



Fire Protection Training

Procedures Handbook 4300

MOBILE EQUIPMENT

TOPIC: Hydraulic 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:

- CDF engine with hydraulic winch
- Appropriate visual aids
- Audio visual equipment

REFERENCES:

- Manufacturer's Manual

PREPARATION: The hydraulic winch is found on some CDF fire engines. The winch adds versatility to the vehicle. Each CDF employee should be familiar with its proper use.



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HYDRAULIC WINCH OPERATIONS

PRESENTATION	APPLICATION
<p>I. PARTS AND TERMINOLOGY</p> <p>A. In Cab</p> <ol style="list-style-type: none">1. Automatic transmission<ol style="list-style-type: none">a. In neutral for all winching operations2. Power take off (PTO)<ol style="list-style-type: none">a. Engagedb. Disengaged - whenever winch not in use3. Winch direction selector<ol style="list-style-type: none">a. Wind cable inb. Wind cable out <p>B. Exterior</p> <ol style="list-style-type: none">1. Cable drum2. Dog clutch<ol style="list-style-type: none">a. Located on winch to engage/disengage the cable drumb. Positions<ol style="list-style-type: none">(1) Engaged - only when winching(2) Disengaged - All other times3. Drum brake<ol style="list-style-type: none">a. Wooden wedgeb. Wing bolt4. Roller guides	

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HYDRAULIC WINCH OPERATIONS

PRESENTATION	APPLICATION
<ul style="list-style-type: none">a. Facilitates winding cable evenly on cable drumb. Reduces wear on cable when wound in or out under load <p>5. Cable or wire rope</p> <ul style="list-style-type: none">a. 150 feet of 1/2" diameter wire rope	<p>Fix-N-Fax #15</p>
<p>II. BASIC OPERATIONS</p> <p>A. Unrolling Cable</p> <ul style="list-style-type: none">1. Free spooling<ul style="list-style-type: none">a. Place transmission in neutralb. Set spring brakec. Set chock blocksd. Release cable drum locking mechanism (if so equipped)<ul style="list-style-type: none">(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 happeninge. Pull wire rope or cable out to desired length2. Winding cable out	



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PRESENTATION	APPLICATION
<ul style="list-style-type: none">a. Place transmission in neutralb. Set spring brakec. Set chock blocksd. Release cable drum locking mechanism (if so equipped)e. Engage dog clutch<ul style="list-style-type: none">(1) If the dog clutch does not engage, slowly pull out the wire rope or winch cable until the dog clutch engages.f. Place transmission in road gear<ul style="list-style-type: none">(1) PTO is driven off the torque converter and the transmission must be placed in gear prior to engaging or disengaging the PTO to align the shaft splinesg. Engage PTOh. Place transmission in neutrali. Position winch direction control device to wind cable outj. Throttle up to desired speed.<ul style="list-style-type: none">(1) If throttle set too high the hydraulic pump will cavitate causing the winch to jerk.(2) Correct cavitation problem by reducing the engine RPM's.k. Wind wire rope or winch cable out to desired length	



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<p>B. Winding Cable In</p> <ol style="list-style-type: none">1. Place transmission in neutral2. Set spring brake3. Set chock blocks4. Release cable drum locking mechanism (if so equipped)5. Engage dog clutch<ol style="list-style-type: none">a. If the dog clutch does not engage, slowly pull out the wire rope or winch cable until the dog clutch engages.6. Place transmission in road gear<ol style="list-style-type: none">a. PTO is driven off the torque converter and the transmission must be placed in gear prior to engaging or disengaging the PTO to align the shaft splines7. Engage PTO8. Place transmission in neutral9. Position winch direction control device to wind cable in10. Throttle up to desired speed<ol style="list-style-type: none">a. If throttle set too high the hydraulic pump will cavitate causing the winch to jerkb. Correct cavitation problem by reducing the engine RPM's11. Wind wire rope or winch cable in fully12. Place winch direction selection device in neutral position	

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<ul style="list-style-type: none">13. Place transmission in road gear14. Disengage PTO15. Place transmission in neutral16. Disengage dog clutch17. Secure tow hook to towing eye on the bumper18. Secure cable drum with locking device, if so equipped	
<p>III. SAFETY PRECAUTIONS</p> <ul style="list-style-type: none">A. Do Not Exceed the Rated Capacity of the WinchB. Replace Any Cable or Wire Rope Which is Worn or FrayedC. Do Not Winch in Excess of 15 Degrees from Center of the Cable Drum<ul style="list-style-type: none">1. Snatch block may be used to keep pull "straight"D. Do Not Winch and Drive the Vehicle at the Same Time<ul style="list-style-type: none">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 UseF. Wear Full Safety Uniform When Handling the Wire Rope or CableG. Post an Assistant in a Position to Supervise the Winching Operation in Plain View of the Engine Operator. If the Engine Operator Loses Sight of any Assistant Stop the Winching Operation Immediately.	



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<p>H. Use Standardized Hand Signals during All Winching Operations</p> <ol style="list-style-type: none">1. When facing vehicle<ol style="list-style-type: none">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) <p>I. Do Not Allow Personnel Within the Bight Area of the Cable</p> <p>J. When Playing Cable Out, Leave Three to Four Wraps on the Drum Minimum</p> <p>K. Paint the Last Thirty Feet of the Cable Yellow to Indicate That When the Yellow is Reached, the Drum is Nearly Empty</p> <p>L. When Winding Cable in:</p> <ol style="list-style-type: none">1. Distribute the cable evenly across the cable drum<ol style="list-style-type: none">a. If the cable is being rewound without a load:<ol style="list-style-type: none">(1) Use one assistant to maintain tension on the cable(2) Use a second assistant to guide the cable on the cable drum	<p>Information sheet #1</p>



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<ul style="list-style-type: none"> (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 <ul style="list-style-type: none"> (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 	
<p>IV. INSPECTION AND MAINTENANCE</p>	
<ul style="list-style-type: none"> A. Check All Fluid Levels 	
<ul style="list-style-type: none"> B. Lubricate in Accord with CDF Policy and/or Manufacturer's Specifications 	
<ul style="list-style-type: none"> C. Inspect Oil Seals for Leakage 	
<ul style="list-style-type: none"> D. Inspect Hook for Cracks or Other Defects Which Affect the Structural Integrity of the Hook <ul style="list-style-type: none"> 1. Do not paint the hook as paint hides defects 	
<ul style="list-style-type: none"> E. Inspect Vent to Oil Reservoir to See It Is Unobstructed <ul style="list-style-type: none"> 1. Do not paint over vent hole 	



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HYDRAULIC WINCH OPERATIONS

SUMMARY:

A hydraulic winch can be found on CDF engines equipped with automatic 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).