TOPIC: Mechanical Winch Operations

TIME FRAME: 30 Minutes

LEVEL OF INSTRUCTION:

BEHAVIORAL OBJECTIVE:

Condition: A written quiz

Behavior: The student will describe CDF procedures to unroll and rewind winch cable, describe the hand signals used, and list appropriate safety precautions.

Standard: With a minimum of 70% accuracy

MATERIALS NEEDED:

- An engine with mechanical winch
- Appropriate visual aids
- Audio visual equipment

REFERENCES:

- Manufacturer's Manual

PREPARATION: The mechanical winch is found on some fire engines, on dozers, heavy transports and dozer tenders. The winch adds versatility to the vehicle. Each CDF employee should be familiar with its proper use.

PRESENTATION	APPLICATION

I. PARTS AND TERMINOLOGY

A. In Cab

1. Standard transmission
    a. In neutral for all winching operations
2. Power take off (PTO)
    a. Engaged
        (1) Wind cable "in" position
        (2) Wind cable "out" position
    b. Disengaged whenever winch not in use
3. Vehicle clutch - engaged to transmit power to winch

B. Exterior

1. Cable drum
2. Dog clutch
    a. Located on winch to engage/disengage the cable drum
    b. Positions
        (1) Engaged - only when winching
        (2) Disengaged - All other times
3. Drum brake
    a. Wooden wedges
    b. Wing bolt
4. Roller guides

PRESENTATION	APPLICATION
a. Facilitates winding cable evenly on cable drum	
b. Reduces wear on cable when wound in or out under load	
5. Cable or wire rope	
a. 150 feet of 1/2" diameter wire rope	
	Fix-N-Fax #15
II. BASIC OPERATIONS	
A. Unrolling Cable	
1. Free spooling	
a. Place transmission in neutral	
b. Set spring brake	
c. Set chock blocks	
d. Release cable drum locking mechanism (if so equipped)	
(1) Since the dog clutch is left disengaged when winching operations are not underway, it is possible for the cable drum to turn thereby allowing the wire rope to spool off the cable drum unnoticed.	
(2) Wooden blocks or drum locks may be used to prevent this from happening	
e. Pull wire rope or cable out to desired length	
2. Winding cable out	

PRESENTATION	APPLICATION

a. Place transmission in neutral

b. Set spring brake

c. Set chock blocks

d. Release cable drum locking mechanism (if so equipped)

e. Disengage vehicle clutch (out position)

f. Engage dog clutch

(1) If dog clutch does not engage, slowly pull out the wire rope or winch cable until the dog clutch engages.

g. Position PTO control in proper position to wind cable out

h. Engage vehicle clutch fully

i. Throttle up to a maximum of 1500 RPM's

j. Wind wire rope or cable out to desired length

B. Winding Cable In

1. Place transmission in neutral

2. Set spring brake

3. Set chock blocks

4. Release cable drum locking mechanism (if so equipped)

5. Disengage vehicle clutch (out position)

6. Engage dog clutch

PRESENTATION	APPLICATION

a. If dog clutch does not engage, slowly pull out the wire rope or winch cable until the dog clutch engages.

7. Position PTO control in proper position to wind cable in

8. Engage vehicle clutch fully

9. Throttle up to a maximum of 1500 RPM's

10. Wind cable in fully

11. Place PTO control in disengaged position

12. Disengage the dog clutch

13. Secure tow hook to towing eye on bumper

14. Secure cable drum with locking device (if so equipped)

III. SAFETY PRECAUTIONS

A. Do Not Exceed the Rated Capacity of the Winch

B. Replace Any Cable or Wire Rope Which is Worn or Frayed

C. Do Not Winch in Excess of 15 Degrees from Center of the Cable Drum

1. Snatch block may be used to keep pull "straight"

D. Do Not Winch and Drive the Vehicle at the Same Time

1. Differing gear ratios cause vehicle to travel faster than winch. Cable will become loose and vehicle will drive over it.

E. The Winch Will Overheat with Prolonged Use

PRESENTATION	APPLICATION
F. Wear Full Safety Uniform When Handling the Wire Rope or Cable	
G. Post an Assistant in a Position to Supervise the Winching Operation in Plain View of the Engine Operator. If the Engine Operator Looses Sight of any Assistant Stop the Winching Operation Immediately.	
H. Use Standardized Hand Signals during All Winching Operations	Information sheet #1
1. When facing vehicle doing winching	
a. Thumb up (take cable in)	
b. Thumb down (let cable out)	
c. Palms of hands forward (stop)	
d. Right hand thumb pointed right (turn left)	
e. Left hand thumb pointed left (turn right)	
I. Do Not Allow Personnel Within the Bight Area of the Cable	
J. When Playing Cable Out, Leave Three to Four Wraps on the Drum Minimum	
K. Paint the Last Thirty Feet of the Cable Yellow to Indicate That When the Yellow is Reached, the Drum is Nearly Empty	
L. When Winding Cable in:	
1. Distribute the cable evenly across the cable drum	
a. If the cable is being rewound without a load:	

PRESENTATION	APPLICATION

(1) Use one assistant to maintain tension on the cable

(2) Use a second assistant to guide the cable on the cable drum

(a) May use a bar or heavy stick to guide cable on the cable drum

(b) May pass cable hand over hand to guide it onto the drum

(i) Do not allow the cable to slide through your hands even with gloves on

b. If winching another vehicle, the operator of the towed vehicle must steer to the left and right to evenly distribute cable on the cable drum.

c. If the winch is towing the winching vehicle the operator of the winching vehicle must steer left and right to evenly distribute cable on the cable drum.

IV. INSPECTION AND MAINTENANCE

A. Check All Fluid Levels

B. Lubricate in Accord with CDF Policy and/or Manufacturer's Specifications

C. Inspect Oil Seals for Leakage

D. Inspect Hook for Cracks or Other Defects Which Affect the Structural Integrity of the Hook

1. Do not paint the hook as paint hides defects

SUMMARY:

A mechanical winch can be found on equipment equipped with standard transmissions. The winch is very effective at freeing "stuck" vehicles and for removing obstacles. If used improperly the winch can be a deadly device. Only well trained personnel should be allowed to work with and around winches.

EVALUATION:

A written quiz.

ASSIGNMENT:

To be determined by instructor(s).