

Santa Barbara City Fire Department - Standard Operating Procedures Training Operations		Code: T-II-3
General Instructions - Engineer		
Chpt: II Hose Lays	Revised: 3/21/13	Pages: 8

I. POLICY

A. To provide a standard method for engineers who operate pumping apparatus. Engineers will perform these operations whenever involved in firefighting operations or while on the drill ground.

II. SPOTTING APPARATUS

A. Watch for electrical lines, obstructions and stay outside of collapse zones.

B. In laying lines from “fire to hydrant”, engineer shall stop with tailboard 5’ beyond the siamese, standpipe connection or appliance.

C. In laying lines from “hydrant to fire”, engineer shall stop with the tailboard 5’ beyond the hydrant.

D. Make sure you are spotting the apparatus in the most advantageous spot for line deployment and water source. It is difficult and time intensive to re-spot an apparatus, do it right the first time!

III. LAYING LINES

A. Watch for electrical lines, obstructions and stay outside of collapse zones.

B. In laying lines from “fire to hydrant”, engineer shall stop with tailboard 5’ beyond the siamese, standpipe connection or appliance.

C. In laying lines from “hydrant to fire”, engineer shall stop with the tailboard 5’ beyond the hydrant.

General Instructions - Engineer

D. When possible try and lay lines to one side of the street to allow other emergency vehicles access to the scene.

E. At large structures (commercial or high rise) allow room for truck company operations.

F. The engineer shall watch and listen for the order to “Go Ahead!”

G. The engineer shall lay lines at a smooth and controlled speed (3-5 mph), watching the mirrors to assure the lines are playing out and not getting hung up.

IV. SETTING CONTROLS IN CAB

A. Engineer shall come to a full stop and set anchor locks

B. Turn on 4 way flashers

C. Make sure radio is on and turned up

D. With foot on brake, put apparatus transmission into neutral.

E. Disengage drive line by putting valve from road to pump,

F. Select appropriate gear for pumping as per apparatus operating instructions.

G. Make sure “OK to pump” light comes on.

H. Once controls have been set, slowly remove foot from brake, assuring pump is engaged.

I. Exit cab

V. SECURING APPARATUS AND SETTING PUMP PANEL.

A. Set chock block(s)

1. Place chocks to the front and rear of duals.

General Instructions - Engineer

- B. Return to pump panel and turn on outside speaker
- C. Turn on panel lights if applicable
- D. Open Tank to Pump valve if applicable
- E. Check to make sure “OK to pump” light is on
- F. Proceed with evolution

VI. PUMPING FROM TANK

- A. Verify that the pump panel shift indicator light is on
- B. Open the tank to pump valve
- C. Smoothly open discharge valve until water is flowing
- D. Run up throttle gradually until the desired pressure is reached.
- E. **WARNING:** If the engine speed increases without an increase in pressure, the pump may be cavitating.
- F. Set relief valve (See relief valve operation)

VII. BASIC PROCEDURES FOR ALL HOSE LAYS

- A. Clear kinks in all lines within 50’ of apparatus
- B. Charge lines slowly and under control
- C. Mark individual discharge gauges with engine company designation to keep track of crews manning lines
- D. Mark and monitor pump panel gauges, specifically compound, oil pressure, water temperature and master pressure gauge. This will provide good baseline readings
- E. Do gasket check before hooking up hose

General Instructions - Engineer

F. When connecting lines to the discharge outlets of the engine;

1. The left hose bed line shall be connected to the left discharge outlet;
2. The right hose bed line shall always be connected to the right discharge outlet. (Both lines should be connected to the engineer's side of the engine whenever possible.)

G. When the engine is required to supply water to standpipe, monitors, deluge sets, ladder pipes, sprinkler systems or any heavy appliance, other than hand lines; the engineer shall connect soft suction or 4" pigtail (See Pumping from hyd. [T-II-12](#)) to hydrant and pump, regardless of hydrant pressure.

VIII. GENERAL SAFETY

A. Close compartment doors after getting equipment

B. Hose lines and supply lines shall be taken around the front or rear of apparatus. Whenever possible, lines shall not pass underneath apparatus unless absolutely necessary.

C. DO NOT leave equipment on the ground. Put unused equipment back in compartments and close doors.

D. Engineers shall not stand on running board and reach into cab to take apparatus out of or put into pump. Engineers shall be seated in the driver's seat with foot on the brake whenever putting apparatus into or out of pump or operating other cab controls while apparatus is running.

E. SAFETY is always the most important priority; remember to open and close all nozzles, discharges, suctions, and hydrants slowly and carefully to prevent water hammer that may burst engine pipes, hoses, and/or water sources. Water hammer may also move charged hoses unexpectedly and cause injuries

General Instructions - Engineer

to firefighters or bystanders standing near hoses.

IX. RELIEF VALVE OPERATION

A. Turn the handwheel clockwise to a position slightly above the desired operating pressure (TPM relief valves have an indicator that shows the approximate pressure setting)

B. After normal operating pressure has been achieved (as indicated on the master pressure gauge and with the pump discharging water), slowly move the handwheel counterclockwise until the relief valve opens, and the amber pilot light comes on.

C. Turn the handwheel slowly clockwise until the pilot light goes out. The relief valve will operate at the set pressure.

D. When the pump is not in operation, turn the handwheel clockwise back to a position slightly above the normal operating pressure.

E. TPM Relief valve Operation from a Hydrant

1. When operating from a positive inlet pressure, during some operational conditions, it may be necessary to adjust the TPM Relief Valve to a point where water is dumping to the ground. The internal relief valve will always open first, and if it cannot handle the pressure rise, the external relief valve will dump water on the ground. When the internal relief valve opens, the panel light will be on, and when the external dump valve opens, the pilot light on the panel will flash.

X. TROUBLESHOOTING

<u>Problem</u>	<u>Cause</u>	<u>Solution</u>
Loss of oil pressure	Broken oil line, low oil, out of fuel, overheated engine	Notify crew and shut down immediately
Overheated engine	Low radiator fluid, hot outside and poor ventilation	Auxiliary cooling or indirect cooling valve, open engine cowling, reduce rpms, notify crew ASAP

General Instructions - Engineer

Losing power, “Melting down”	Inverter on with low rpms	High idle
Pump overheating	High rpm with not enough water flowing	Flow water, open tank fill, open pump cooler valve
Broken supply	Numerous	Notify crew. Switch to tank supply and perform another self b/u or have another engine lay supply line
Broken discharge line	Numerous	Notify crew immediately, shut down line and replace broken section.
Unable to get apparatus into pump	Road to pump valve not engaged, truck in wrong gear or in neutral, anchor locks not set	Check road to pump valve and reset, check transmission gear, set anchor locks
Unable to get pressure at pump	Air lock, apparatus in wrong gear or in neutral, rig not in pump, closed valve, not enough incoming water, relief valve set too low	Pull primer, check valves, get additional water supply, check cab controls, reset relief valve
Low hydrant pressure	Hydrant not open all the way, kink in supply line	Open hydrant fully, remove kinks, get additional supply line from alternate hydrant
Out of tank water	Lack of supply line, not paying attention to water levels	Notify crew ASAP, have another engine give their water, self back up
Cavitation	Pumping more volume than taking in, pump water boiling, dry tank, not watching compound gauge	Increase intake gpm, throttle down, reduce discharge pressure, get additional supply line

General Instructions - Engineer

Inlet pressure is higher than discharge pressure	Hydrant is “Hotter” than the discharge amount, or supplying engine is pumping too much pressure	Open suction fully and gate down on discharge lines, From supplying engine: Have supplying engine reduce pressure until you have 20 psi on your compound gauge.
Relief valve is dumping to ground and light won't go out	Intake pressure much higher than discharge pressure (hot hydrant)	In this instance you may have to gate down on the intake until your incoming pressure is closer to your discharge pressure
Moving a poorly spotted apparatus	Fire gains intensity, wind shifts, poor initial spot	Notify crews of movement, disconnect lines and move apparatus and reconnect lines (may need to add more sections of hose),

XI. PUMPING GUIDELINES

A. SBFD will use the CQ^2L formula for calculating friction loss.

1. C = A set coefficient based on the size of hose
2. Q = GPM divided by 100
3. L = Length of lay divided by 100

B. Refer to the Pumping Guidelines sheet (Form [T-II](#)) for more information.

C. When pumping to lines of unequal length, you will pump to the line with the highest desired pump pressure and gate down on other line(s).

XII. CHANGING FROM TANK SUPPLY TO HYDRANT SUPPLY LINE (CHANGE OVER PROCEDURE:

General Instructions - Engineer

1. Connect supply line to Auxiliary Suction Inlet. It may be beneficial to crack the intake slightly to allow for easier opening of valve.
2. Charge line and remove kinks
3. Slowly open suction while watching discharge pressure to operating line(s).



4. As suction is opened, throttle down to maintain proper pressure to operating line(s) until suction is completely open
5. If throttle is all the way down and suction is still not fully open:
6. Gate down on discharge line(s) while opening suction completely to maintain proper pressure to operating line(s)



7. As soon as suction is fully open and pressures are set to operating lines:
 - a. Close tank to pump valve.
 - b. Open tank fill valve to top off tank. This will assure that you have water to work with if you lose your supply line.
 - c. You may have to adjust the throttle to compensate for tank fill.
 - d. Reset relief valve.
(When inlet pressure is higher than discharge pressure desired, relief valves will not operate.)

