelers? Yes / No

Are all structural areas of the tower properly padded that a rappeller might contact during rappel operations? Yes / No

Is the structural padding in serviceable condition, securely fastened, and free from protruding nails, bolts, or fasteners? Yes / No

Is the landing area free of obstructions and hazards? Yes / No

Does the landing area extend an uninterrupted distance of 15 feet from the tower base and at least 2 feet beyond the width of the base Yes / No
with cushioning material in the event of a fall?

Is the landing area adequately cushioned in case of a fall (24 inches of non-compressed wood chips, mulch, or sawdust; 12 inches of commercially produced shredded rubber; or safety pads that offer similar fall protection)?  
Yes / No

Has the cushioning material in the landing area been loosened up prior to use and, if large numbers of students are rappelling, are procedures in place and equipment available to loosen it up again during training?  
Yes / No

PHYSICAL SECURITY AND FIRE PROTECTION

Is there a positive locking device on the ladder/steps or a locked fence around the tower that denies unauthorized access to the tower?  
Yes / No

Is there a prominently displayed warning sign that discourages unauthorized use of the tower (eg: WARNING: OFF LIMITS TO UNAUTHORIZED PERSONNEL)?  
Yes / No

Are NO SMOKING signs posted at the tower to preclude potential ignition of cushioning materials?  
Yes / No

RISK MANAGEMENT AND TRAINING CONSIDERATIONS

Is there a current Risk Management Worksheet on file and available on-site?  
Yes / No

Has the Risk Management Worksheet been reviewed, approved, and signed at the appropriate level?  
Yes / No

Is the tower within one hour of an Advanced Trauma Life Support (ATLS) facility?  
Yes / No

Are certified Combat Lifesaver (CLS) or medical personnel and a dedicated medical vehicle on site to render emergency medical aid and evacuation, if required?  
Yes / No

Is training conducted in accordance with TC 21-24 and TSP No. 1?  
Yes / No

Is there a current Standing Operating Procedure (SOP) available that
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delineates requirements for instructors, students, support personnel, and other requirements?

Are properly —certified‖ instructors available to conduct rappel training?
(If NO, DO NOT CONDUCT RAPPEL TRAINING!)

Name(s):
Location and date of certification:

ROPE AND EQUIPMENT

Are rappel ropes serviceable and properly inspected and stored?

Are rope inspections and usage properly documented on DA Form 5752-R, Rope Log (Usage and History)?

Are snap links serviceable (No excessive rust, sharp edges, improper gate opening and closing, excessive pin movement, missing pins, etc.)?

Are properly sized, serviceable, heavy leather gloves and protective headgear available for rappellers?

COMMENTS/OTHER

Name, Title, Organization, and Phone No. of Inspector(s):

____________________________________________________________

Signature of Inspector: _____________________________

Date of Inspection: _____________________________

Name, Title, Organization, and Phone No. of Local Point of Contact:

________________________________________________________________
APPENDIX 5 - RAPPELLING KNOTS

KNOTS

1. Square Knot
2. Double Sheet Bend Knot
3. Bowline
4. Directional Figure Eight (both directions)
5. Bowline on a Bight
6. Double Bowline on a Bight
7. Prusik Hitch
8. Clove Hitch
9. Figure Eight

Knot Terms

[Diagram showing diagrams for Bight, Loop, Half Hitch, Running End, Standing End, Turn, and Round-Turn]
1. **BENDS** (Joining or End-to-end tie-offs)

   a. **Square Knot:** Used to tie the ends of two ropes of equal diameter together. It should be secured by **overhand** knots on both sides of the square knot.

   (1) **Tying the Knot.**
   
   **STEP 1.** Holding one working end in each hand, place the working end in the right hand over the one in the left hand.
   **STEP 2.** Pull it under and back over the top of the rope in the left hand.
   **STEP 3.** Place the working end in the left hand over the one in the right hand and repeat **STEP 2.**
   **STEP 4.** Dress the knot down and secure it with an overhand knot on each side of the square knot.

   (2) **Standards.**
   
   (a) There are two interlocking bights.
   (b) The running end and standing part are on the same side of the bight formed by the other rope.
   (c) The running ends are parallel to and on the same side of the standing ends with 4-inch minimum pig tails after the overhand safeties are tied.

   b. **Double Sheet Bend:** Used to tie the ends of two ropes of equal or unequal diameter together. It can also be used to tie the ends of several ropes to the end of one rope. When a single rope is tied to more than one rope, the bight is formed with multiple ropes.

   (1) **Tying the Knot.**
   
   **STEP 1.** Make a bight towards the end of the first rope.
   **STEP 2.** Thread the running end of the second rope up through the bight and around both ropes of the bight.
   **STEP 3.** Loop the running end of the second rope around the two ropes of the bight and bring it under itself.
   **STEP 4.** Place the running end of the second rope on top of the bight next to where it initially comes under the bight. Dress the night down.
2. Anchor Knot (End of the line only)

   a. Bowline: Used to tie a fixed loop in the end of a rope. The bowline is always finished off with an overhand knot unless it is being used as a secondary knot. Even if the bowline is being used as a secondary knot, it may be finished off with an overhand knot.

   ![Diagram of bowline knot]

   (1) Tying the Knot.
   STEP 1. Bring the working end of the rope around the anchor, from right to left (as you face the anchor).
   STEP 2. Form an overhand loop in the standing part of the rope (on your right) toward the anchor.
   STEP 3. Reach through the loop and pull up a bight.
   STEP 4. Place the working end of the rope (on your left) through the bight, and bring it back onto itself. Now dress the knot down.
   STEP 5. Form an overhand knot with the tail from the bight.

   (2) Standards.
   (a) The bight is locked into place by a loop.
   (b) The short portion of the bight is on the inside and on the loop around the anchor (or inside the fixed loop).
   (c) There is a minimum 4-inch pigtail after tying the overhand safety.

3. MID-LINE KNOTS (Used as either Middle of the Rope or Anchor Knots as indicated)

   a. Directional Figure Eight: When tied and tension is applied to both ends (running and standing) the knot will not pull apart as the double figure of eight would. Notice the standing end of the rope and the bight must be together. This is a middle of the rope knot.
(1) **Tying the Knot.**

**STEP 1.** Face the far side anchor so that when the knot is tied, it lays inward.
**STEP 2.** Lay the rope from the far side anchor over the left palm. Make one wrap around the palm.
**STEP 3.** With the wrap thus formed, tie a figure-eight knot around the standing part that leads to the far side anchor.
**STEP 4.** When dressing the knot down, the tail and the bight must be together.

(2) **Standards.**

(1) The loop should be large enough to accept a carabiner but no larger than a helmet-size loop.
(2) The tail and bight must be together.
(3) The figure eight is tied tightly.
(4) The bight in the knot faces back toward the near side.

b. **Bowline on a Bight.** The bowline on a bight is a middle of the rope knot, but it may be used as an end of the line knot. It will take stress on either of the running ends and on the loop. It must be dressed down gently and evenly. Good knot for secondary anchor points.

(1) **Tying the Knot.**

**STEP 1.** Form a bight in the rope about twice as long as the finished loops will be.
**STEP 2.** Tie an overhand knot on a bight.
**STEP 3.** Hold the overhand knot in the left hand so that the bight is running down and outward.
**STEP 4.** Grasp the bight with the right hand; fold it back over the overhand knot so that the overhand knot goes through the bight.
**STEP 5.** From the end (apex) of the bight, follow the bight back to where it forms the cross in the overhand knot. Grasp the two ropes that run down and outward and pull up, forming two loops.
**STEP 6.** Pull the two ropes out of the overhand knot and dress the knot down.
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STEP 7. A final dress is required: grasp the ends of the two fixed loops and pull, spreading them apart to ensure the loops do not slip.

(2) Standards.
(a) There are two fixed loops that will not slip.
(b) There are no twists in the knot.
(c) A double loop is held in place by a bight.

b. Double Bowline on a Bight: This knot forms a four loop bight with a double bight and works well as both a middle of the rope and as an end of the rope knot.

(1) Tying the Knot. The double bowline on a bight is tied the same way as a standard bowline on a bight with the differences noted below in italics.
STEP 1. Form a bight in the double rope about three times as long as the finished loops will be.
STEP 2. Tie an overhand knot on a bight.
STEP 3. Hold the overhand knot in the left hand so that the bight is running down and outward.
STEP 4. Grasp the four loops of the bight with the right hand; fold it back over the overhand knot so that the overhand knot goes through the bight.
STEP 5. From the end (apex) of the bight, follow the bight back to where it forms the cross in the overhand knot. Grasp the four ropes that run down and outward and pull up, forming four loops.
STEP 6. Pull the four ropes out of the overhand knot and dress the knot down.
STEP 7. A final dress is required: grasp the ends of the four fixed loops and pull, spreading them apart to ensure the loops do not slip. If the loops slip (act like a slip knot), you did not dress the knot down properly (likely you pulled on one of the running ends and flipped the knot). You must dress the knot downward from the newly formed loop.

(2) Standards.
(a) There are four fixed loops that will not slip.
(b) There are no twists in the knot.
(c) The four loops are held in place by a double bight.
4. Specialty Knots

a. Prusik Hitch

1. Middle of the Rope Prusik Hitch: The Prusik knot is used to put a moveable rope on a fixed rope to aid in ascents or as a tightening system. For best results, the Prusik should be tied with a smaller diameter rope (8mm if using 11mm rope). The Prusik may be tied with either a bight or at the end of a rope. If the Prusik is slipping, extra wraps may be used to form a more secure Prusik.

   ![Prusik Knot Diagram]

   **STEP 1.** Double the short rope, forming a bight, with the working ends even. Lay it over the long rope so that the closed end of the bight is 12 inches below the long rope and the remaining part of the rope (working ends) is the closest to yourself; spread the working end apart.

   **STEP 2.** Reach down through the 12-inch bight. Pull up both of the working ends and lay them over the long rope. Repeat this process making sure that the working ends pass in the middle of the first two wraps. Now there are four wraps and a locking bar working across them on the long rope.

   **STEP 3.** Dress the wraps and locking bar down to ensure they are tight and not twisted. Tying an overhand knot with both ropes will prevent the knot from slipping during periods of variable tension.

2. End of the Rope Prusik Hitch:

   ![End of Rope Prusik Hitch Diagram]

   **STEP 1.** Using an arm's length of rope, and place it over the long rope.

   **STEP 2.** Form a complete round turn in the rope.

   **STEP 3.** Cross over the standing part of the short rope with the working end of the short rope.

   **STEP 4.** Lay the working end under the long rope.

   **STEP 5.** Form a complete round turn in the rope, working back toward the middle of the knot.

   **STEP 6.** There are four wraps and a locking bar running across them on the long rope. Dress the wraps and locking bar down. Ensure they are tight, parallel, and not twisted.

   **STEP 7.** Finish the knot with a bowline to ensure that the Prusik knot will not slip out during periods of varying tension.

(3) Standards.
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(a) Four wraps with a locking bar.
(b) The locking bar faces you.
(c) The knot is tight and dressed down with no ropes twisted or crossed.
(d) The knot contains an overhand or bowline to prevent slipping.

b. Clove Hitch (End of Rope): A simple knot that can be easily adjusted. **CAUTION** - Constant tension must be maintained on this knot to prevent slipping. When a clove hitch is tied, no loose ends are left. In other words, the clove hitch could be considered a middle of the rope anchor knot, but it has application as an anchor knot at the end of the rope when used in conjunction with a bowline or round turn with two half hitches.

1. **Tying the Knot**

   STEP 1. Place 76 centimeters of rope over the top of the anchor. Hold the standing end in the left hand. With the right hand, reach under the horizontal anchor, grasp the working end, and bring it inward.

   STEP 2. Place the working end of the rope over the standing end (to form a loop). Hold the loop in the left hand. Place the working end over the anchor from 20 to 25 centimeters to the left of the loop.

   STEP 3. With the right hand, reach down to the left hand side of the loop under the anchor. Grasp the working end of the rope. Bring the working end up and outward.

   STEP 4. Dress down the knot.

2. **Standards.**

   (a) The knot has two round turns around the anchor with a diagonal locking bar.

   (b) The locking bar is facing 90 degrees from the direction of pull.

   (c) The ends exit 180 degrees from each other.

   (d) The knot has more than a 4-inch pigtail remaining.

d. **Figure-Eight Loop:** This knot is very versatile and has a variety of different uses. It can be used as a middle of the rope knot.
(1) Tying the Knot.
STEP 1. Form a bight in the rope about as large as the diameter of the desired loop.
STEP 2. With the bight as the working end, form a loop in rope (standing part).
STEP 3. Wrap the working end around the standing part 360 degrees and feed the working end through the loop. Dress the knot tightly.

(2) Standards.
(a) The loop is the desired size.
(b) The ropes in the loop are parallel and do not cross over each other.
(c) The knot is tightly dressed.
APPENDIX 6 - RAPPEL HARNESS USE AND CARE

1. Inspecting the Harness.

   a. Each harness will be inspected after each use and at least once a year by a certified Rappel Master/RSO/Trainer. Record the date of the inspection and the results in the equipment log for that harness (see attachment for sample equipment log). Each rappeller will be trained in harness inspection and should do a cursory inspection and check component compatibility before each use.

   b. When inspecting the harness, check for:

      - Webbing:
        - Cuts
        - Worn or frayed areas
        - Broken fibers
        - Soft or hard spots
        - Discoloration
        - Melted fibers
      - Check the stitching for pulled threads, abrasion, or breaks
      - Check hardware for damage, sharp edges, and improper operation.

   c. If any of the above are noted, or if the harness has been subjected to shock loads, fall loads, or abuse other than normal, the harness should be removed from service and destroyed. If there is any doubt about the serviceability of the harness, remove it from service and destroy it.

2. Putting on the Harness. Time spent practicing donning the harness and adjusting the straps will increase the cadets level of comfort and their ability to quickly put on and adjust the harness. The following procedure will be used to don the harness.

   1. Loosen the waist strap and leg loops as far as possible, but do not pull the web out of the buckles.
   2. Hold the harness in front of you.
   3. Make sure the web loop is in front and the leg loops are not twisted.
   4. Lower the harness until the leg loops are lying on the ground in the proper position.
   5. Step over the waist belt and into the leg loops.
   6. Pull the harness up around your hips and tighten the waist strap until it is snug and the web loop is centered on your mid-section.
   7. Ensure the waist web loop has been re-fed through the buckle so that the end of the web loop is facing towards the rappellers back.
   8. Tie off the end of the waist web loop with an overhand knot immediately behind the belt buckle. Tuck any remaining webbing into a pocket.
9. Adjust the leg loops so they are snug.
10. Snug waist and leg loops are a mandatory safety requirement.

3. **Using the Harness.** Snap links must be attached directly to the metal loop on the front of the harness. If figure-8 safety decenders are used, a locking snap link will be used with the harness. **DO NOT** place the snap link around any part of the harness webbing.

4. **Care of the Harness.**

   a. During use, carrying, and storage keep the harness away from acids, alkalis, exhaust emissions, rust and strong chemicals. Do not expose the harness to flame or high temperatures. Carry the harness where it will be protected as the harness could melt or burn and fail if exposed to flame or high temperature.

   b. If the harness becomes soiled, it can be washed in cold water with a mild detergent. Dry out of direct sunlight. Do not dry in an automatic dryer.

   c. Store in a cool dry location!
# Rappel Harness Equipment Inspection and Maintenance Log

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<thead>
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<th>Date</th>
<th>How Used or Maintained</th>
<th>Comments</th>
<th>Name</th>
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APPENDIX 7 – RAPPEL DAY PACKING LIST

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### 4th Brigade
Junior Reserve Officers’ Training Corps (JROTC)

**RAPPELLING PROCEDURES**

**APPENDIX 8 – SAMPLE RISK ASSESSMENT FORM**

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<thead>
<tr>
<th>Task Description</th>
<th>Risk Level</th>
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<td>Conduct Tower Rappelling</td>
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<td>Ensure drivers get adequate rest and drive defensively.</td>
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<td>M</td>
<td>Instruct &amp; demonstrate rappelling fundamentals, properly tied knots &amp; safety requirements (required use of harness &amp; gloves).</td>
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<td></td>
<td>M</td>
<td>Monitor weather, advise all cadets to drink sufficient water to prevent dehydration, provide sufficient water &amp; drinking equipment for the cadets.</td>
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<td>H</td>
<td>Conduct inspection of tower and all equipment prior to training. Conduct equipment failure &amp; equipment failure resulting in fall training.</td>
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</tbody>
</table>

Previous versions are OBSOLETE.
4th Brigade
Junior Reserve Junior Reserve Officers’ Training Corps (JROTC)
RAPPELLING PROCEDURES