SAN DIEGO FIRE-RESCUE DEPARTMENT

TRACTOR DRAWN AERIAL TASK BOOK

May 2021

TRAINEE NAME: _____

This page intentionally left blank

TRACTOR DRAWN AERIAL CERTIFICATION

MUST BE COMPLETED IN ITS ENTIRETY BEFORE AN APPARATUS CERTIFICATION WILL BE ISSUED.

Apparatus No: _____ @ Station: _____Return certification to Station #: _____

Name (Print): _____ Employee ID #: _____

Rank: _____ Station: _____ Division: _____ Battalion: _____

CDL#: _____ Exp: ____ / _____ / ____ Physical: ____ / ____ / ____ Exp: ____ / ____ / _____

Class: _____ Endorsement(s): _____ Restriction(s): _____

This trainee has completed within (**6**) months from the start date, twenty-two **(22**) hours (minimum) if trainee has previously completed service aerial certification or (**26**) hours without previous service aerial certification. The Trainee will be able to operate this vehicle, demonstrating the requisite knowledge and skills to effectively and safely operate this classification of apparatus.

NOTE: Total training hours required for certification will depend upon the trainee's skill level and **NOT** the minimum hourly requirement.

Dates of Training: From: _____ / _____ / _____ To: _____ / _____ / _____
Month Day Year Month Day Year

Trainee has documented the following training on the Driver Training Record (FD-902):

- ☐ Received two (**2**) hour TDA Training Power Point
- ☐ A minimum of eight (**8**) hours of driving on Rodeo Course with successful completion of TDA Driving Performance Requirements.
- ☐ A minimum of four (**4**) hours of driving on Road Course
- ☐ A minimum of eight (**8**) hours of ladder operation, hose lays, hydraulics, and other aerial ladder drills demonstrating the requisite knowledge and skills to successfully and effectively perform all operational tasks associated with this apparatus. 4 hours of which must be using the ladder as a lifting device. Ladder Operation hours may be reduced to 4 hours if Trainee has previously completed a service aerial certification.
- ☐ A minimum of four (**4**) hours using all apparatus forms and performing apparatus pre-trip, auxiliary equipment maintenance, and documentation.

Trainee Signature: _____

* Trainer: _____ _____
Print Name and Rank Signature

* Captain: _____ _____
Print Name and Rank Signature

* Battalion Chief: _____ _____
Print Name and Rank Signature

---

* Your signature certifies that the above person has completed the certification program detailed in this booklet. This individual has completed the minimum number of training hours and demonstrated a driving and operating ability that is consistent with all department standards and procedures.

TRAINING DIVISION USE ONLY

Driver Training Officer Signature: _____

Training Chief Signature: _____

This page intentionally left blank

TRAINING RECORD – TRACTOR DRAWN AERIAL

Trainee Name:____**Page**____**of**____

MO/DY/YR	TIME	HRS	APP #	TASK	STA#	CAPTAIN NAME
(Example) 8/27/19	FROM: 0800 TO: 1200	4	2641	(Example) Driving (Document only one task at a time, i.e. Off Road Driving, On Road Driving)	10	PRINT: Captain James Roberto SIGN: James Roberto
MO/DY/YR	**TIME**	**HRS**	**APP #**	**TASK**	**STA#**	**CAPTAIN NAME**
	FROM: TO:					PRINT: SIGN:
MO/DY/YR	**TIME**	**HRS**	**APP #**	**TASK**	**STA#**	**CAPTAIN NAME**
	FROM: TO:					PRINT: SIGN:
MO/DY/YR	**TIME**	**HRS**	**APP #**	**TASK**	**STA#**	**CAPTAIN NAME**
	FROM: TO:					PRINT: SIGN:
MO/DY/YR	**TIME**	**HRS**	**APP #**	**TASK**	**STA#**	**CAPTAIN NAME**
	FROM: TO:					PRINT: SIGN:
MO/DY/YR	**TIME**	**HRS**	**APP #**	**TASK**	**STA#**	**CAPTAIN NAME**
	FROM: TO:					PRINT: SIGN:
MO/DY/YR	**TIME**	**HRS**	**APP #**	**TASK**	**STA#**	**CAPTAIN NAME**
	FROM: TO:					PRINT: SIGN:
MO/DY/YR	**TIME**	**HRS**	**APP #**	**TASK**	**STA#**	**CAPTAIN NAME**
	FROM: TO:					PRINT: SIGN:
MO/DY/YR	**TIME**	**HRS**	**APP #**	**TASK**	**STA#**	**CAPTAIN NAME**
	FROM: TO:					PRINT: SIGN:
MO/DY/YR	**TIME**	**HRS**	**APP #**	**TASK**	**STA#**	**CAPTAIN NAME**
	FROM: TO:					PRINT: SIGN:
MO/DY/YR	**TIME**	**HRS**	**APP #**	**TASK**	**STA#**	**CAPTAIN NAME**
	FROM: TO:					PRINT: SIGN:
TOTAL HOURS THIS PAGE:						

*NOTE: Training hours shall be documented in Target Solutions daily and be limited to a **maximum** of eight hours per shift.

TRAINING RECORD – TRACTOR DRAWN AERIAL

Trainee Name:____Page____of____

MO/DY/YR	TIME	HRS	APP #	TASK	STA##	CAPTAIN NAME
	FROM:					PRINT:
	TO:					SIGN:
MO/DY/YR	**TIME**	**HRS**	**APP #**	**TASK**	**STA#**	**CAPTAIN NAME**
	FROM:					PRINT:
	TO:					SIGN:
MO/DY/YR	**TIME**	**HRS**	**APP #**	**TASK**	**STA#**	**CAPTAIN NAME**
	FROM:					PRINT:
	TO:					SIGN:
MO/DY/YR	**TIME**	**HRS**	**APP #**	**TASK**	**STA#**	**CAPTAIN NAME**
	FROM:					PRINT:
	TO:					SIGN:
MO/DY/YR	**TIME**	**HRS**	**APP #**	**TASK**	**STA#**	**CAPTAIN NAME**
	FROM:					PRINT:
	TO:					SIGN:
MO/DY/YR	**TIME**	**HRS**	**APP #**	**TASK**	**STA#**	**CAPTAIN NAME**
	FROM:					PRINT:
	TO:					SIGN:
MO/DY/YR	**TIME**	**HRS**	**APP #**	**TASK**	**STA#**	**CAPTAIN NAME**
	FROM:					PRINT:
	TO:					SIGN:
MO/DY/YR	**TIME**	**HRS**	**APP #**	**TASK**	**STA#**	**CAPTAIN NAME**
	FROM:					PRINT:
	TO:					SIGN:
MO/DY/YR	**TIME**	**HRS**	**APP #**	**TASK**	**STA#**	**CAPTAIN NAME**
	FROM:					PRINT:
	TO:					SIGN:
MO/DY/YR	**TIME**	**HRS**	**APP #**	**TASK**	**STA#**	**CAPTAIN NAME**
	FROM:					PRINT:
	TO:					SIGN:
MO/DY/YR	**TIME**	**HRS**	**APP #**	**TASK**	**STA#**	**CAPTAIN NAME**
	FROM:					PRINT:
	TO:					SIGN:
TOTAL HOURS THIS PAGE:						

*NOTE: Training hours shall be documented in Target Solutions daily and be limited to a **maximum** of eight hours per shift.

SAN DIEGO FIRE–RESCUE TRACTOR DRAWN AERIAL DRIVING PERFORMANCE REQUIREMENTS

All students participating in the Tractor Drawn Aerial Driver Training Program are required to meet the specific performance objectives set below.

These Objectives are designed to confirm the student's ability to learn and apply SDFD Training techniques. These techniques accelerate successful Driving habits and, when properly applied, reduce the risk of accident and injury while driving a Tractor Drawn Aerial.

INSTRUCTOR:_____ DATE:_____

SQUARE FIGURE EIGHT RODEO				
Driver drives tractor wide and deep	YES		NO	
Driver ensures clearance on the inside of the corner	YES		NO	
Driver verifies tiller wheels are neutral when exiting a corner (Student must demonstrate proficiency on this objective before Driving outside of Rodeo Environment on public streets.)	YES		NO	
Tiller holds neutral position when necessary	YES		NO	
Tiller verifies outside, and maneuvers trailer close to outside object	YES		NO	
Tiller returns wheels to the neutral position (Student must demonstrate proficiency on this objective before Tillering outside of Rodeo Environment on public streets.)	YES		NO	

ROAD COURSE RODEO				
Driver pulls 5th wheel wide and deep	YES		NO	
Driver ensures clearance on the inside of the corner	YES		NO	
Driver proper mirror use	YES		NO	
Driver proper speed	YES		NO	
Tiller verifies outside, and maneuvers trailer close to outside corner	YES		NO	
Tiller returns wheels to the neutral position	YES		NO	

SAN DIEGO FIRE–RESCUE TRACTOR DRAWN AERIAL DRIVING PERFORMANCE REQUIREMENTS

SERPENTINE RODEO				
Driver proper speed	YES		NO	
Driver proper mirror use	YES		NO	
Driver starts pivot 2’ off pylon	YES		NO	
Driver pivots at pivot point	YES		NO	
Driver does not cause tractor to overrun trailer	YES		NO	
Driver does not compensate for Tiller	YES		NO	
Tiller correct hand position on wheel for backing	YES		NO	
Tiller starts pivot 4’ off pylon	YES		NO	
Tiller pivots at correct location on the trailer	YES		NO	
Tiller pivots at appropriate rate	YES		NO	

BLIND ALLEY RODEO				
Driver proper speed	YES		NO	
Driver manages front end swing on outside curb	YES		NO	
Driver maintains arc in corner	YES		NO	
Driver does not allow the apparatus to get flat	YES		NO	
Driver verifies clearance on the inside of the corner	YES		NO	
Driver does not fixate on trailer in alley	YES		NO	
Driver head on a swivel using mirrors in alley	YES		NO	
Tiller does not dive down to alley	YES		NO	
Tiller head to the outside, not fixate on inside	YES		NO	
Tiller stays proper distance from outside alley wall	YES		NO	
Tiller steering input speed proper, less is more	YES		NO	

Comments: _____

_____

_____

_____

_____

_____

_____

_____

_____

TABLE OF CONTENTS

This page intentionally left blank

01
Overview

This page intentionally left blank

1.1 INTRODUCTION

Task Book:

The San Diego Fire-Rescue Department Training Division has developed this Task Book to provide a training format and certification of the minimum skill level needed to successfully operate this apparatus as the driver and equipment operator. Each Task Book lists the job performance requirements for the specific certification in a format that allows a candidate to be trained and evaluated during the training sessions. To achieve certification, the applicant must successfully complete ALL task and job performance requirements listed in this Task Book.

Note: Before a certification can be issued, successful job performance of all sections must be observed and recorded by a qualified and approved trainer.

These job performance requirements serve as general guidelines. As such, they are not intended to replace specific sequences of apparatus or equipment operation that may be outlined by manufacturer specifications. Training shall follow department standard operating procedures. **IF** you are unsure about the safe operating principles and limitations of the specific make of your apparatus, refer to the manufacturer operation manual. When a conflict with department procedures and manufacturer specifications occur, manufacturer procedures will govern the task. **Err on the side of safety**. Trainers should have manufacturer specifications and department standard operational guidelines available. Should additional assistance be required, contact the Driver Training Officer at the Training and Education Division for assistance. **DO NOT** contact the manufacturer directly.

There is a six-month time restriction from beginning a certification to the time of completion. If a trainee does not complete the certification in the six-month time limit, they must start the entire process over. The Training Division must receive the completed Task Book no later than thirty (30) days after completion of training.

Trainer:

1. Must be certified on the apparatus and possess a current license with appropriate endorsement(s), before conducting any training.
2. Ensure that all information, dates, and hours are recorded accurately in this Task Book.

Trainee:

1. Must have a current applicable license or permit, with appropriate endorsement(s), in their possession and show it to the trainer at **each** training session.
   Note: Drivers must follow all restrictions on their license. Example: a 64 restriction (automatic transmission only) cannot drive a manual transmission apparatus.
2. Check to see that the trainer is certified for the apparatus you will be utilizing.
3. Complete driver's license information on the certification page(s).
4. When all Task Book information has been documented, obtain required signatures and forward the completed Task Book to the Driver Training Officer, at the Training and Education Division.

The Driver Training Officer will review this Task Book to determine that all the information is complete and correct. The certification form will be removed and filed at Training, and the Task Book will be returned to the trainee for future reference.

A CLASS "B" LICENSE IS REQUIRED TO DRIVE THIS APPARATUS

1.2 INSTRUCTIONS

A TRAINEE IS NOT AUTHORIZED TO DRIVE OR TILLER AN APPARATUS TO OR FROM THE TRAINING AREA(S) UNTIL COMPETENCE HAS BEEN DEMONSTRATED DURING PRIOR TRAINING.

A. The trainer will check (☑) off each box after successful completion of the performance requirements by the trainee.

B. Trainee must complete a of minimum eight (**8**) hours of driving on Rodeo with successful completion of TDA Driving Performance Requirements on the following:

1. Square Figure 8 Phase 1,2,3
2. Road Course Rodeo
3. Blind Alley Rodeo
4. Serpentine Rodeo

CAUTION: The Supervisor and Trainer are responsible for the performance of the trainee at all times.

C. Received two (**2**) hour TDA Training Power Point

D. A minimum of eight (**8**) hours of driving on Rodeo Course

E. A minimum of four (**4**) hours of driving on Road Course

F. A minimum of eight (**8**) hours of ladder operation, hose lays, hydraulics, and other aerial ladder drills demonstrating the requisite knowledge and skills to successfully and effectively perform all operational tasks associated with this apparatus. 4 hours of which must be using the ladder as a lifting device. Ladder Operation hours may be reduced to 4 hours if Trainee has previously completed a service aerial certification.

G. A minimum of four (**4**) hours using all apparatus forms and performing apparatus pre-trip, auxiliary equipment maintenance, and documentation.

* Driving skills can be demonstrated during normal driving after completion of practice training and basic skill demonstration in an approved practice area(s).:

NOTE: Driving requirement(s) may be adjusted or eliminated if not in the available operation area

H. Resources:

1. Manufacturer's Maintenance and Operating Manuals
2. San Diego Fire-Rescue Department Policies and Procedures
3. California Vehicle Code and Department of Motor Vehicle Commercial Driver Handbook
4. City of San Diego Driver / Operator Manual
5. IFSTA Aircraft Rescue and Firefighting
6. Ervin Fire Fighting Apparatus and Procedures (3rd edition)
7. SDFD apparatus specification sheet

02
Apparatus

This page intentionally left blank

2.1 PREPARATION

A. Read the apparatus operation manual and ancillary equipment manuals completely
B. Articulate an understanding of all danger, warning, and caution notices stated in the apparatus operation manual

2.2 DESCRIPTION

A. Manufacturer _____
B. Apparatus Type _____
C. GVWR _____
D. Engine Manufacturer _____
E. Engine Cycles / Type _____
F. # of cylinders / CID _____ / _____
G. Max Horsepower _____ @ RPM _____
H. Max Torque _____ @ RPM _____
I. Transmission Type_____
J. Water Tank Capacity_____

2.3 SPECIFICATIONS

A. Height (clearance) _____ Width _____ Turning Diameter _____
B. Width (Body) _____ Width (Body, Equipment, & Mirrors) _____
C. Length _____ Chassis overhang – Front _____ Rear _____
D. Equipment overhang – Front _____ Rear _____
E. Angle of approach _____ Departure _____ Ground Clearance _____
F. Tire pressure – Front _____ Rear _____
G. Fuel Tank: _____gallons Fuel Type: _____
H. Def Tank: _____gallons

2.4 VERIFICATION OF OPERATIONAL STATUS

A. Checks that parking brake is set
B. Performs Pre-trip inspection (PSTrax)
C. Perform daily, weekly, and monthly assigned checks as assigned on PSTrax
D. Knowledge of all forms that apply to this apparatus
E. Performs "Walk Around" prior to entering cab to drive
    1. Secure equipment
    2. Compartment doors closed
    3. Disconnect electrical cords
    4. Wheel blocks up and stowed
    5. Clear to proceed
F. Adjusts seat and mirrors
G. Checks that intercom and radios are operational and volume is correctly set

2.5 STARTING

A. Fastens seatbelt
B. Battery switch on "**BOTH**" and / or master ignition switch "**ON**"
C. Transmission in Neutral
D. Ignition to "**ON**" position, Let gauges cycle
E. Locates and checks gauges, switches, and controls
F. Observes dash indicator light system test for indicator light problems
G. Starts engine- **DO NOT** pump accelerator
H. If it doesn't start
    1. Repeat steps B thru G
    2. Maximum crank time 15-seconds, then rest 15-seconds. Repeat 3 times
    3. If it still does not start
        a. Utilize PS Trax, "Urgent Request"
I. Runs engine at **Low Idle (600-800 RPM)** for two-minutes to lubricate engine
J. Check gauges (at 1000 RPM)

    WARNING - DO NOT operate vehicle if gauge readings are outside of normal range, high or low

    1. Oil pressure reading _____ PSI Normal reading should be _____ PSI
    2. Air pressure reading _____ PSI max Driving pressure range is ____ to ____ PSI
    3. Voltmeter reading _____ Volts Normal reading should be _____ Volts
    4. Ammeter reading _____ Amps Normal reading should be _____ Amps
    5. Engine temperature _____ F Normal operating temperature should be _____ F
    6. Transmission temperature _____ F Normal operating temperature should be _____ F
K. Check Jacobs Engine Brake control switch "**ON**"

2.6 AIR BRAKE SYSTEMS

A. Describe operation of apparatus compressed air system
    1. Is air compressor belt or gear driven?
    2. "**C**ut In" pressure must occur before minimum of _____PSI
    3. "Cut **O**ut" pressure must occur by the maximum _____ PSI
    4. "**A**pplied" leakage test must not drop more than _____ PSI per min for a Tractor Trailer?
    5. "**L**ow Pressure" must occur between _____ PSI and _____PSI
    6. "**S**pring Brake Test must occur between _____PSI and _____PSI
    7. **Parking Brake Test** -With the parking brake engaged, and the engine on, place the tractor in drive, testing the vehicle's forward movement.
    8. **Service Brake Test**- With the parking brake put the vehicle in drive, accelerate to 5 mph and apply the service brake to see if the vehicle(s) stops and/or pulls to one side or the other. If the vehicle does not stop or pulls to one side or the other, turn the vehicle in for repair.
    9. **Anti-lock Brake System (ABS) Check** - On all ABS equip vehicles, when starting the vehicle, check to ensure the ABS lighting indicator illuminates and promptly turns off. If the ABS light remains illuminated, turn the vehicle in for repairs.

2.6 AIR BRAKE SYSTEMS (CONTINUED)

10. Air Pressure Build Up Test-Engine must be running at normal operating idle. With air pressure below 80 psi, watch the gauge when the gauge reads 85 psi time the compressor build up to 100 psi. The compressor must build the air from 85 psi to 100 psi within 45 seconds. Inform the examiner how many seconds it took for the air pressure to build from 85 psi to 100 psi If the buildup doesn't happen within 45 seconds, turn the vehicle in for repair.

B. Parking-Brake (Spring-Brake)
   1. Describe the operation and function of the spring brake system
   2. Describe and demonstrate how to apply and release both front and rear parking brakes correctly
      a. Apply front brake only after applying rear brake system and **must keep engine running if front brake is set.**
      b. Releasing rear brake system automatically releases front brake system

2.7 SECONDARY BRAKING DEVICES

A. Jacobs Engine Brake
   1. Read Jacobs Engine Brake Operators manual found in Target Solutions-Training-Training Division-Driver Training and Apparatus Information-Handbooks and Manuals
   2. Describe theory of operation and normal switch positions
   3. Demonstrates proper use during driving operations
   4. Procedure for wet or slippery conditions (Dry grass and loose soil are slippery surfaces)
      a. Switch positions
      b. Use / non-use of Jacobs Engine Brake

B. Telma
   1. Describe theory of operation and normal switch position
   2. Demonstrates proper use during driving operations
   3. Telma will not work at speeds of less than_____ MPH
   4. Procedure for wet or slippery conditions
      a. Switch position Use / non-use of Jacobs Exhaust Retarder
      b. Use/non-use of retarder.

2.8 REGEN PROCEEDURES

REGEN PROCEDURE for CAT and DETROIT DIESEL Series 60

HOW TO PERFORM A "PARKED REGEN"

1. **Must** have the DPF light on or flashing to REGEN. Engine should be at 140 or above. 
2. Ensure tailpipe and surrounding area is clear. **Must be done outside.**
3. Set wheel blocks, start apparatus with parking brake set and in neutral.
4. Release parking brake.
5. Place transmission in "D", watch transmission "Monitor" to show "1".
6. Return to neutral.
7. Set Parking and Front Brakes.
8. Request a "PARKED REGEN"

2.8 REGEN PROCEEDURES (CONTINUED)

9. **CAT and Pierce Arrow XT with Detroit Diesel Series 60**
    - Under dash, far left side, behind grab handle, far left bottom switch marked "REGEN"
    - Push and hold for 5 seconds, release.
10. **International Chassis (water tenders, etc…)**
    - To right of steering column, switch on left marked "PARKED REGEN"
    - Push and hold for 5 seconds, release.
11. Idle should increase on its own, REGEN will start.
12. DPF light will go out shortly after starting, REGEN is continuing until a return to idle. (20-60) minutes.
13. When Apparatus returns to idle with a successfully completed REGEN, complete **ENGINE REGENERATION RECORD in** Engineer Manual**.**
14. To interrupt "PARKED REGEN", release parking brake and wait to return to idle.
15. To interrupt "AUTOMATIC REGEN", use "REGEN INHIBIT" switch.

REGEN TYPES

1. **PASSIVE-** Will occur when driving. No DPF burn, just higher exhaust temps. No action required by operator.
2. **AUTOMATIC-** Active burn off of soot occurs while driving. Must be sustained "Freeway" driving or pumping of 45-60 minutes. No action required by operator.
3. **PARKED-** Operator uses on board "REGEN" switch to initiate a REGEN. Works for all levels. 45-60 minutes.
4. **LAPTOP-** Used by the shop to perform a REGEN when all other attempts have failed. Only true way to check and analyze system performance.

OTHER TIPS

- **CAT ARD HEAD CLEAN-** On Cat-equipped engines, if the "ARD Clean" Green LED is on (next to park brake control), attempt to continue driving or park &idle whenever possible. This will extend regen intervals & reduce out of service events.
- **INHIBIT REGEN-** If using vehicle vocationally (PTO engaged-pumping, aerial ops, etc.) and regen starts but must be interrupted, depress "Regen inhibit" switch for 5 sec. & release. It's adjacent to the "Request Regen" switches on Pierce and internationals.
- **Strike Team Response-** If freeway driving and the DPF light comes on, you can keep driving to allow an "automatic" regen. Stop and perform a "manual" regen if DPF light starts to flash, "Check Engine "light comes on or you're at the incident.

2.8 REGEN PROCEEDURES (CONTINUED)

	The amber **Check Engine Lamp (CEL)** warning light indicates a fault with the engine controls or after treatment controls and/or components has occurred. The operator can drive the vehicle to the end of their shift and call service to remedy the problem.
	The red **Stop Engine** warning light indicates a major engine fault that may result in engine damage. The operator should move the vehicle to a safe location and shutdown the engine.
	The **Malfunction Indicator (MIL)** light provides an indication to the vehicle operator that a fault has occurred on an emission related component. This light may illuminate at the same time as the Check Engine light. The operator can drive the vehicle to the end of their shift and call service to remedy the problem.
	**High Exhaust System Temperature (HEST) Automatic** (passive) regen occurring. Continue to drive or park with the high idle on when possible. This will extend regen intervals. No other action required. No need to log this event. Note difference between this & the DPF light.
	The **Diesel Particulate Filter (DPF)** light will illuminate when a regeneration is necessary. There are progressive stages of need for regeneration indicated by this.

LEVEL 1  *(SOLID)*	1. DPF on solid (low to medium levels of particulate build-up). The vehicle requires regeneration but should be able to complete the current mission. Perform a regeneration in a reasonable amount of time. • **In Service.** • **Ensure the Regen Inhibit Switch is not activated.** • **Initiate a DPF regeneration by switching to a more challenging duty cycle (such as highway driving for at least 20 minutes or pumping) OR perform a parked regeneration.**
LEVEL 2  *(Flashing)*	2. DPF flashing (medium to high levels of particulate build-up). DPF reaching system limits and regeneration required as soon as possible. • **Out of Service.** • **Perform a Mandatory Parked Regeneration as soon as possible.** • **Complete Regeneration Record**
LEVEL 3  *(Flashing)*	3. DPF flashing, CEL lit. System has REACHED limitations. • **Out of Service.** • **Return to quarters** • **Contact Repair Facility- Requires mechanic to do Laptop regen. Engine Damage will occur with continued operation.**
LEVEL 4  *(Flashing)*	4. DPF flashing, CEL lit, and Stop Engine light lit. System has EXCEEDED limitations. ENGINE SHUTDOWN. • **Out of Service. Stop when safe.** • **Shut down engine** • **Contact Repair Facility- Requires mechanic to do Laptop regen. Engine Damage will occur with continued operation.**

2.8 REGEN PROCEEDURES (CONTINUED)

REGEN PROCEDURE DETROIT DIESEL (DD13 ENGINES).

1. Must have the DPF light on or flashing  to REGEN. Engine should be at 140 or above.
2. Ensure tailpipe and surrounding area is clear. Must be done outside.
3. Set wheel blocks, start apparatus with parking brake set and in neutral.
4. Release parking brake.
5. Place transmission in "D", watch transmission "Monitor" to show "1".
6. Return to neutral.
7. Set Parking and Front Brakes.
8. Request a "PARKED REGEN"
9. Push and hold REGEN button (far left bottom switch) for 5 seconds and release.

10. Idle should increase on its own, REGEN will start.
11. DPF light will go out shortly after starting, REGEN is continuing until a return to idle. (45-60) minutes.
12. **If REGEN is unsuccessful the first time, initiate a second REGEN. After two failed attempts, contact the shop.**
13. When Apparatus returns to idle with a successfully completed REGEN, complete ENGINE REGENERATION RECORD.
14. To interrupt "PARKED REGEN", release parking brake and wait to return to idle.
15. To interrupt "AUTOMATIC REGEN", use "REGEN INHIBIT" switch.

REGEN TYPES

1. PASSIVE- Will occur when driving. No DPF burn, just higher exhaust temps. No action required by operator.
2. AUTOMATIC- Active burn off of soot occurs while driving. Must be sustained "Freeway" driving or pumping of 45-60 minutes. No action required by operator.
3. PARKED- Operator uses on board "REGEN" switch to initiate a REGEN. Works for all levels. 45-60 minutes.
4. LAPTOP- Used by the shop to perform a REGEN when all other attempts have failed. Only true way to check and analyze system performance.

2.8 REGEN PROCEEDURES (CONTINUED)

	The amber **Check Engine Lamp (CEL)** warning light indicates a fault with the engine controls or after treatment controls and/or components has occurred. The operator can drive the vehicle to the end of their shift and call service to remedy the problem.
	The red **Stop Engine** warning light indicates a major engine fault that may result in engine damage. The operator should move the vehicle to a safe location and shutdown the engine.
	The **Malfunction Indicator (MIL)** light provides an indication to the vehicle operator that a fault has occurred on an emission related component. This light may illuminate at the same time as the Check Engine light. The operator can drive the vehicle to the end of their shift and call service to remedy the problem.
	**High Exhaust System Temperature (HEST) Automatic** (passive) regen occurring. Continue to drive or park with the high idle on when possible. This will extend regen intervals. No other action required. No need to log this event. Note difference between this & the DPF light.
	The **Diesel Particulate Filter (DPF)** light will illuminate when a regeneration is necessary. There are progressive stages of need for regeneration indicated by this.

LEVEL 1  *(SOLID)*	1. DPF on solid (low to medium levels of particulate build-up). The vehicle requires regeneration but should be able to complete the current mission. Perform a regeneration in a reasonable amount of time. • **In Service.** • **Ensure the Regen Inhibit Switch is not activated.** • **Initiate a DPF regeneration by switching to a more challenging duty cycle (such as highway driving for at least 20 minutes or pumping) OR perform a parked regeneration.**
LEVEL 2  *(Flashing)*	2. DPF flashing (medium to high levels of particulate build-up). DPF reaching system limits and regeneration required as soon as possible. • **Out of Service.** • **Perform a parked regeneration as soon as possible.** • **<u>If lamps remain on after parked regeneration, repeat the parked regeneration.</u>** • **<u>If second attempt fails, notify the shop.</u>**
LEVEL 3  *(Flashing)*	3. DPF flashing, CEL lit. System has REACHED limitations. • **Out of Service.** • **Parked regeneration must be performed in a safe location.** • **<u>If lamps remain on after parked regeneration, repeat the parked regeneration.</u>** • **<u>If second attempt fails, notify the shop.</u>**
LEVEL 4  *(Flashing)*	4. DPF flashing, CEL lit, and Stop Engine light lit. System has EXCEEDED limitations. ENGINE SHUTDOWN. • **Out of Service.** • **Parked regeneration must be performed in a safe location IMMEDIATELY. <u>If lamps remain on after parked regeneration, repeat the parked regeneration.</u>** • **<u>If second attempt fails, notify the shop.</u>** • **Engine can be restarted, but a parked regeneration must be initiated within 30 seconds or engine will shut down.**

2.9 AUXILIARY AND SAFETY SYSTEMS

A. Load Manager
   1. Purpose and function of Load Manager
   2. Explains significance of each indicator light (colors) _____, _____
   3. Normal operating position of the Load Manager switch along with the Master Light switch is that both switches are _____ (up / down)
   4. Which systems are controlled by the Load Manager?
   5. Order in which the Load Manager sheds systems
   6. How and when the Load Manager can be bypassed
   7. Possible consequences of bypassing the Load Manager
   8. Proper way to reset the Load Manager

B. Antilock Braking System (ABS)
   1. Describes ABS operation
   2. Describe location of ABS indicator light _____
   3. ABS prevents wheel _____
   4. Wheels effected _____
   5. Utilizes normal brake pedal pressure during stops (DO NOT PUMP BRAKE PEDAL)
   6. ABS warning light remains lit until _____ MPH (color) _____
   7. Reports malfunction if warning light stays on (color) _____
   8. Emergency Braking with Antilock Braking System (ABS)
      a. **USE IN EMERGENCY SITUATIONS ONLY**
      b. **STOMP** - the brake pedal to the floorboard
      c. **STAY** - on the brake pedal, do not let up
         i. Releasing the pedal resets the ABS computer, **INCREASING** the stopping distance
      d. **STEER** - around the hazard(s)
         i. The vehicle will handle well with ABS system working

C. Automatic Traction Control (ATC)
   1. Theory of operation
   2. What ATC does when wheel spin develops
   3. Locate the control switch
      a. The switch label indicates_____
   4. Normal control switch position _____ (up / down)
   5. Explains why the green indicator light might illuminate
   6. Explains what to do if the green indicator light remains illuminated

2.10 MAINTENANCE PROCEDURES

A. Describes frequency and procedure to replace
   1. Coolant capacity _____ gallons % Mix _____
   2. Power steering fluid type _____
   3. Engine oil type _____ Engine oil capacity _____ gallons
   4. Transmission oil type _____ Transmission Oil capacity _____ gallons
   5. Fuel type_____Fuel Capacity _____ gallons
   6. Def Capacity_____gallons

2.10 MAINTENANCE PROCEDURES (CONTINUED)

7. Differential Oil Type_____
8. Front Oil Type_____

B. Describes benefits of proper maintenance
   1. Aerial hydraulic oil type
   2. Hydraulic oil tank capacity_____ gallons

Warning- Only fill hydraulic oil tank when the aerial device is in the fully bedded & retracted position to ensure that all of the systems oil has drained back into the tank

   3. Cable, Guides, Pulleys, and Waterway maintenance (frequency)
   4. Hydraulic pressure gage test pressure PSI (frequency)

C. Performs Monthly and Quarterly Apparatus Maintenance checks as assigned on PSTrax
   1. Reviews maintenance manual for appropriate lubricants and chart of lubrication points
   2. Cleans and degreases apparatus
   3. Inspects apparatus for leaks, defects, rust, cracked or chafing hoses, and repaint needs
   4. Lubricate all wire rope
   5. Lubricates all grease points (zerk fittings) and other moving joints
   6. Lubricates Outriggers
   7. Cleans excessive grease from all fittings and surfaces
   8. Cleans and inspects all pump intake screens
   9. Performs Elevation (to 75^0), Rotation, and Extension maneuvers to distribute lubrication
   10. Clean excessive grease from all fittings and surfaces
   11. Performs auxiliary equipment tests and maintenance
   12. Perform Monthly Ladder System Tests
   13. Perform Monthly EPU Operational Test

D. Cab Tilt Procedure
   1. SAFETY considerations for Cab tilt operation
      a. Secure all loose materials in cab and close doors
      b. Check for apparatus equipment that may interfere with cab tilt and reposition
      c. Check for over-head obstructions
   2. Engine Ignition is _____ when cab is raised.
   3. Demonstrates proper procedure for raising cab
   4. After raising cab, secures in the up position with safety support
   5. Lowering cab
      a. Raises off safety support lock
      b. Lowers cab
      c. Ensure side latches are properly secured (hold lowering toggle switch down until latches set and indicator light is "OFF")

E. Explains Lubrication System and the Engineer duties relative to the system
   1. Daily, visually checks (observes) "AUTO LUBE" self-check indicator on apparatus startup
      a. Light should blink three (3) times indicating system "OK"
      b. If light remains "ON", there is a system fault
      c. Checks system grease level to see if system needs refill
      d. Reports all faults to the Repair Facility immediately
      e. System refill is only performed by the Repair Facility

2.10 MAINTENANCE PROCEDURES (CONTINUED)

2. Visually checks auto lube operation at the system lube points looking for excess grease on the apparatus or the ground indicating possible broken lube lines or loose connections
3. Monthly lubricates all grease points (zerk fittings) and other moving joints that are not part of the auto lubrication system
4. During pre-trip brake and undercarriage inspection, checks the system hose lines and connections for looseness, kinks, or other damage
5. **DOES NOT** store any equipment (where the auto lube unit is located) that in any way touches, or can possibly touch, the system wiring or lube hoses
6. Reviews maintenance manual for appropriate lubricants and chart of lubrication points

F. Washing Instructions
1. Pierce maintenance manual section #4
2. Avoid using high water pressure, hot wash solutions, abrasive detergents, or rough cleaning materials or motions
3. Never wash in direct sunlight as the apparatus surface temperature may be too hot and gold leaf or other lettering may be damaged.
    a. Wax these areas only do not wash!
4. Use only vehicle washing soap such as 3M car wash soap PN_39000 or equivalent
5. Pre-wet all surfaces before applying soap solution
6. Use only soft materials and gentle cleaning motions to apply washing solution
7. Rinse thoroughly before washing solution can dry
8. Pressure wash ONLY the under-side of the apparatus
9. Dry all surfaces with a clean, soft, non-abrasive cloth or chamois
10. Avoid daily washing as it damages paint, wash only when dirty, wipe down with damp chamois or cloth to remove dust or dirt between washings

G. Apparatus Towing Instructions
1. **NEVER** tow an automatic transmission equipped vehicle in neutral, remove the drive shaft to prevent transmission damage
2. All towing operations and connections are the responsibility of the tow operator
3. Chock vehicle tires while working on or around the vehicle
4. Unload as much equipment as possible to reduce tow weight

H. Describes checks to be performed after any maintenance at any repair facility
1. Clean and refuel apparatus as necessary
2. Perform a complete inventory
3. Perform a complete pre-trip inspection
4. Check tire pressure before moving the apparatus and after driving 25 miles
5. Perform a complete post trip inspection immediately upon return to the station and immediately report any problems noted

03
Incident Communications

This page intentionally left blank

3.1 INCIDENT COMMUNICATIONS

A. Demonstrate Knowledge and ability to:

1. Interpret dispatch information from a cell phone
2. Explains and properly demonstrates Fire Department radio operating policies and procedures
    a. Uses correct radio terminology
3. Understands there is no MDC, so know where you are going
4. Read maps (SDFD, Thomas Brothers, & topographic) and find locations
5. Has alternate communication plan (Cell #'s, etc.…)
6. Select appropriate Staging position
7. Have the necessary supplies for a prolonged response (meals, water, etc…)
8. Communicate with the Incident Commander as to:
    a. Staging location
    b. Judge safety of staged and operating positions
    c. Appropriate PPE for incident
9. Ensure 800mhz and VHF Radio Fleet Maps is on apparatus and is the most current version
    http://10.200.100.88/documents/800RadioFleetmap.pdf
    http://10.200.100.88/documents/VHFMobileRadio.pdf
    http://10.200.100.88/documents/VHFPortableRadio.pdf

This page intentionally left blank

04
Driving

This page intentionally left blank

4.1 DRIVING

A. Checks that crew is seated and seat belts are fastened
B. Foot on brake
C. Wears appropriate gear for road, weather, and operating conditions, Has FULL PPE available for response
D. Releases parking brake
E. Does not allow apparatus to roll back
F. Acceleration
    1. Applies light accelerator pressure to begin movement
    2. Eases off accelerator as desired speed is reached
    3. Avoids full throttle acceleration from a stop
    4. Consistent, smooth, and controlled
G. Braking
    1. Anticipates stops and roadway imperfections
    2. Slows down and brakes before roadway imperfections such as dips and drainage swales
    3. Brakes into turn - Accelerates out of turn
    4. Leaves room to go around other vehicles or obstacles when stopped
    5. Consistent, smooth, and controlled
H. Operates engine in proper power range
    1. Maintain engine RPM in the lower 1/3 of the engine's power range for current operating conditions, which include the designated roadway speed limit
I. Operates vehicle with awareness of chassis length and chassis and equipment overhang
    1. Considers vehicle length when changing lanes.
    2. Slows sufficiently at bumps and dips in roadway to prevent chassis from bottoming out
J. Chooses correct lane for driving conditions
K. Follows all Fire Department Policies, Procedures, and California Vehicle Code regulations-
    1. Headlights on at all times.
L. Turning
    1. Plans and adjusts for short turning radius of vehicle, and how to avoid roll-overs
    2. Uses mirrors consistently during driving and maneuvering for positioning in turns and to monitor for possible hazards
        a. Awareness of all vehicles and obstacles in possible turning areas
    3. Utilizes turn signals well in advance of maneuver(s) to alert others of intentions
    4. Preselects appropriate gear to slow and control apparatus before and during turns
    5. Starts and completes turn in proper lane
    6. Obeys speed signs on all roadway turns
    7. Proper hand position on steering wheel
    8. Does Not let steering wheel slip through hands
    9. Avoids turning steering wheel while stopped
M. **DO NOT** idle engine for long periods of time (**10 minutes or more**) as damage to turbo and injectors will occur from poor engine lubrication
        a. If idling for long periods is required by operations, increase RPM level to a minimum of **900 RPM (High Idle)** to cool and lubricate engine and turbocharger

4.2 DRIVING CAUTIONS

A. Understands and applies height and weight restrictions to operation of the apparatus
    1. High center of gravity
    2. Mass of water in motion (4,000+ lbs)
    3. Partially empty water / foam tanks increase vehicle instability due to sloshing of fluid
    4. Reduced braking ability due to heavy weight (_____ lbs. GVWR)

B. **NO sharp turns at any speed above 10 mph**
    1. Preselects appropriate gear to slow apparatus for driving conditions and turns
    2. Does not brake hard while turning except at low speeds
    3. Checks the speedometer **BEFORE** making any turn
        a. **DO NOT** attempt to estimate the apparatus speed
    4. Remember, mass in motion will continue to move in the same direction
    5. When responding to emergencies, accelerate while driving straight, but downshift and brake before going into a turn or curve

C. **NEVER** allow vehicle to coast in neutral
    1. **TRANSMISSION DAMAGE WILL OCCUR**
    2. **ENGINE BRAKING** is not available
    3. **POWER** is not available when needed

4.3 BACKING

A. When and how to back (Refer to SDFD Ops Manual SI 1 Sec. 9 F.3, and City of San Diego Administrative Regulation 75.05 Backing Policy)
B. Use of emergency lights, and horn if appropriate.
C. Utilization of crew
    1. Use personnel to back apparatus at all-times (includes other responders)
    2. Utilize back-up horn control cable and signal button to assist in proper backing
    3. Stop immediately if backing personnel are lost from sight
    4. Ensures crew utilizes all backup warning devices
D. Communications with crew
    1. Remove communication headset to hear crew outside apparatus
E. Sets up backing maneuver by proper positioning
F. Appropriate speed while backing
G. Demonstrates procedure when alone
H. Turning radius when backing is _____ feet
I. Avoids over steering while backing

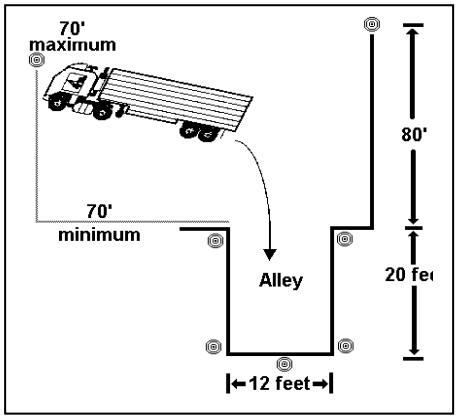
4.4 DRIVING SKILLS

A. Avoids over steering while backing. Demonstrates the following driving skills / maneuvers:

Driving skills can be demonstrated during normal driving after completion of required practice training and basic skill demonstration in an approved practice area(s). When practicing the DMV Skills, during the Off-Set Backing, Parallel Parking and Alley dock you are allowed two free pull-ups and may exit the vehicle a maximum of two times to check behind the vehicle. On the Straight Line Backing you are allowed one free pull-up and may exit the vehicle only once to check behind the vehicle.

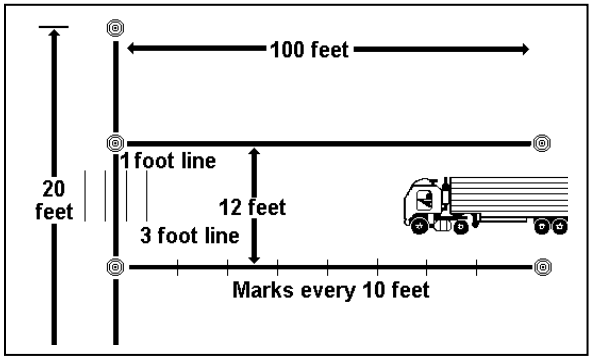
1. *__**Alley Dock** (Backing into the station) **(DMV)**__

Dock the vehicle from a 90-degree angle in one movement, without touching any cones or stanchions, staying within all boundary lines, and stopping within three (3) feet of the dock or stop line. Pulling forward will result in a penalty.



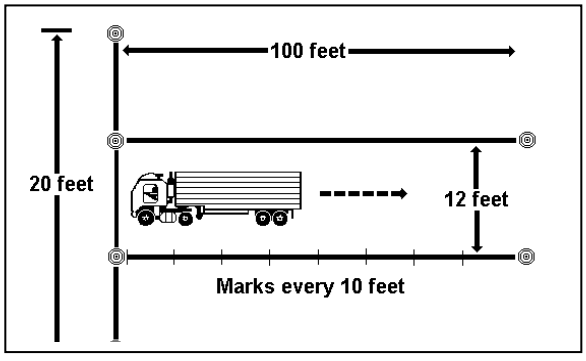
2. __**Forward Stop** (Limit-line)__

Drive down a 12-foot-wide lane and stop when the driver estimates that the bumper is even with the stop line. Driver is allowed to make **one** stop only, to be within one (1) foot of the stop line.



3. __**Straight Line Backing (DMV)**__

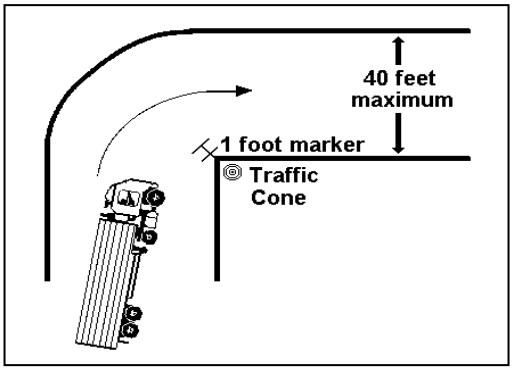
May be combined with forward stop (Limit Line). Drive in reverse in a 12-foot-wide lane without going outside the cones or boundary lines.



4.4 DRIVING SKILLS (CONTINUED)

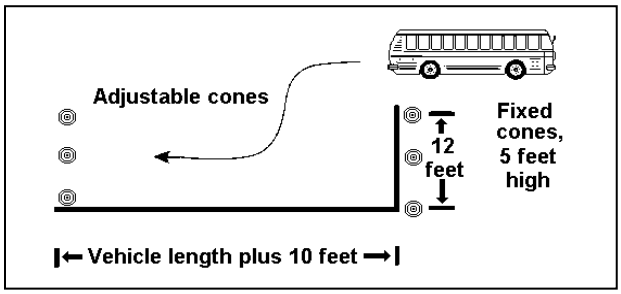
4. Measured Right Turn

Make a right turn around a corner with the back axles of the vehicle within one (1) foot of the designated cone, **without** striking it. All turns will be started from and completed into lanes that do not exceed twelve (12) feet in width.



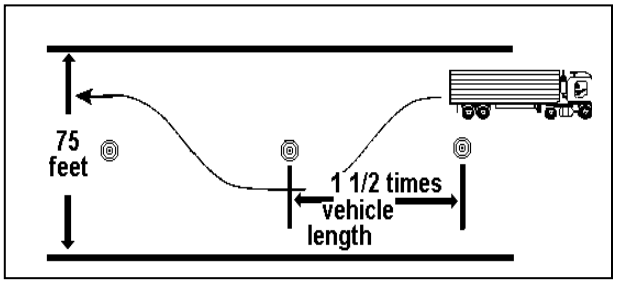
5. Parallel Parking (Conventional or Sight Side) (DMV)

Park in a designated area without striking any cones or boundary lines.



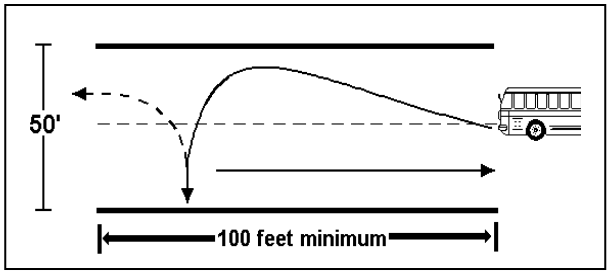
6. Serpentine

Maneuver vehicle both forward and in reverse around 3 cones in a serpentine manner without striking any cones and staying within the boundary lines.



7. Three-point U-turn

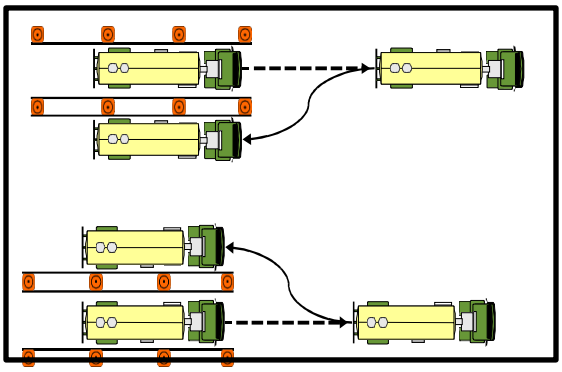
Driver turns the vehicle 180 degrees, staying inside the cones or boundary lines. There is no limitation on the number of maneuvers used to accomplish this task.



4.4 DRIVING SKILLS (CONTINUED)

8. Off-Set Backing (Left or Right) (DMV)

Pull to boundary line. Stop, then back vehicle to the opposite lane until the front of the vehicle has passed the first set of cones.



☐ 4.5 SHIFTING AUTOMATIC TRANSMISSIONS

A. Maintains and selects appropriate transmission gear for road, weather, and operating conditions to retain engine speed in power range
   1. The engine power range is the safest and most fuel-efficient rpm to operate the engine
   2. To reduce apparatus speeding incidents drive in the lowest possible gear that maintains the engine in the **lower 1/3 of the engine power range** at the posted speed limit

B. Manually selects lower gear when engine lugs or transmission cycles between gears

C. DOES NOT descend a hill in a gear higher than that required to ascend the hill

☐ 4.6 CODE 3 OPERATIONS

A. Explain Hazards associated driving this apparatus

B. Review SDFD Code 3 driving Policy, SDFD Operations Manual Standard Instruction 01, sec.09, pg. 2-7

☐ 4.7 UNIMPROVED/SEMI-IMPROVED SURFACES

A. Remember the GVWR of this apparatus is _____lbs.

B. Operation on semi - improved surfaces (other than fully engineered surfaces) **MUST** be done with extreme care as structural stability of surface and underlying soil is unknown
   1. Soil or surfaces other than dedicated streets or highways have unknown load bearing capability
      a. Gravel roadways or parking areas
      b. Back country roads (private and fire), culverts, and bridges
      c. Paved surfaces other than dedicated streets
      d. Private driveways
      e. Sidewalks
      f. Parking structures
      g. Adjacent to surfaces at the top of slopes
      h. Adjacent to surfaces or slopes above soil held in position by retaining walls
   2. Improved or engineered surfaces are load rated at **500 PSI**

C. Carefully inspects the apparatus, tires, and under carriage for damage after operation on an unimproved or semi-improved surface

4.8 SECURING APPARATUS FROM DRIVING

A. Refuels apparatus as necessary
B. Curbs wheels when on incline or decline
C. Set parking brake(s)
D. Transmission in park
E. Check engine temperature (normal temp _____)
    1. For high temperature idle at _____ to _____ RPM until normal temperature achieved
    2. Normal engine idle speed is _____ RPM
F. Wheel block down or in station parking cradle (manufacturers supplied wheel blocks only)
G. Post trip vehicle inspection
    1. Air and fluid leaks
    2. Apparatus damage
    3. Equipment missing or damaged
    4. Clean apparatus
    5. Plug in air and / or elect

05
Aerial Ladder

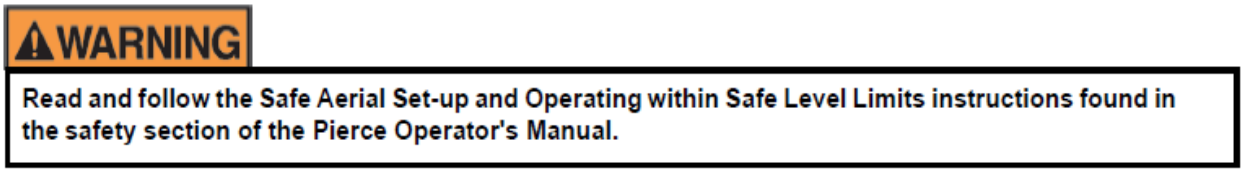
This page intentionally left blank

5.1 AERIAL DESCRIPTION

A. Describe ladder system and ladder design type
B. Sections to this ladder _____
C. Maximum Elevation _____degrees Maximum extension _____feet
D. Maximum grade for Slope (side to side) operation _____%
E. Maximum grade for Grade (front to back) operation_____%
F. Maximum aerial stability is achieved by _____?
G. Maximum GPM flow _____gallons @ Degrees and _____Feet Elevation?
H. Supply Hose sizes _____ft and _____ft.
I. Outrigger system type_____ Outrigger width fully extended _____ft.

5.2 LADDER CAPACITIES

WARNING - ALWAYS REFER TO APPARATUS LOAD CHART DO NOT RELY ON MEMORY!



REMEMBER to **ADD UP** the weight of Personnel, PPE, and Equipment operating on the ladder

A. Standard Load capacity is determined with apparatus operating at:
   1. Level ground
   2. Maximum elevation
   3. Full extension
   4. No water flowing
   5. Maximum Ladder capacity throughout rotation is_____lbs.
B. Load capacity, water flowing, 45 - 75 degree elevation_____#
C. Load capacity, water flowing, 0 - 44 degree elevation_____#
D. Inclinometer used _____
E. 100 % load capacity is allowed on grades up to _____degrees or _____% slope
F. Load capacity drops to 50 % on grades exceeding _____degrees or _____% slope
G. **DO NOT USE** ladder on grades exceeding _____degrees or _____%slope
H. Ladder capacity is reduced by **RUNG TILT**, Twisting of ladder from operation to the side while on a slope. Describe how to set up your apparatus, and use your ladder to keep the ladder from having a tilt to it while personnel are climbing, keeping the rungs parallel to the ground?

_____

_____

_____

_____

_____

_____

5.2 LADDER CAPACITIES (CONTINUED)

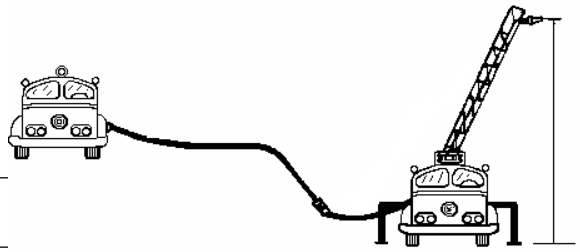
I. Describe types of ladder loads and the effects on the ladder

1. Dead (Static)
2. Live (Dynamic)
3. Impact / Shock
4. Torsional
5. Side

J. Describe reasons for ladder failure and give example
   1. Overloading
   2. Impact loads
   3. Torsional loads
   4. Mechanical damage
   5. Human.

5.3 HYDRAULICS

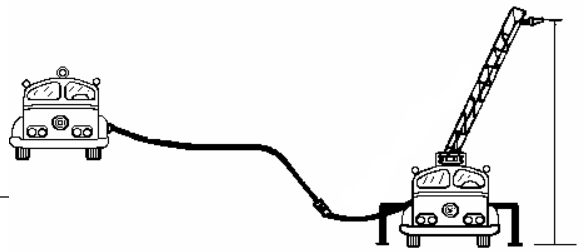
A. Immediate Pump Pressure _____ PSI
B. Fog Nozzle- Nozzle Pressure _____PSI
C. Ladder Pipe Appliance Loss _____PSI
D. 3" hose conversion factor _____
E. 4" hose conversion factor _____
F. Maximum Pump pressure _____PSI
G. Calculate the PP (Pump Pressure) for a Fog nozzle at 100' elevation. The supply line is 300' of 4" hose. **SHOW ALL YOUR WORK**



Pump Pressure =_____PSI

5.3 HYDRAULICS (CONTINUED)

H. Calculate the PP (Pump Pressure) for a Fog nozzle at 80' elevation. The supply line is 100' of 4" hose.
SHOW ALL YOUR WORK



Pump Pressure =_____PSI

5.4 LADDER SYSTEM OPERATION- Cab Procedures

A. Using Command Zone ensure to be between 0 and 30^0 Jackknife to ensure maximum ladder capabilities.
B. Shift Transmission into Neutral
C. Set parking brake(s) Front and Rear
D. Emergency Lights "ON"
E. Aerial Master switch "ON"
    1. Light color_____
F. Generator switch "ON" (if needed)
G. **Exit Cab**
    1. Take helmet, portable radio and other PPE

5.5 AERIAL STABILIZATION

A. **ALWAYS** be aware of road **CROWN** and **FALL LINE** of roadway
B. **ALWAYS** ensure **ALL BRAKES** are correctly applied
C. Place wheel blocks on left and right front tires, front and back, with collapsible wheel blocks locked. Must be done prior to outriggers CRITICAL ERROR

Correct placement:

1. Forward and aft of wheel
2. Wheel blocks should be in complete alignment with tire
3. Square to tread

D. Extend outriggers
    1. Low side first
    2. High side second
E. Place outrigger plates down
    1. Place plates with handles facing the truck side- trip hazard
    2. Lower jacks to ground- low side first- stair step lifting if needed, jacks should be placed in center of pad

3. Lower each jack until the on-ground indicator is illuminated

5.5 AERIAL STABILIZATION (CONTINUED)

4. Lower each jack further until the apparatus angle indicators show that the apparatus is within the safe level in slope and grade.

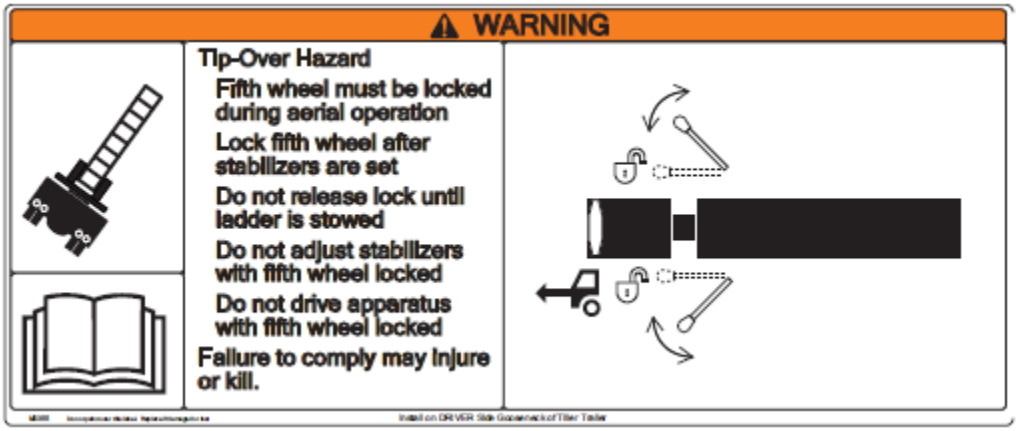
F. Rear Tractor Axle tires can be on or off the ground so long as the on-ground indicators are illuminated. If traction is of concern the bulge may be taken out of the tires.

G. Level Assist may be used, lower the stabilizers on both sides until the on-ground indicators begin to flash, engage the level assist switch to have the Command Zone system bring the apparatus into a near-level condition.

H. Install all stabilizer jack safety pins into the highest available hole on the jack

I. Move the fifth-wheel lock-out control lever to the LOCKED position

J. Observe the fifth-wheel lock-out control lever to make sure the retaining latch will hold the lever in the LOCKED position



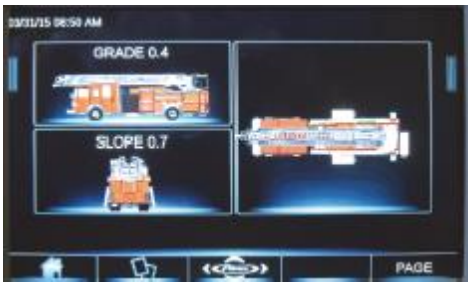
⚠WARNING

Do not operate the aerial when the tiller tractor is jackknifed in excess of 60 degrees for an Ascendant aerial of being in line with the tiller trailer. The apparatus is unstable in this condition and could tip over causing serious injury or death to personnel.

K. With Kingpin Lockout (Ascendant Aerial) If your tiller aerial apparatus includes a kingpin lockout feature, then it is designed to allow 360 degrees of ladder rotation with the tractor in-line with the trailer or jackknifed up to 30 degrees. Note that there is limited ladder rotation when the trailer is jackknifed between 30 degrees and 60 degrees. Observe the arrow indicators on the turntable and make sure that the arrow on the tractor is between the arrows on the turntable. This will ensure that your apparatus is within the 60-degree jackknife criteria.

5.5 AERIAL STABILIZATION (CONTINUED)

L. The Command Zone may be used on the pedestal, or inside the cab to see the status of the aerial device stabilizers, as well as the slope and grade of the apparatus.



Status Bar	Color	Beam Position	Jack Position
Deployed	Green	Full extension	Set
Short-Jacked	Yellow	Short extension	Set
Not Set	Red	Short extension	Not set
Stowed	Gray	Full retracted	Full retracted

M. Aerial Limitation Screen displays (Green-OKAY/Red-Not OKAY) for allowable aerial rotation, angle, and allowable aerial operating zones.

5.6 SHORT-JACK STABILIZER SET-UP

A. Your aerial device is equipped with a safety interlock that will prevent aerial operation over the short-jacked side. Do not rely on this interlock. Never attempt to rotate the device past the centerline of the apparatus over the short-jacked side.

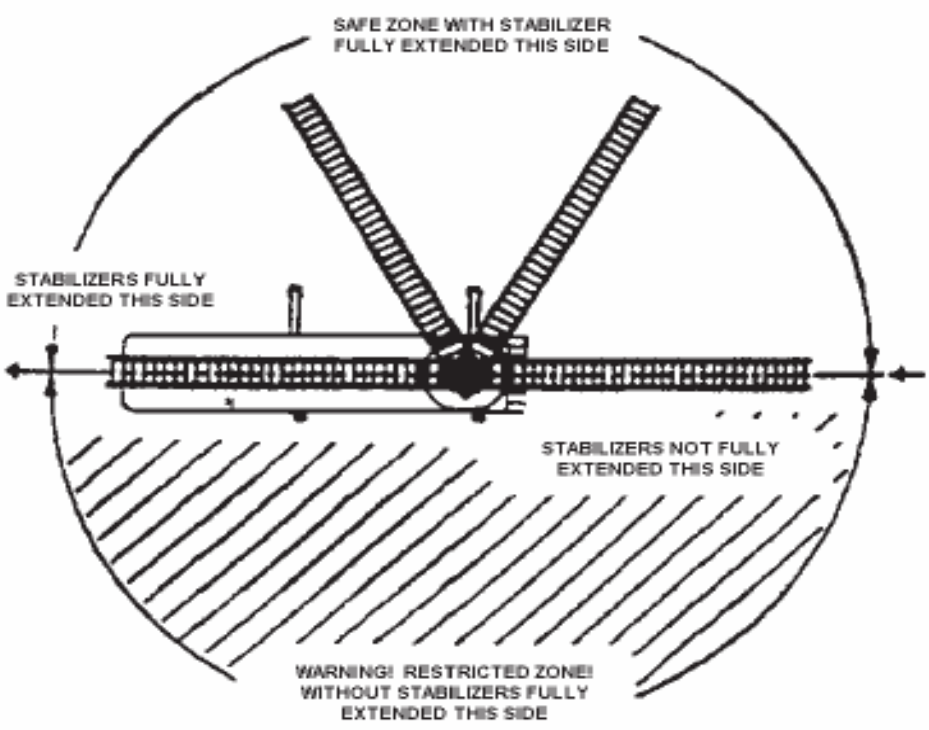
B. Your apparatus has the option of setting up with the stabilizers only partially extended on one side of the apparatus (short-jacking). **This option should only be used when absolutely necessary and only after all other attempts to re-spot the apprartus have been attempted.** This could be used when you are forced to set up in tight quarters. In the short-jacked condition you must only operate your aerial device over the side where the stabilizers are fully extended and set. You will NOT be able to safely rotate the device over the side where the stabilizers are not fully extended. Follow the procedure for stabilizer setup with the following exceptions.

1. On the short jack side, it will be necessary to extend the beam far enough to remove the stabilizer jack safety pin (if equipped) from its storage bracket and install it into the jack assembly.

5.6 SHORT-JACK STABILIZER SET-UP (CONTINUED)

2. If your apparatus is equipped with Command Zone control system a short-jack graphic indicating the short-jack condition will appear on the CZIC display when the procedure is complete.

C. If Short-Jacking is necessary, **<u>you must inform the Company Officer and the Incident Commander</u>** that the truck is being utilized in the short-jack position.



5.7 OPERATIONAL CONSIDERATIONS

A. Ensures Fire Fighting Safety
   1. Engineer at operating aerial device or on pedestal "IS" the **ACCOUNTABILITY OFFICER** for this entry point
   2. Observes incident conditions and advises officer, assigned personnel, and command of condition and situational changes

B. Rescue priorities
   1. Most severely threatened
   2. Largest group
   3. Remaining victims in fire area
   4. Other exposed persons

C. Rescue techniques
   1. Remove victim from fire or hazard
      a. Begin at highest point (Top then Down)
   2. Drop ladder to victim from above to prevent people from jumping on the ladder
   3. Remove fire or hazard from victim or area
   4. Ventilate structure

5.7 OPERATIONAL CONSIDERATIONS (CONTINUED)

D. Avoid impact and dynamic loads to aerial device when rescuing persons

1. Approach victim location from above to prevent victim jumping on the ladder
2. Carefully consider load capacities when assisting victims **ON TO** and **DOWN** the ladder
3. Consider load distribution on ladder when rescuing victims
4. Multiple persons on the ladder will result in twisting forces as they move on the ladder

E. **NEVER** Position stabilizers on top of manholes or other ground equipment boxes
F. **NEVER** Position stabilizers on top of Sidewalks or curbs
G. **NEVER** Position stabilizers on top of unprepared surfaces; such as dirt, loose soil or gravel
    1. Parking lot surfaces are not engineered for loads; use extreme care when stabilizing and loading apparatus
H. Describe and demonstrate the **SAFE ENVELOPE** of operation for this aerial device
I. Describe and demonstrate **SCRUB** area or **TARGET** area for this apparatus Aerial device
    1. Locations that the Aerial device can reach under normal operating conditions
    2. Reachable locations vary depending on the apparatus position relative to the building or objective
J. Positions apparatus to keep ladder extensions as close as possible to the center line of the apparatus and fall line of the roadway for maximum ladder reach and stability
    1. Off the rear (**BEST POSITION FOR SERVICE AERIAL LADDER OPERATION**)
    2. Off the front
        a. Within 45 degrees of center line of apparatus
        b. **REMEMBER** the effects of **ROAD CROWN**
K. General apparatus positioning
    1. Positions apparatus parallel to and in front of building for equipment and ground ladder utilization
        a. Consider immediate use of the aerial device when operational conditions warrant
        b. Factor in height and / or positioning of structure relative to access and incident
        c. Anticipate changes in conditions and operations
    2. Maintain awareness of companies blocking access to ground ladders and reposition these units to prevent them from blocking access to ladders, equipment, or the incident (structure)
    3. Clear of overhead obstructions
        a. Power lines
        b. Building components
L. Placements for Rescue
    1. Perpendicular to building
    2. Parallel to building
    3. Flush with sill of window or balcony railing
    4. Above roof line or object location for all other situations
M. Placement for Ventilation_____
N. Placement for Water tower operation _____
O. Placement for below level operation _____
P. Placement for operations on an incline
    1. Uphill
    2. Downhill
    3. Side hill
    4. Best ___

5.7 OPERATIONAL CONSIDERATIONS (CONTINUED)

Q. Accurately and correctly places apparatus and ladder for

1. Roof operations
2. Windows
3. Fire escapes and balconies
4. Below Level position

5.8 PEDESTAL CONTROLS

A. Operating gauges
B. Intercom system
C. High idle switch
D. Extension / elevation / rotation control levers
E. Ladder light switches
F. Inclinometer
G. Ladder Load Chart(s)
H. Rung alignment indicator
I. Command Zone functions
J. Camera functions
K. Remote nozzle controls

5.9 AERIAL EVOLUTIONS

A. Trainee must perform the following evolutions utilizing appropriate procedures
   1. To Roof
   2. Window Rescue
   3. Fire escape and balcony rescue
   4. Low angle rescue
   5. Lifting and placing rescuer with rope system
   6. Water Tower

5.10 EMERGENCY POWER UNIT

A. Procedures for electrical and hydraulic failure
   1. Procedures to take control
B. Describe use and demonstrate operation
   1. Emergency pump HP_____Speed (RPM)_____Pressure (PSI) _____
   2. Manual circuit selector
   3. Manual interlock override
   4. Pedestal outrigger and aerial operation interlock over rides
C. Limits of EPU operation
   1. ONLY operate__seconds_____Times per minute for___minutes maximum
D. Describe and perform EPU operational check
E. Describe procedures if emergency pump overheats and / or hydraulic fluid is hot

5.11 EMERGENCY LADDER OPERATIONS

A. Knowledge of manual and / or emergency ladder operations
   1. Operation requires (2) two personnel to perform
   2. Follow instructions under metal plate on 1st step from platform to ladder
B. Dash ignition Switch "ON" for emergency pump (On Seagrave, disengage transmission and PTO)
C. Perform manual and emergency ladder operations
   1. Rotate
      a. Use EPU to rotate aerial device
   2. Bleed off hydraulic pressure to retract and bed ladder
      a. Retract
      b. Lower

5.12 OPERATION OF AERIAL LADDER DEVICE FROM PEDESTAL

A. Proper sequence for operation
    1. Rescue situation (Elevate- Rotate- Extend-Lower to objective or designated area for rescue)
    2. Ladder pipe operations (see Chapter 6 in this task book)
        a. Utilize a firefighter on the ladder pipe **only as a last result.**
        b. The firefighter may **climb the ladder only after the ladder is elevated and extended.**
B. Operate pedestal controls with HIGH IDLE switch **"ON"**
C. **DO NOT** operate the ladder if the Stabilizer Not Fully Extended Light is illuminated
    1. Indicates one or more stabilizer beams not fully extended
    2. High idle indicator light will not illuminate - **DO NOT** turn high idle **"ON"**
D. Properly / Safely elevate to object or use position
    1. Keep elevation angle above 45 degrees whenever possible to reduce ladder loading
E. Extends ladder using proper rung alignment
    1. Green alignment indicator light "ON" indicates that overlapping section rungs are aligned
F. Properly rotates ladder to operating position
G. Properly lowers ladder to building or object (does not touch building or object)
    1. Utilize low idle when close to building or other objects to prevent damage to nozzle and Waterway
H. Aerial evolutions are done **SLOWLY** and **SMOOTHLY** and Aerial device is **FEATHERED** to a stop at **ALL** times

5.13 SECURING APPARATUS FROM AERIAL OPERATIONS

A. Notify supply engine to stop pumping and / or secure
B. Close discharges and bleed down line pressures **BEFORE** retracting ladder
C. Leave system drain **OPEN** on **ALL** pre-plumbed apparatus **until ladder is secured in the cradle**.
D. Ensure personnel on ladder are returned to ground
    1. **"DO NOT RETRACT WITH PERSONNEL ON THE LADDER"**
E. Raise ladder from objective
F. Verify ladder pipe nozzle tipped up to clear windshield when bedding ladder
G. Lower ladder and secure in cradle
H. Gently power ladder into cradle to prevent shifting while driving apparatus
    1. Until top rail of lower section begins to deflect outward
I. Properly stow ladder pipe system
    1. Return ladder to rescue MODE position
    2. If straight tip is utilized on ladder pipe, stow in correct location and reinstall fog nozzle
J. Determine engine temperature normal__▪ , idle to cool if necessary
K. Performs walk around
    1. All equipment accounted for
    2. All equipment secured
    3. Compartment doors closed
    4. Wheel blocks up and stowed
    5. Clear to proceed

5.14 SAFETY PROTOCOL

A. **ALWAYS** put jack plates down with handles to the side or inside to eliminate any trip hazard
B. **ALWAYS** observe **ALL** moving apparatus, ladder jack, and ladder components when placing into or removing the ladder from operation to prevent injury to personnel or ladder damage
C. Check for overhead obstructions
D. **DO NOT**, at any time, operate ladder close to, around or thru any wires or cables
    1. Electricity both static and generated will arc to ladder causing injury and damage
    2. Smoke, rain, nozzle spray, runoff water, and cable deformation can contribute to arc potential
    3. All cords and wiring on the apparatus will conduct electrical arc's and other electrical charges to earth ground, including communications headsets worn by personnel
E. Observes Ladder load limits
    1. **DO NOT** rely on memory use load charts or tables
    2. Apply all loads perpendicular to ladder rungs (design strength) not laterally to ladder
    3. Tip loads are computed with the apparatus on level ground and waterway drained
    4. Maintain separation between personnel on the ladder to distribute the load according to the ladder load chart.
    5. The Inclinometer is the **KEY** device in determining load capacity
    6. Ladder pipe operations reduce load capacity and **MAY PROHIBIT** other uses
F. Understands ladder dynamic and static loads and demonstrates caution when moving ladder
    1. Avoid rapid and / or jerky movements with ladder controls; these actions cause twisting and other improper loads on the ladder, utilize **slow smooth movements**
    2. **ALWAYS** turn water flows **ON** and **OFF SLOWLY** to avoid **DYNAMIC** forces moving the ladder and causing damage or injury
    3. **ALWAYS** be aware that strong winds **WILL** affect the load capacity and stability of any aerial device. Winds over 35 MPH **REQUIRE** to **DISCONTINUE** use of ladder
    4. The smaller the ladder elevation angle (closer to horizontal) the lower the load capability of the ladder is
    5. Shock loads such as a person jumping on to the ladder, impose stress several times grater than those loads involved when the load is gradually applied and may cause I**MMEDIATE** ladder failure
G. Grant permission to mount pedestal platform
H. Grant permission to climb ladder
    1. Inspect personnel for PPE and SCBA
    2. Inspect personnel for loose or unsecured objects that may fall or be dislodged, leave at ground level
    3. Inspect for ladder belt
    4. Brief personnel on manual ladder belt signals
        a. One (1) tap Move ladder to the RIGHT
        b. Two (2) taps Move ladder to the LEFT
        c. Three (3) taps **HELP** assistance or communication **REQUIRED**
    5. Ensures personnel perform ladder belt test prior to mounting and climbing ladder

5.14 SAFETY PROTOCOL (CONTINUED)

I. **ENSURES** use of life belt, and foot pedals.
    1. Leg locks are prohibited on an aerial ladder

J. Maintains visual contact with personnel on ladder and top of ladder

K. Monitor and verify fatigue level of personnel working on ladder at regular intervals (NOT TO EXCEED 30 minutes) and provide relief when necessary

L. **ENSURE** no apparatus park **UNDER** or firefighters work **UNDER** a raised Aerial device

M. **NEVER** power into or support ladder on a building or other surface
    1. Defeats the cantilever design of the ladder, its major strength
    2. Position a minimum of 12" above roof, wall or windowsill

N. **NEVER** utilize ladder as:
    1. A battering ram or tool to break objects, such as punching out windows
        a. Windows may be broken by dropping the ladder tip into the window (allowed by NFPA)
    2. To support any portion of a structure

O. **NEVER** scrape ladder on or along the surface of any objective (roof, wall, balcony, or window)
    1. Maintain clearance and keep movements slow, smooth and gentle

P. **NEVER** use ladder as an Anchor Point for any rigging system except the department approved System described in the using ladder as a lifting device section of this task book (Chapter 7).
    2. All other Anchor Points SHALL only be attached to apparatus wheels, frame, or anchor points.

Q. **NEVER** rappel from any aerial ladder as this produces uncontrollable loads on the ladder

R. The outrigger **INTERLOCK OVERRIDE** switch **SHALL** be utilized only in emergencies to cradle the aerial ladder
    1. Utilizes jack system override to **UNSTICK** stabilizer beam or jack for retraction ONLY
    2. System may not be completely extended and interlock will prevent system operation
    3. Interlock prevents ladder retraction if an outrigger lifts off the ground.

S. Keep knees clear of tailboard or side of apparatus when lowering stabilizing jacks to prevent injury.

T. Keep hands clear of yellow caution areas and **ALL** moving parts to prevent injury

U. **Only** a Command Officer **MAY** at their discretion in a life threatening emergency, override a safety protocol.

V. **EXTREME CAUTION MUST BE USED AT THIS TIME**
    1. Any Aerial device used in any **non-approved** manner or damaged in an accident **SHALL** be placed out of service and the Repair Facility notified.
    2. The Truck may remain in service, but the Aerial device is out of service until repaired, inspected and test

This page intentionally left blank

06
Ladder Pipe Evolution

This page intentionally left blank

6.1 LADDER PIPE DESCRIPTION

A. The placement of the ladder pipe/nozzle appliance will need to be secured onto the ladder and supplied by the 3" supply hose carried only on the Pierce TDA.

B. A 4" hose will be supplied by an engine connecting to a manual 4" to 2 ½" gate valve that is also carried only on the Pierce TDA.

C. SDFD Pierce TDA Ladder Pipe Components:

1. Akron 1494 Ladder Pipe Assembly with 2 ½" coupling (1000 max. gpm)
2. Akromatic Electric Master Stream Nozzle
3. TFT In-Line Gate Valve 4" intake to 2 ½" discharge
4. Two hose straps with aluminum carabiner

6.2 OPERATIONS TO BE PERFORMED

A. Spot apparatus considering optimal placement for waterway.

1. Tractor/Trailer jackknife position in-line (zero degrees) up to 30-degree jackknife for greatest ladder load capability. 30-59.9 degrees jackknifed position the aerial ladder capabilities will be limited to the non-jackknifed side only.
2. In excess of 60 degrees jackknife the apparatus is unstable and could tip over causing serious injury of death to personnel.
3. *Consider placement of the waterway hose coming off the turntable and down to the manual gate valve and to the supply engine. This makes working off the side of the apparatus generally preferred for hose placement.

B. Ensure spring and front brakes are both applied, then engage aerial master.

1. *Aerial master will not engage if both brakes are not applied.

C. Chock the front and back of front tires on Engineer and Captain side of tractor.

D. Extend outriggers, low side first, high side second. Then place outrigger pads in center of jack.

1. *It is recommended to deploy outriggers from their respective sides to ensure they are clear of all obstacles.
2. *Pierce recommendations are to raise the rear tractor axle tires off the ground or take the bulge out of the rear tractor axle tires so long as the on-ground indicators are illuminated. Consider improved braking when maintaining contact with the ground with your rear tractor tires. By not removing enough weight from the rear tractor tires, outriggers may become unweighted in some instances, restricting aerial movements.
3. *Lower outrigger jack located on the downhill/low side of the apparatus first. Continue holding the jack down switch until it automatically stops. Repeat the same process on the high side of the apparatus. Additional weight may then be taken off the rear tractor axle tires by adding additional down input to each jack while also properly leveling the turntable. The auto level switch may also be used for leveling but the goal is to bring the apparatus level indicators into the green for slope and grade.

E. Ensure all on green indicator lights are illuminated to activate ladder power

F. Ensure outriggers are properly pinned.

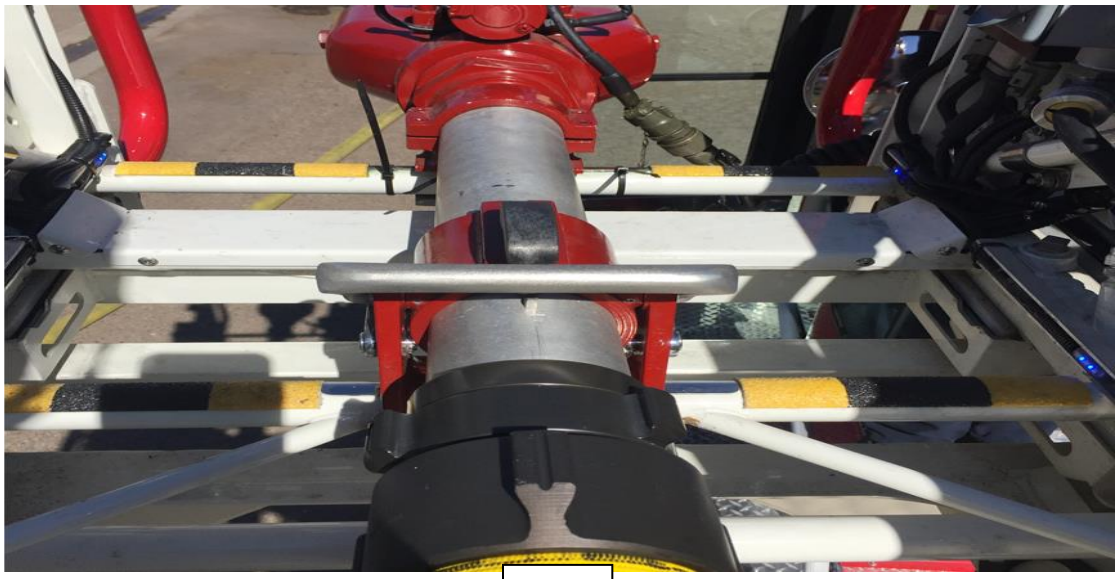
G. Prior to mounting turntable, switch hydraulic diverter from outrigger to ladder mode and set the lock.

6.3 DEPLOYING THE MANUAL WATERWAY AND AKRON AERIAL NOZZLE

*****ATTENTION*****

Ladder must be raised from the cradle and offset from the tiller cab in order to mount the waterway nozzle. This can be safely achieved by raising the ladder up to 2-3 degrees and then rotating left or right until the ladder beam is in line with the opposite corner of the tiller cab. Ensure clearance from obstacles along trailer while rotating ladder. This movement of the ladder allows for the nozzle to be easily removed from the ladder pipe mount and then handed to an additional crewmember on top of the ladder. The nozzle is now secured to the top two rungs of the fly section with the manual locking clamp. It is preferred that two personnel are utilized to mount the nozzle (one on the ladder and one on the trailer) due to the weight and length of the appliance for safety.

A. Secure waterway and mount it onto the top two rungs of the fly section. Connect electronic connections from aerial ladder to the ladder pipe. (see pic. 1).



Pic 1

*****SAFETY NOTE: <u>There is no safety mechanism to prevent the attached nozzle from being moved into the tiller cab. Exercise caution while making movements near the tiller cab with the nozzle attached.</u> *****

6.3 DEPLOYING THE MANUAL WATERWAY AND AKRON AERIAL NOZZLE (CONTINUED)

B. Secure 3" waterway hose, lay it down the length of the ladder on the rungs (this may be done when originally walking out the ladder), and attach it to the mounted nozzle spanner tight all connections-nozzle and hose/coupling connections. Secure hose to the ladder utilizing hose strap to the hose with a cow hitch 2-3 feet from the coupling and around a fly section rung with the carabiner resting on top (see pic. 2). Personnel will now exit the ladder.

Pic 2

CAUTION	**Do not allow hose, couplings, hose-straps, etc...to become trapped between the rungs or equipment damage may result**

6.3 DEPLOYING THE MANUAL WATERWAY AND AKRON AERIAL NOZZLE (CONTINUED)

C. Elevate, Extend (deploying hose), then Rotate ladder to desired position for ladder tower operation. The Akron automatic fog nozzle does not allow for left and right movements, only stream adjustments (fog to straight stream) and movements up and down. Movements left and right will be made by rotating the ladder.

1. *Additional personnel will ensure hose deploys smoothly from the hose storage box while the ladder is being extended and positioned by the aerial operator. After aerial is positioned, remove remaining hose from storage box and connect it to the 4"x 2 ½" waterway gate valve (see Pic.2) placed on the ground near the pedestal of the TDA. There is an additional 25' section of 3" waterway hose that can be utilized as needed. Consider the routing of your 3" hose to allow for elongation and movement when charged with water. Avoid hose and or coupling binding/damaging railings, flood lights, and body of apparatus as the hose is moved or charged

Pic 3

D. Ensure the 4" supply line has been connected to the "closed" 4" x 2 ½" waterway gate valve and master stream couplings are all spanner tight. Water is called for to the closed gate valve.

1. *Truck personnel should ensure that care has been placed into laying the 4" aerial supply line as flat and straight as is reasonable to minimize movement of the gate valve while it is charged. The supply line shall be charged slowly by the supply engine at idle pressure to manage movement of the gate valve.

E. Truck Engineer will call for water. The firefighter will open the gate valve and monitor the hose charging on the ladder and near the turntable to reduce the risk of hose damaging apparatus, injuring personnel and to reduce nozzle/ladder reaction. After the hose is charged, water is flowing from the nozzle, ensure lines are free of kinks and resting in safe locations limiting movement or chance of damage, then secure second hose strap to the ladder near the base of the ladder (bottom 5 rungs).

CAUTION	**Do not extend or retract the Aerial ladder with a charged hose**

6.3 DEPLOYING THE MANUAL WATERWAY AND AKRON AERIAL NOZZLE (CONTINUED)

F. Pump Engineer will factor in the following for Hydraulic calculations
   - NP= 80 psi (this is a low psi adjustable fog nozzle)
   - TFL= 90 psi for 100' 3" Hose
   - TFL= 13 psi per 100' 4" supply hose
   - AL= 15 psi
   - GL= .5 psi per 1 foot of elevation based on extension of ladder. (confirm this with truck engineer)

6.4 SHUTTING DOWN THE MANUAL WATERWAY OPERATION

A. Ensure that pump engineer slowly returns pump pressure to idle. Once at idle, pump engineer closes the discharge to the supply line.

B. Fire fighter closes the gate valve while pump engineer continues to drain their supply line. Break the 4" side of the waterway hose line at the waterway gate valve. Then, slowly open the waterway gate valve to remove remaining water from the aerial waterway hose. Disconnect 3" hose from the waterway gate valve.

C. Remove the bottom hose strap from the ladder and the hose. Utilize personnel to tend the 3" hose at and near the turntable as the ladder is retracted. Hose may be taken to the ground to roll and remove air, or if well drained it can be loaded into the storage box.

D. After ladder is fully retracted, rotate and lower the ladder bringing the ladder and nozzle down near the tiller cab. A spotter shall be used to give the Truck Engineer hand signals showing the distance between the nozzle and the tiller cab stopping Aerial movement at least 3 feet from tiller cab. **Reminder that there is no safety to prevent the nozzle from striking the tiller cab.**
   1. * When the ladder is within 8 degrees of elevation near alignment with the trailer, the ladder will enter the "bed assist" feature. While holding the ladder "down" control, the ladder will begin to make left or right adjustments coming to the midline of the trailer in addition to down movements in order to self bed. **This feature is not to be over ridden**, be aware that it will move the nozzle into the tiller cab if the ladder operator does not stop their movements to prevent bed assist from moving the nozzle into the tiller cab.

E. After the ladder movement is stopped, a crew member may walk out the ladder to the nozzle. The hose shall be disconnected from the ladder pipe and set aside. The nozzle can then be unlocked and removed and placed on the rungs of the ladder in the control of the firefighter standing on the ladder. The nozzle is no longer projecting beyond the tip of the ladder.
   1. ***It is recommended that a crew member standing on the trailer assists the firefighter on the ladder with the removal of the nozzle by preventing the nozzle from tipping forward when the clamp is unlocked.**

6.4 SHUTTING DOWN THE MANUAL WATERWAY OPERATION CONTINUED

F. The ladder operator can now resume lowering the Aerial ladder with the crewmember riding inside the fly section of the ladder on the nozzle. When the ladder reaches two degrees incline, the ladder operator can again rotate left or right of center until the beam aligns with the opposite corner of the tiller cab. The firefighter on the ladder can now pass the nozzle back down to the crew member standing on the trailer where it will then be secured back onto the trailer nozzle mount.

    1. ***Ladder operator must always visualize clearances around the ladder during movements to prevent contact or damage.**

G. After the nozzle is secured and with all members off and clear of the ladder, the ladder can be completely stowed on its cradle.

07
Lyfe Pulley

This page intentionally left blank

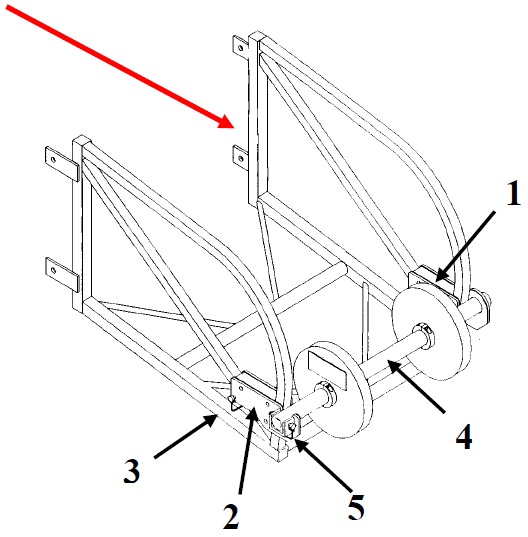
7.1 USING LADDER AS A LIFTING DEVICE WITH THE LYFE PULLEY SYSTEM

⚠DANGER – Death or serious personal injury may occur if these procedures are not followed

A. You must not operate this device unless:
   1. You have been trained
   2. You follow the safety and operating recommendations contained in the Pierce apparatus manual
   3. You follow SDFD policy
   4. Use only with NFPA approved rescue safety rope
   5. Use this pulley system only on ladders manufactured by Pierce Manufacturing Inc.
   6. You establish a safety area for rigging, loading and off-loading of the rescuer(s) and victim(s) prior to rigging the ladder rope system, and attempting any rescue operation

B. Install the Lyfe Pulley System on the portion of the ladder called the "EGRESS"
   1. **NOTE: This portion of the ladder is called the "EGRESS"**

C. Ensure the following information is understood and applied to all installations:
   1. Use Lyfe pulley system only when **all pins and fasteners are properly installed**
   2. **Use only original equipment fasteners**
      a. **Never use substitute pins or fasteners**
   3. The left (# 1) and right (# 2) **mounting brackets** for the Lyfe pulley system on the egress are unique and they **are not interchangeable**
   4. The pin (# 5) securing the shaft and pulley assembly **must pass through both** the right mounting bracket (# 2) and the Lyfe pulley shaft (# 4)



D. MOUNTING BRACKET INSTALLATION STEPS
   1. Install left mounting bracket (# 1) and right mounting bracket (# 2) on egress with two pins (# 3). Note: Mounting bracket pin on #1 side not shown
   2. Slide shaft and pulley assembly (# 4) through hole in left mounting bracket (# 1)
   3. Lower other end of shaft into right mounting bracket (# 2) and secure with pin (# 5)
   4. The pin securing the shaft and pulley assembly must pass through both the right mounting bracket and the shaft.

E. The system pulleys may be positioned (spaced) at any location along the mounting shaft bar
   1. To reposition pulleys, loosen pulley collar setscrews, relocate pulley, and retighten setscrews
   2. San Diego Fire-Rescue Department (SDFD) policy **REQUIRES** both pulleys be centered on the Lyfe pulley system mounting shaft to reduce torsional forces to the ladder

7.2 LYFE PULLEY USE GUIDELINES DANGER REMINDERS

A. Before attempting the rigging and rescue operation, establish a safety area for rigging, loading, and off loading of rescuer(s) and victim(s)
B. The capacity of the pulley system is **500 lbs or the tip load of the ladder**, whichever is less
C. Do not allow the pulley system to come into contact with any objects (rocks, cliffs, walls, windows, victim, and rescuer)

7.3 RIGGING AERIAL LADDER FOR A HIGH ANCHOR POINT

A. Properly install the cross bar and shaft and pulley assembly to the end (Egress portion) of the ladder
    1. This rope system requires **BOTH** the cross bar and shaft and pulley assembly to complete the high anchor point system
    2. Shaft and pulley assembly with pulleys centered on the shaft
    3. Cross bar

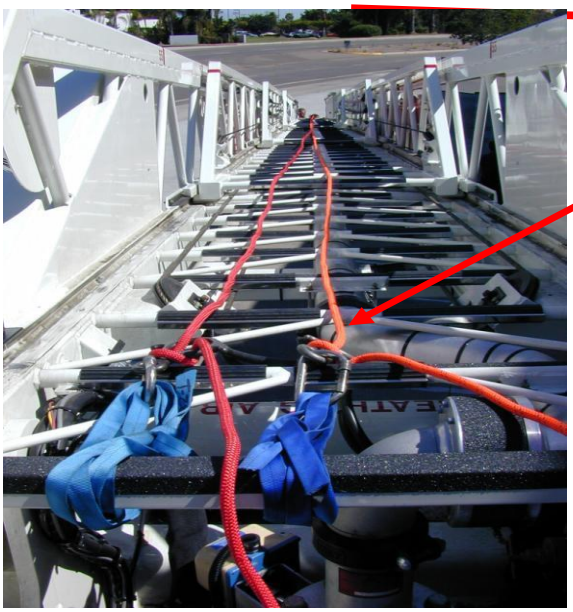
B. Obtain and deploy the following rope rescue equipment to rig the aerial ladder pulley system
    1. Two (2) ½" x 300' static kernmantle ropes (400'ropes are being ordered for this evolution)
    2. Two (2) pulleys
    3. Six (6) steel carabiners
    4. Two (2) eight plates
    5. Four (4) 1" pieces of tubular webbing
C. Begin by separating the above listed equipment into two areas
    1. Ladder tip area
        a. Two (2) ½" x 300' static kernmantle ropes
        b. Two (2) pulleys
        c. Two (4) steel carabiners
        d. Two (2) 1" pieces of tubular webbing to attach to the rescuer at the end of the rig
    2. Ladder base or pedestal area
        a. Two (2) steel carabiners
        b. Two (2) eight plates

7.3 RIGGING AERIAL LADDER FOR A HIGH ANCHOR POINT (CONTINUED)

b. Two (2) 1" pieces of tubular webbing foranchor points
c. Two (2) prussic (Optional)

D. Build the ladder rope system in two stages, making identical belay and haul systems
   1. Split the ladder tip equipment cache into two (2) identical smaller caches
   2. Tie a figure eight on a bight and clip it into the cross bar with a steel carabiner
   3. Attach one pulley and one carabiner to the rope and loop the rope up and over the Lyfe pulley, down to the base of the ladder. This is called the ladder rig
   4. Any load shall be attached to the pulley carabiner
   5. Rig the second line over the unused Lyfe system pulley wheel in an identical manner

E. Complete the ladder rope system in two stages by building identical anchors for the belay and haul systems
   1. Split the ladder base equipment cache into two (2) identical smaller caches
   2. Tie a webbing anchor around the three-inch crossbeam at the base of the ladder
   3. Load an eight plate and attach it to the webbing with a carabiner



4. To complete the second system, rig the second line by duplicating the first rigging process
5. The complete high anchor point system has two identically rigged main (haul) line and belay line
6. DO NOT lock off the ropes to the eight plates at this time
7. A prussic may be added as a dead man safety to protect the rescuer should a lower/belay person become incapacitated.

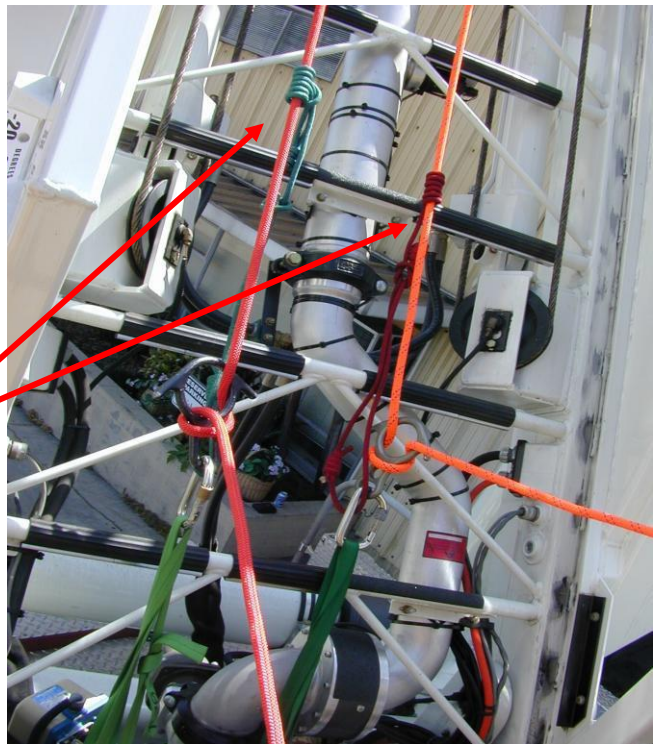
7.3 RIGGING AERIAL LADDER FOR A HIGH ANCHOR POINT (CONTINUED)

F. Complete the ladder rope system in two stages by building identical anchors for the belay and haul systems
    1. Split the ladder base equipment cache into two (2) identical smaller caches
    2. Tie a webbing anchor around the three-inch crossbeam at the base of the ladder
    3. Load an eight plate and attach it to the webbing with carabiner

4. To complete the second system, rig the second line duplicating the first rigging process

5. The complete high anchor point system has two identically rigged main (haul) line and belay line

6. **DO NOT** lock off the ropes to the eight plates at this time



7. A prussic may be added as a dead man safety to protect the rescuer should a lower/belay person become incapacitated

    NOTE: These prussics must be tended to prevent them from setting whenever the rope is moving

8. Attachment of the ropes to the ladder base at the pedestal, allows the turntable to be rotated 360 degrees without a diagonal pull on the ladder or interference from stationary objects

7.3 RIGGING AERIAL LADDER FOR A HIGH ANCHOR POINT (CONTINUED)

G. Use two (2) pieces of webbing to extend the body harness connections to the ladder rig pulleys, away from the rescuer's body, keeping hands, clothes, and tools
    i. out of the pulley system

H. Connect the stokes collection ring or eight plate directly to the two ladder rig carabineers.

7.4 HIGH POINT ANCHOR SYSTEM OPERATION

REMINDERS:

A. **ALL** steps of this rescue system's operation must be practiced in advance and fullyunderstood by **ALL** crewmembers prior to beginning a rescue

B. The system's eight plates should **NEVER** be locked off when the ladder is in motionbecause any bind in the rope or another system component may harm the rescuer, victim, or the ladder

C. Depending on rescue needs the order of deployment may vary

7.4 HIGH POINT ANCHOR SYSTEM OPERATION (CONTINUED)

A. Operation of the system requires three (3) personnel on the ladder pedestal
    1. An aerial ladder operator
    2. One belay person
    3. One main (haul) line person

    Note: Both system lines are rigged the identicallyand either can be used as the main line or belay line

B. It is important that the ladder operator **FULLY** understand the operation of the ladder and pulley system combination and how each ladder movement (raising, lowering, retracting, or extending) changes the upward or downward movement of the system ropes
    1. Watch both the top and bottom of the ladder for interference of ropes, webbing, carabiners,and pulleys with each other, the ladder, and any load(s)

C. The raising / lowering operation is most effective when using the ladder at the highest angle possible
    1. This will allow for the most flexible use of the system to deploy the rescuer
    2. The operational steps include:
        a. Rig both ladder systems as described
        b. Attach rescuer/stokes to ladder rig carabineer as described
        c. Retract the fly ladder to approximately six (6) feet of the fully retracted position, (ladderbase) if not already there
            1) Full retraction may cause rope system entanglement with the ladder
        d. Raise the ladder to the highest point without rope(s) contacting the ladder. Allow allropes to pay out during this maneuver
        e. Watch ropes and ladder components for contact with other objects
        f. **DO NOT ATTEMPT** the rescue at this time

REMINDER: The eight plates should **not** be locked off when the ladder is in motion (rotation, extension, retraction, raising, or lowering)

D. If the rescuer is not attached to the ladder rig before raising, than with the ladder fully elevated and properly retracted, rig the rescuer to the end of the ladder rig

E. The rescue leader will then give the command for the two line tenders on the pedestal to puttension on the eight plates

F. The rescue leader will then give the command for the ladder operator to raise the rescuer or stokesbasket from the ground

7.4 HIGH POINT ANCHOR SYSTEM OPERATION (CONTINUED)

G. The ladder operator will now adjust the ladder position, under the guidance of the rescue leader,to place the rescuer into a position to reach the victim
    1. This process may require the ladder to be elevated, retracted, or extended to adjust the position of the rescuer to correctly arrive at the victim's location
    2. The ladder operator will perform all ladder movements slowly to prevent stress on any part ofthe system

H. Reverse the above steps to raise the victim and the rescuer to safety
    2. **Remember the load limit of the ladder**; this may affect retrieval operations. With a 500- pound tip load limit, two rescuers or a rescuer and one victim may only be raised if within theladder load limit.

7.5 SUMMARY OF HIGH POINT ANCHOR SAFETY PROTOCOLS

A. **READ, UNDERSTAND, AND APPLY** all manufacturer **Danger, Warning,** and **Caution** notices concerning ladder and Lyfe pulley system operation and use\

B. Properly **INSTALL BOTH** the Cross Bar and the shaft and pulley assembly to the end of theladder

C. **Know the load limit of the ladder and Lyfe Pulley System at all times**

1. **Calculate all ladder loads using the Ladder Load Chart**
2. The allowable tip load may be lower depending on the ladder's load chart for the ladder elevation, side tilt, and operating angle
3. The **MAXIMUM CAPACITY** of the Lyfe Pulley System is **500 lbs**
4. The retrieval operation for the rescuer and victim may have to be done **one person at-a-time**

D. **DO NOT** allow the pulley system to come into contact with rocks, cliffs, walls, electric wires,windows, victim, the rescuer, or any other object

E. **DO NOT** rappel from the ladder

F. **NEVER** side load, impact load, or cause tortional loads to the ladder

G. Refer to the SDFD Vertical Rescue Manual for additional information on rope rescue operations

1. Knots
2. Harnesses
3. Stokes rigging
4. Anchor systems
5. Rappel systems
6. Mechanical advantage systems

H. Truck crew responsibilities include:

1. Captain — Ladder operation team leader
2. Engineer — Ladder operator
3. Firefighter — Rigger and main line operator
4. Firefighter — Rigger and belay line operator

I. Rescue operations involving this rigging system may require more personnel than the availabletruck crew to perform the required operational steps

1. After the truck crew completes rigging the ladder rope system, the following personnel or equipment may be required to assist in rescue operations

a. Rescuer
b. Rigger
c. Safety observers
d. Tag line personnel
e. Medical personnel
f. Heavy Rescue personnel
g. Incident Command personnel
h. Law Enforcement personnel
i. Lifeguards
j. Relief personnel
k. 10. Additional apparatus

08
Additional Equipment

This page intentionally left blank

8.1 ADDITIONAL EQUIPMENT

A. Operates and maintains all fixed systems and equipment on the apparatus not specifically
B. Operates and maintains all portable auxiliary equipment assigned to this class apparatus
    1. PERFORMS Monthly Electrical Equipment Maintenance Checks.
C. Hydro-Gen generator operations and specifications
    1. Specifications
        a. Type_____manufacturer_____
        b. Voltage_____Amperage_____Wattage _____
    2. Length of electric reel is_____feet number of reels_____
    3. Location of main circuit pane_____
    4. Location of each circuit breaker for each light and receptacle
    5. On and off operating sequence for standard generator unit
        a. Disconnect loads before starting or securing unit
    6. On and off operating sequence for PTO operated generator units
        a. Aerial device already deployed
        b. Generator operating need to deploy Aerial device
        c. Transmission must be in _____
        d. Disconnect loads prior to engaging or disengaging generator PTO and securing unit from operation
        e. **DO NOT** engage Hydro-Gen generator PTO with High Idle **"ON"**
        f. Restores all systems to correct standby positions

TRACTOR DRAWN AERIAL (TDA) NOTES: